Osi

trunk

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Contents

1 Todo List

Member OsiSolverInterface::getIntegerTolerance () const

This method should be replaced; it's architecturally wrong. This should be an honest dblParam with a keyword. Underlying solvers that do not support integer variables should return false for set and get on this parameter. Underlying solvers that support integrality should add this to the parameters they support, using whatever tolerance is appropriate. -lh, 091021-

2 Deprecated List

Member OsiSolverInterface::columnType (bool refresh=false) const

See #getColType

3 Namespace Index

3.1 Namespace List

Here is a list of all namespaces with brief descriptions:

4 Hierarchical Index

4.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

- std::list< T >::const_reverse_iterator
- std::forward_list< T >::const_reverse_iterator
- std::map< K, T >::const_reverse_iterator
- std::unordered_map< K, T >::const_reverse_iterator
- std::multimap< K, T >::const_reverse_iterator
- std::basic_string< Char >::const_reverse_iterator
- std::unordered_multimap< K, T >::const_reverse_iterator
- std::set< K >::const_reverse_iterator
- std::string::const_reverse_iterator
- std::unordered_set< K >::const_reverse_iterator
- std::multiset< K >::const_reverse_iterator
- std::wstring::const_reverse_iterator
- std::unordered_multiset< K >::const_reverse_iterator
- std::vector< T >::const_reverse_iterator
- std::deque< T >::const_reverse_iterator
- std::deque< T >
- std::error_category
- std::error_code
- std::error_condition
- std::exception
  - std::bad_alloc
  - std::bad_cast
  - std::bad_exception
  - std::bad_typeid
  - std::ios_base::failure
  - std::logic_error
    - std::domain_error
    - std::invalid_argument
    - std::length_error
    - std::out_of_range
  - std::runtime_error
    - std::overflow_error
    - std::range_error
    - std::underflow_error
- std::forward_list< T >

- std::ios_base
  - basic_ios< char >
  - basic_ios< wchar_t >
  - std::basic_ios
    - basic_istream< char >
    - basic_istream< wchar_t >
    - basic_ostream< char >
    - basic_ostream< wchar_t >
    - std::basic_istream
      - basic_ifstream< char >
      - basic_ifstream< wchar_t >
      - basic_iostream< char >
      - basic_iostream< wchar_t >
      - basic_istringstream< char >
      - basic_istringstream< wchar_t >
      - std::basic_ifstream
        - std::ifstream

5 Class Index

5.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

6 File Index

6.1 File List

Here is a list of all files with brief descriptions:

7 Namespace Documentation

7.1 OsiUnitTest Namespace Reference

A namespace so we can define a few 'global' variables to use during tests.

Classes

- class TestOutcome

  A single test outcome record.
- class TestOutcomes

  Utility class to maintain a list of test outcomes.

Functions

- void failureMessage (const std::string &solverName, const std::string &message)

  Print an error message.
- void failureMessage (const OsiSolverInterface &si, const std::string &message)
- void failureMessage (const std::string &solverName, const std::string &testname, const std::string &testcond)

  Print an error message, specifying the test name and condition.
- void failureMessage (const OsiSolverInterface &si, const std::string &testname, const std::string &testcond)
- void testingMessage (const char ∗const msg)

  Print a message.
- bool equivalentVectors (const OsiSolverInterface ∗si1, const OsiSolverInterface ∗si2, double tol, const double ∗v1, const double ∗v2, int size)

  Utility method to check equality.
- bool compareProblems (OsiSolverInterface ∗osi1, OsiSolverInterface ∗osi2)

  Compare two problems for equality.
- bool isEquivalent (const CoinPackedVectorBase &pv, int n, const double ∗fv)

  Compare a packed vector with an expanded vector.
- bool processParameters (int argc, const char ∗∗argv, std::map< std::string, std::string > &parms, const std::map< std::string, int > &ignorekeywords=std::map< std::string, int >())

  Process command line parameters.
- template<typename Component >
  bool OsiUnitTestAssertSeverityExpected (bool condition, const char ∗condition_str, const char ∗filename, int line, const Component &component, const std::string &testname, TestOutcome::SeverityLevel severity, bool expected)

Variables

- unsigned int verbosity

  Verbosity level of unit tests.
- unsigned int haltonerror

  Behaviour on failing a test.
- TestOutcomes outcomes

  Test outcomes.

7.1.1 Detailed Description

A namespace so we can define a few 'global' variables to use during tests.

7.1.2 Function Documentation

7.1.2.1 void OsiUnitTest::failureMessage (const std::string & *solverName*, const std::string & *message*)

Print an error message.

Formatted as "XxxSolverInterface testing issue: message" where Xxx is the string provided as `solverName`.

Flushes std::cout before printing to std::cerr.

7.1.2.2 void OsiUnitTest::failureMessage (const OsiSolverInterface & *si*, const std::string & *message*)

This is an overloaded member function, provided for convenience. It differs from the above function only in what argument(s) it accepts.

7.1.2.3 void OsiUnitTest::failureMessage (const std::string & *solverName*, const std::string & *testname*, const std::string & *testcond*)

Print an error message, specifying the test name and condition.

Formatted as "XxxSolverInterface testing issue: testname failed: testcond" where Xxx is the OsiStrParam::OsiSolverName parameter of the `si`. Flushes std::cout before printing to std::cerr.

7.1.2.4 void OsiUnitTest::failureMessage (const OsiSolverInterface & *si*, const std::string & *testname*, const std::string & *testcond*)

This is an overloaded member function, provided for convenience. It differs from the above function only in what argument(s) it accepts.

7.1.2.5 void OsiUnitTest::testingMessage (const char ∗const *msg*)

Print a message.

Prints the message as given. Flushes std::cout before printing to std::cerr.

7.1.2.6 bool OsiUnitTest::equivalentVectors (const OsiSolverInterface ∗ *si1*, const OsiSolverInterface ∗ *si2*, double *tol*, const double ∗ *v1*, const double ∗ *v2*, int *size*)

Utility method to check equality.

Tests for equality using CoinRelFltEq with tolerance `tol`. Understands the notion of solver infinity and obtains the value for infinity from the solver interfaces supplied as parameters.

7.1.2.7 bool OsiUnitTest::compareProblems (OsiSolverInterface ∗ *osi1*, OsiSolverInterface ∗ *osi2*)

Compare two problems for equality.

Compares the problems held in the two solvers: constraint matrix, row and column bounds, column type, and objective. Rows are checked using upper and lower bounds and using sense, bound, and range.

7.1.2.8 bool OsiUnitTest::isEquivalent (const CoinPackedVectorBase & *pv*, int *n*, const double ∗ *fv*)

Compare a packed vector with an expanded vector.

Checks that all values present in the packed vector are present in the full vector and checks that there are no extra entries in the full vector. Uses CoinRelFltEq with the default tolerance.

7.1.2.9 bool OsiUnitTest::processParameters (int *argc*, const char ** *argv*, std::map< std::string, std::string > & *parms*, const std::map< std::string, int > & *ignorekeywords* = `std::map< std::string, int >()`)

Process command line parameters.

An unrecognised keyword which is not in the `ignorekeywords` map will trigger the help message and a return value of false. For each keyword in `ignorekeywords`, you can specify the number of following parameters that should be ignored.

This should be replaced with the one of the standard CoinUtils parameter mechanisms.

7.1.2.10 template<typename Component > bool OsiUnitTest::OsiUnitTestAssertSeverityExpected (bool *condition*, const char * *condition_str*, const char * *filename*, int *line*, const Component & *component*, const std::string & *testname*, TestOutcome::SeverityLevel *severity*, bool *expected*)

Definition at line 236 of file OsiUnitTests.hpp.

7.1.3 Variable Documentation

7.1.3.1 unsigned int OsiUnitTest::verbosity

Verbosity level of unit tests.

0 (default) for minimal output; larger numbers produce more output

7.1.3.2 unsigned int OsiUnitTest::haltonerror

Behaviour on failing a test.

- 0 (= default) continue
- 1 press any key to continue
- 2 stop with abort()

7.1.3.3 TestOutcomes OsiUnitTest::outcomes

Test outcomes.

A global TestOutcomes object to store test outcomes during the run of the unit test for an OSI.

7.2 soplex Namespace Reference

8 Class Documentation

8.1 OsiSolverInterface::ApplyCutsReturnCode Class Reference

Internal class for obtaining status from the applyCuts method.

```
#include <OsiSolverInterface.hpp>
```

Public Member Functions

Constructors and desctructors

- ApplyCutsReturnCode ()
  Default constructor.
- ApplyCutsReturnCode (const ApplyCutsReturnCode &rhs)
  Copy constructor.
- ApplyCutsReturnCode & operator= (const ApplyCutsReturnCode &rhs)
  Assignment operator.
- ∼ApplyCutsReturnCode ()
  Destructor.

Accessing return code attributes

- int getNumInconsistent () const
  Number of logically inconsistent cuts.
- int getNumInconsistentWrtIntegerModel () const
  Number of cuts inconsistent with the current model.
- int getNumInfeasible () const
  Number of cuts that cause obvious infeasibility.
- int getNumIneffective () const
  Number of redundant or ineffective cuts.
- int getNumApplied () const
  Number of cuts applied.

Private Member Functions

Private methods

- void incrementInternallyInconsistent ()
  Increment logically inconsistent cut counter.
- void incrementExternallyInconsistent ()
  Increment model-inconsistent counter.
- void incrementInfeasible ()
  Increment infeasible cut counter.
- void incrementIneffective ()
  Increment ineffective cut counter.
- void incrementApplied ()
  Increment applied cut counter.

Private Attributes

Private member data

- int intInconsistent_
  Counter for logically inconsistent cuts.
- int extInconsistent_
  Counter for model-inconsistent cuts.
- int infeasible_
  Counter for infeasible cuts.
- int ineffective_
  Counter for ineffective cuts.
- int applied_
  Counter for applied cuts.

Friends

- class OsiSolverInterface
- class OsiClpSolverInterface
- class OsiGrbSolverInterface

8.1.1 Detailed Description

Internal class for obtaining status from the applyCuts method.

Definition at line 74 of file OsiSolverInterface.hpp.

8.1.2 Constructor & Destructor Documentation

8.1.2.1 OsiSolverInterface::ApplyCutsReturnCode::ApplyCutsReturnCode ( ) [inline]

Default constructor.

Definition at line 83 of file OsiSolverInterface.hpp.

8.1.2.2 OsiSolverInterface::ApplyCutsReturnCode::ApplyCutsReturnCode (const ApplyCutsReturnCode & *rhs*) [inline]

Copy constructor.

Definition at line 90 of file OsiSolverInterface.hpp.

8.1.2.3 OsiSolverInterface::ApplyCutsReturnCode::∼ApplyCutsReturnCode ( ) [inline]

Destructor.

Definition at line 109 of file OsiSolverInterface.hpp.

8.1.3 Member Function Documentation

8.1.3.1 ApplyCutsReturnCode& OsiSolverInterface::ApplyCutsReturnCode::operator= (const ApplyCutsReturnCode & *rhs*) [inline]

Assignment operator.

Definition at line 97 of file OsiSolverInterface.hpp.

8.1.3.2 int OsiSolverInterface::ApplyCutsReturnCode::getNumInconsistent ( ) const [inline]

Number of logically inconsistent cuts.

Definition at line 115 of file OsiSolverInterface.hpp.

8.1.3.3 int OsiSolverInterface::ApplyCutsReturnCode::getNumInconsistentWrtIntegerModel ( ) const [inline]

Number of cuts inconsistent with the current model.

Definition at line 118 of file OsiSolverInterface.hpp.

8.1.3.4 int OsiSolverInterface::ApplyCutsReturnCode::getNumInfeasible ( ) const [inline]

Number of cuts that cause obvious infeasibility.

Definition at line 121 of file OsiSolverInterface.hpp.

8.1.3.5 int OsiSolverInterface::ApplyCutsReturnCode::getNumIneffective ( ) const [inline]

Number of redundant or ineffective cuts.

Definition at line 124 of file OsiSolverInterface.hpp.

8.1.3.6 int OsiSolverInterface::ApplyCutsReturnCode::getNumApplied ( ) const [inline]

Number of cuts applied.

Definition at line 127 of file OsiSolverInterface.hpp.

8.1.3.7 void OsiSolverInterface::ApplyCutsReturnCode::incrementInternallyInconsistent ( ) [inline], [private]

Increment logically inconsistent cut counter.

Definition at line 135 of file OsiSolverInterface.hpp.

8.1.3.8 void OsiSolverInterface::ApplyCutsReturnCode::incrementExternallyInconsistent ( ) [inline], [private]

Increment model-inconsistent counter.

Definition at line 137 of file OsiSolverInterface.hpp.

8.1.3.9 void OsiSolverInterface::ApplyCutsReturnCode::incrementInfeasible ( ) [inline], [private]

Increment infeasible cut counter.

Definition at line 139 of file OsiSolverInterface.hpp.

8.1.3.10 void OsiSolverInterface::ApplyCutsReturnCode::incrementIneffective ( ) [inline], [private]

Increment ineffective cut counter.

Definition at line 141 of file OsiSolverInterface.hpp.

8.1.3.11 void OsiSolverInterface::ApplyCutsReturnCode::incrementApplied ( ) [inline], [private]

Increment applied cut counter.

Definition at line 143 of file OsiSolverInterface.hpp.

8.1.4 Friends And Related Function Documentation

8.1.4.1 friend class OsiSolverInterface [friend]

Definition at line 75 of file OsiSolverInterface.hpp.

8.1.4.2 friend class OsiClpSolverInterface [friend]

Definition at line 76 of file OsiSolverInterface.hpp.

8.1.4.3 friend class OsiGrbSolverInterface [friend]

Definition at line 77 of file OsiSolverInterface.hpp.

8.1.5 Member Data Documentation

8.1.5.1 int OsiSolverInterface::ApplyCutsReturnCode::intInconsistent_ [private]

Counter for logically inconsistent cuts.

Definition at line 149 of file OsiSolverInterface.hpp.

8.1.5.2 int OsiSolverInterface::ApplyCutsReturnCode::extInconsistent_ [private]

Counter for model-inconsistent cuts.

Definition at line 151 of file OsiSolverInterface.hpp.

8.1.5.3 int OsiSolverInterface::ApplyCutsReturnCode::infeasible_ [private]

Counter for infeasible cuts.

Definition at line 153 of file OsiSolverInterface.hpp.

8.1.5.4 int OsiSolverInterface::ApplyCutsReturnCode::ineffective_ [private]

Counter for ineffective cuts.

Definition at line 155 of file OsiSolverInterface.hpp.

8.1.5.5 int OsiSolverInterface::ApplyCutsReturnCode::applied_ [private]

Counter for applied cuts.

Definition at line 157 of file OsiSolverInterface.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiSolverInterface.hpp

8.2 OsiCuts::const_iterator Class Reference

Const Iterator.

`#include <OsiCuts.hpp>`

Public Types

- typedef
  std::bidirectional_iterator_tag iterator_category
- typedef OsiCut ∗ value_type
- typedef size_t difference_type
- typedef OsiCut ∗∗ pointer
- typedef OsiCut ∗& reference

Public Member Functions

- const_iterator (const OsiCuts &cuts)
- const_iterator (const const_iterator &src)
- const_iterator & operator= (const const_iterator &rhs)

- ∼const_iterator ()
- const OsiCut ∗ operator∗ () const
- const_iterator operator++ ()
- const_iterator operator++ (int)
- bool operator== (const const_iterator &it) const
- bool operator!= (const const_iterator &it) const
- bool operator< (const const_iterator &it) const

Private Member Functions

- const_iterator ()
- const_iterator begin ()
- const_iterator end ()

Private Attributes

- const OsiCuts ∗ cutsPtr_
- int rowCutIndex_
- int colCutIndex_
- const OsiCut ∗ cutP_

Friends

- class OsiCuts

8.2.1 Detailed Description

Const Iterator.

This is a class for iterating over the collection of cuts.

Definition at line 74 of file OsiCuts.hpp.

8.2.2 Member Typedef Documentation

8.2.2.1 typedef std::bidirectional_iterator_tag **OsiCuts::const_iterator::iterator_category**

Definition at line 77 of file OsiCuts.hpp.

8.2.2.2 typedef **OsiCut**∗ **OsiCuts::const_iterator::value_type**

Definition at line 78 of file OsiCuts.hpp.

8.2.2.3 typedef size_t **OsiCuts::const_iterator::difference_type**

Definition at line 79 of file OsiCuts.hpp.

8.2.2.4 typedef **OsiCut**∗∗ **OsiCuts::const_iterator::pointer**

Definition at line 80 of file OsiCuts.hpp.

8.2.2.5 typedef **OsiCut**∗& **OsiCuts::const_iterator::reference**

Definition at line 81 of file OsiCuts.hpp.

8.2.3 Constructor & Destructor Documentation

8.2.3.1 OsiCuts::const_iterator::const_iterator (const **OsiCuts** & *cuts*)

8.2.3.2 OsiCuts::const_iterator::const_iterator (const **const_iterator** & *src*)

8.2.3.3 OsiCuts::const_iterator::∼const_iterator ( )

8.2.3.4 OsiCuts::const_iterator::const_iterator ( ) `[inline], [private]`

8.2.4 Member Function Documentation

8.2.4.1 **const_iterator**& OsiCuts::const_iterator::operator= (const **const_iterator** & *rhs*)

8.2.4.2 const **OsiCut**∗ OsiCuts::const_iterator::operator∗ ( ) const `[inline]`

Definition at line 88 of file OsiCuts.hpp.

8.2.4.3 **const_iterator** OsiCuts::const_iterator::operator++ ( )

8.2.4.4 **const_iterator** OsiCuts::const_iterator::operator++ (int) `[inline]`

Definition at line 92 of file OsiCuts.hpp.

8.2.4.5 bool OsiCuts::const_iterator::operator== (const **const_iterator** & *it*) const `[inline]`

Definition at line 99 of file OsiCuts.hpp.

8.2.4.6 bool OsiCuts::const_iterator::operator!= (const **const_iterator** & *it*) const `[inline]`

Definition at line 103 of file OsiCuts.hpp.

8.2.4.7 bool OsiCuts::const_iterator::operator< (const **const_iterator** & *it*) const `[inline]`

Definition at line 107 of file OsiCuts.hpp.

8.2.4.8 **const_iterator** OsiCuts::const_iterator::begin ( ) `[private]`

8.2.4.9 **const_iterator** OsiCuts::const_iterator::end ( ) `[private]`

8.2.5 Friends And Related Function Documentation

8.2.5.1 friend class **OsiCuts** `[friend]`

Definition at line 75 of file OsiCuts.hpp.

8.2.6 Member Data Documentation

8.2.6.1 const **OsiCuts**∗ OsiCuts::const_iterator::cutsPtr_ `[private]`

Definition at line 115 of file OsiCuts.hpp.

8.2.6.2 int OsiCuts::const_iterator::rowCutIndex_ [private]

Definition at line 116 of file OsiCuts.hpp.

8.2.6.3 int OsiCuts::const_iterator::colCutIndex_ [private]

Definition at line 117 of file OsiCuts.hpp.

8.2.6.4 const OsiCut∗ OsiCuts::const_iterator::cutP_ [private]

Definition at line 118 of file OsiCuts.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiCuts.hpp

8.3 glp_prob Struct Reference

```
#include <OsiGlpkSolverInterface.hpp>
```

Public Attributes

- double _opaque_prob [100]

8.3.1 Detailed Description

Definition at line 30 of file OsiGlpkSolverInterface.hpp.

8.3.2 Member Data Documentation

8.3.2.1 double glp_prob::_opaque_prob[100]

Definition at line 30 of file OsiGlpkSolverInterface.hpp.

The documentation for this struct was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/OsiGlpk/OsiGlpkSolverInterface.hpp

8.4 OsiCuts::iterator Class Reference

Iterator.

```
#include <OsiCuts.hpp>
```

Public Member Functions

- iterator (OsiCuts &cuts)
- iterator (const iterator &src)
- iterator & operator= (const iterator &rhs)
- ∼iterator ()
- OsiCut ∗ operator∗ () const

- iterator operator++ ()
- iterator operator++ (int)
- bool operator== (const iterator &it) const
- bool operator!= (const iterator &it) const
- bool operator< (const iterator &it) const

Private Member Functions

- iterator ()
- iterator begin ()
- iterator end ()

Private Attributes

- OsiCuts & cuts_
- int rowCutIndex_
- int colCutIndex_
- OsiCut ∗ cutP_

Friends

- class OsiCuts

8.4.1 Detailed Description

Iterator.

This is a class for iterating over the collection of cuts.

Definition at line 30 of file OsiCuts.hpp.

8.4.2 Constructor & Destructor Documentation

8.4.2.1 OsiCuts::iterator::iterator (**OsiCuts** & *cuts*)

8.4.2.2 OsiCuts::iterator::iterator (const **iterator** & *src*)

8.4.2.3 OsiCuts::iterator::∼iterator ( )

8.4.2.4 OsiCuts::iterator::iterator ( ) `[private]`

8.4.3 Member Function Documentation

8.4.3.1 **iterator**& OsiCuts::iterator::operator= (const **iterator** & *rhs*)

8.4.3.2 **OsiCut**∗ OsiCuts::iterator::operator∗ ( ) const `[inline]`

Definition at line 37 of file OsiCuts.hpp.

8.4.3.3 iterator OsiCuts::iterator::operator++ ( )

8.4.3.4 iterator OsiCuts::iterator::operator++ (int) [inline]

Definition at line 40 of file OsiCuts.hpp.

8.4.3.5 bool OsiCuts::iterator::operator== (const iterator & *it*) const [inline]

Definition at line 47 of file OsiCuts.hpp.

8.4.3.6 bool OsiCuts::iterator::operator!= (const iterator & *it*) const [inline]

Definition at line 51 of file OsiCuts.hpp.

8.4.3.7 bool OsiCuts::iterator::operator< (const iterator & *it*) const [inline]

Definition at line 55 of file OsiCuts.hpp.

8.4.3.8 iterator OsiCuts::iterator::begin ( ) [private]

8.4.3.9 iterator OsiCuts::iterator::end ( ) [private]

8.4.4 Friends And Related Function Documentation

8.4.4.1 friend class OsiCuts [friend]

Definition at line 31 of file OsiCuts.hpp.

8.4.5 Member Data Documentation

8.4.5.1 OsiCuts& OsiCuts::iterator::cuts_ [private]

Definition at line 64 of file OsiCuts.hpp.

8.4.5.2 int OsiCuts::iterator::rowCutIndex_ [private]

Definition at line 65 of file OsiCuts.hpp.

8.4.5.3 int OsiCuts::iterator::colCutIndex_ [private]

Definition at line 66 of file OsiCuts.hpp.

8.4.5.4 OsiCut∗ OsiCuts::iterator::cutP_ [private]

Definition at line 67 of file OsiCuts.hpp.

The documentation for this class was generated from the following file:

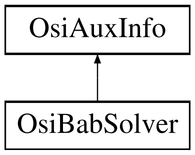
- /home/ted/COIN/trunk/Osi/src/Osi/OsiCuts.hpp

8.5 OsiAuxInfo Class Reference

This class allows for a more structured use of algorithmic tweaking to an OsiSolverInterface.

```
#include <OsiAuxInfo.hpp>
```

Inheritance diagram for OsiAuxInfo:



Public Member Functions

- OsiAuxInfo (void ∗appData=NULL)
- OsiAuxInfo (const OsiAuxInfo &rhs)
- virtual ∼OsiAuxInfo ()
- virtual OsiAuxInfo ∗ clone () const

    Clone.
- OsiAuxInfo & operator= (const OsiAuxInfo &rhs)

    Assignment operator.
- void ∗ getApplicationData () const

    Get application data.

Protected Attributes

- void ∗ appData_

    Pointer to user-defined data structure.

8.5.1 Detailed Description

This class allows for a more structured use of algorithmic tweaking to an OsiSolverInterface.

It is designed to replace the simple use of appData_ pointer.

This has been done to make it easier to use NonLinear solvers and other exotic beasts in a branch and bound mode. After this class definition there is one for a derived class for just such a purpose.

Definition at line 21 of file OsiAuxInfo.hpp.

8.5.2 Constructor & Destructor Documentation

8.5.2.1 OsiAuxInfo::OsiAuxInfo (void ∗ *appData* = `NULL`)

8.5.2.2 OsiAuxInfo::OsiAuxInfo (const **OsiAuxInfo** & *rhs*)

8.5.2.3 virtual OsiAuxInfo::∼OsiAuxInfo ( ) `[virtual]`

8.5.3 Member Function Documentation

8.5.3.1 virtual **OsiAuxInfo**∗ OsiAuxInfo::clone ( ) const `[virtual]`

Clone.

Reimplemented in OsiBabSolver.

8.5.3.2 **OsiAuxInfo**& OsiAuxInfo::operator= (const **OsiAuxInfo** & *rhs*)

Assignment operator.

8.5.3.3 void∗ OsiAuxInfo::getApplicationData ( ) const [inline]

Get application data.

Definition at line 37 of file OsiAuxInfo.hpp.

8.5.4 Member Data Documentation

8.5.4.1 void∗ OsiAuxInfo::appData_ [protected]

Pointer to user-defined data structure.

Definition at line 41 of file OsiAuxInfo.hpp.

The documentation for this class was generated from the following file:

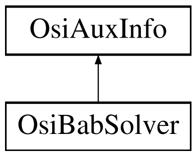
- /home/ted/COIN/trunk/Osi/src/Osi/OsiAuxInfo.hpp

8.6 OsiBabSolver Class Reference

This class allows for the use of more exotic solvers e.g.

`#include <OsiAuxInfo.hpp>`

Inheritance diagram for OsiBabSolver:



Public Member Functions

- OsiBabSolver (int solverType=0)
- OsiBabSolver (const OsiBabSolver &rhs)
- virtual ∼OsiBabSolver ()
- virtual OsiAuxInfo ∗ clone () const

  Clone.
- OsiBabSolver & operator= (const OsiBabSolver &rhs)

  Assignment operator.
- void setSolver (const OsiSolverInterface ∗solver)

  Update solver.
- void setSolver (const OsiSolverInterface &solver)

  Update solver.
- int solution (double &objectiveValue, double ∗newSolution, int numberColumns)

  returns 0 if no heuristic solution, 1 if valid solution with better objective value than one passed in Sets solution values if good, sets objective value numberColumns is size of newSolution
- void setSolution (const double ∗solution, int numberColumns, double objectiveValue)

  Set solution and objective value.
- bool hasSolution (double &solutionValue, double ∗solution)

  returns true if the object stores a solution, false otherwise.

- void setSolverType (int value)

  Sets solver type 0 - normal LP solver 1 - DW - may also return heuristic solutions 2 - NLP solver or similar - can't compute objective value just from solution check solver to see if feasible and what objective value is.
- int solverType () const

  gets solver type 0 - normal LP solver 1 - DW - may also return heuristic solutions 2 - NLP solver or similar - can't compute objective value just from solution check this (rather than solver) to see if feasible and what objective value is
- bool solutionAddsCuts () const

  Return true if getting solution may add cuts so hot start etc will be obsolete.
- bool alwaysTryCutsAtRootNode () const

  Return true if we should try cuts at root even if looks satisfied.
- bool solverAccurate () const

  Returns true if can use solver objective or feasible values, otherwise use mipBound etc.
- bool reducedCostsAccurate () const

  Returns true if can use reduced costs for fixing.
- double mipBound () const

  Get objective (well mip bound)
- bool mipFeasible () const

  Returns true if node feasible.
- void setMipBound (double value)

  Set mip bound (only used for some solvers)
- double bestObjectiveValue () const

  Get objective value of saved solution.
- bool tryCuts () const

  Says whether we want to try cuts at all.
- bool warmStart () const

  Says whether we have a warm start (so can do strong branching)
- int extraCharacteristics () const

  Get bit mask for odd actions of solvers 1 - solution or bound arrays may move in mysterious ways e.g.
- void setExtraCharacteristics (int value)

  Set bit mask for odd actions of solvers 1 - solution or bound arrays may move in mysterious ways e.g.
- const double $*$ beforeLower () const

  Pointer to lower bounds before branch (only if extraCharacteristics set)
- void setBeforeLower (const double $*$array)

  Set pointer to lower bounds before branch (only if extraCharacteristics set)
- const double $*$ beforeUpper () const

  Pointer to upper bounds before branch (only if extraCharacteristics set)
- void setBeforeUpper (const double $*$array)

  Set pointer to upper bounds before branch (only if extraCharacteristics set)

Protected Attributes

- double bestObjectiveValue_

  Objective value of best solution (if there is one) (minimization)
- double mipBound_

  Current lower bound on solution (if $>$ 1.0e50 infeasible)
- const OsiSolverInterface $*$ solver_

  Solver to use for getting/setting solutions etc.

- double ∗ bestSolution_

  Best integer feasible solution.
- const double ∗ beforeLower_

  Pointer to lower bounds before branch (only if extraCharacteristics set)
- const double ∗ beforeUpper_

  Pointer to upper bounds before branch (only if extraCharacteristics set)
- int solverType_

  Solver type 0 - normal LP solver 1 - DW - may also return heuristic solutions 2 - NLP solver or similar - can't compute objective value just from solution check this (rather than solver) to see if feasible and what objective value is.
- int sizeSolution_

  Size of solution.
- int extraCharacteristics_

  Bit mask for odd actions of solvers 1 - solution or bound arrays may move in mysterious ways e.g.

8.6.1 Detailed Description

This class allows for the use of more exotic solvers e.g.

Non-Linear or Volume.

You can derive from this although at present I can't see the need.

Definition at line 49 of file OsiAuxInfo.hpp.

8.6.2 Constructor & Destructor Documentation

8.6.2.1 OsiBabSolver::OsiBabSolver (int *solverType* = 0)

8.6.2.2 OsiBabSolver::OsiBabSolver (const **OsiBabSolver** & *rhs*)

8.6.2.3 virtual OsiBabSolver::∼OsiBabSolver ( ) [virtual]

8.6.3 Member Function Documentation

8.6.3.1 virtual **OsiAuxInfo**∗ OsiBabSolver::clone ( ) const [virtual]

Clone.

Reimplemented from OsiAuxInfo.

8.6.3.2 **OsiBabSolver**& OsiBabSolver::operator= (const **OsiBabSolver** & *rhs*)

Assignment operator.

8.6.3.3 void OsiBabSolver::setSolver (const **OsiSolverInterface** ∗ *solver*) [inline]

Update solver.

Definition at line 65 of file OsiAuxInfo.hpp.

8.6.3.4 void OsiBabSolver::setSolver (const **OsiSolverInterface** & *solver*) [inline]

Update solver.

Definition at line 68 of file OsiAuxInfo.hpp.

8.6.3.5 int OsiBabSolver::solution (double & *objectiveValue,* double ∗ *newSolution,* int *numberColumns*)

returns 0 if no heuristic solution, 1 if valid solution with better objective value than one passed in Sets solution values if good, sets objective value numberColumns is size of newSolution

8.6.3.6 void OsiBabSolver::setSolution (const double ∗ *solution,* int *numberColumns,* double *objectiveValue*)

Set solution and objective value.

Number of columns and optimization direction taken from current solver. Size of solution is numberColumns (may be padded or truncated in function)

8.6.3.7 bool OsiBabSolver::hasSolution (double & *solutionValue,* double ∗ *solution*)

returns true if the object stores a solution, false otherwise.

If there is a solution then solutionValue and solution will be filled out as well. In that case the user needs to allocate solution to be a big enough array.

8.6.3.8 void OsiBabSolver::setSolverType (int *value*) [inline]

Sets solver type 0 - normal LP solver 1 - DW - may also return heuristic solutions 2 - NLP solver or similar - can't compute objective value just from solution check solver to see if feasible and what objective value is.

```
- may also return heuristic solution
```

3 - NLP solver or similar - can't compute objective value just from solution check this (rather than solver) to see if feasible and what objective value is. Using Outer Approximation so called lp based

- may also return heuristic solution 4 - normal solver but cuts are needed for integral solution

Definition at line 102 of file OsiAuxInfo.hpp.

8.6.3.9 int OsiBabSolver::solverType ( ) const [inline]

gets solver type 0 - normal LP solver 1 - DW - may also return heuristic solutions 2 - NLP solver or similar - can't compute objective value just from solution check this (rather than solver) to see if feasible and what objective value is

```
- may also return heuristic solution
```

3 - NLP solver or similar - can't compute objective value just from solution check this (rather than solver) to see if feasible and what objective value is. Using Outer Approximation so called lp based

- may also return heuristic solution 4 - normal solver but cuts are needed for integral solution

Definition at line 116 of file OsiAuxInfo.hpp.

8.6.3.10 bool OsiBabSolver::solutionAddsCuts ( ) const [inline]

Return true if getting solution may add cuts so hot start etc will be obsolete.

Definition at line 120 of file OsiAuxInfo.hpp.

8.6.3.11 bool OsiBabSolver::alwaysTryCutsAtRootNode ( ) const [inline]

Return true if we should try cuts at root even if looks satisfied.

Definition at line 123 of file OsiAuxInfo.hpp.

8.6.3.12 bool OsiBabSolver::solverAccurate ( ) const [inline]

Returns true if can use solver objective or feasible values, otherwise use mipBound etc.

Definition at line 127 of file OsiAuxInfo.hpp.

8.6.3.13 bool OsiBabSolver::reducedCostsAccurate ( ) const [inline]

Returns true if can use reduced costs for fixing.

Definition at line 130 of file OsiAuxInfo.hpp.

8.6.3.14 double OsiBabSolver::mipBound ( ) const

Get objective (well mip bound)

8.6.3.15 bool OsiBabSolver::mipFeasible ( ) const

Returns true if node feasible.

8.6.3.16 void OsiBabSolver::setMipBound (double *value*) [inline]

Set mip bound (only used for some solvers)

Definition at line 137 of file OsiAuxInfo.hpp.

8.6.3.17 double OsiBabSolver::bestObjectiveValue ( ) const [inline]

Get objective value of saved solution.

Definition at line 140 of file OsiAuxInfo.hpp.

8.6.3.18 bool OsiBabSolver::tryCuts ( ) const [inline]

Says whether we want to try cuts at all.

Definition at line 143 of file OsiAuxInfo.hpp.

8.6.3.19 bool OsiBabSolver::warmStart ( ) const [inline]

Says whether we have a warm start (so can do strong branching)

Definition at line 146 of file OsiAuxInfo.hpp.

8.6.3.20 int OsiBabSolver::extraCharacteristics ( ) const [inline]

Get bit mask for odd actions of solvers 1 - solution or bound arrays may move in mysterious ways e.g.

cplex 2 - solver may want bounds before branch

Definition at line 152 of file OsiAuxInfo.hpp.

8.6.3.21 void OsiBabSolver::setExtraCharacteristics (int *value*) [inline]

Set bit mask for odd actions of solvers 1 - solution or bound arrays may move in mysterious ways e.g.

cplex 2 - solver may want bounds before branch

Definition at line 158 of file OsiAuxInfo.hpp.

8.6.3.22 const double∗ OsiBabSolver::beforeLower ( ) const [inline]

Pointer to lower bounds before branch (only if extraCharacteristics set)

Definition at line 161 of file OsiAuxInfo.hpp.

8.6.3.23 void OsiBabSolver::setBeforeLower (const double ∗ *array*) [inline]

Set pointer to lower bounds before branch (only if extraCharacteristics set)

Definition at line 164 of file OsiAuxInfo.hpp.

8.6.3.24 const double∗ OsiBabSolver::beforeUpper ( ) const [inline]

Pointer to upper bounds before branch (only if extraCharacteristics set)

Definition at line 167 of file OsiAuxInfo.hpp.

8.6.3.25 void OsiBabSolver::setBeforeUpper (const double ∗ *array*) [inline]

Set pointer to upper bounds before branch (only if extraCharacteristics set)

Definition at line 170 of file OsiAuxInfo.hpp.

8.6.4 Member Data Documentation

8.6.4.1 double OsiBabSolver::bestObjectiveValue_ [protected]

Objective value of best solution (if there is one) (minimization)

Definition at line 174 of file OsiAuxInfo.hpp.

8.6.4.2 double OsiBabSolver::mipBound_ [protected]

Current lower bound on solution (if $>$ 1.0e50 infeasible)

Definition at line 176 of file OsiAuxInfo.hpp.

8.6.4.3 const OsiSolverInterface∗ OsiBabSolver::solver_ [protected]

Solver to use for getting/setting solutions etc.

Definition at line 178 of file OsiAuxInfo.hpp.

8.6.4.4 double∗ OsiBabSolver::bestSolution_ [protected]

Best integer feasible solution.

Definition at line 180 of file OsiAuxInfo.hpp.

8.6.4.5 const double∗ OsiBabSolver::beforeLower_ [protected]

Pointer to lower bounds before branch (only if extraCharacteristics set)

Definition at line 182 of file OsiAuxInfo.hpp.

8.6.4.6 const double∗ OsiBabSolver::beforeUpper_ [protected]

Pointer to upper bounds before branch (only if extraCharacteristics set)

Definition at line 184 of file OsiAuxInfo.hpp.

8.6.4.7 int OsiBabSolver::solverType_ [protected]

Solver type 0 - normal LP solver 1 - DW - may also return heuristic solutions 2 - NLP solver or similar - can't compute objective value just from solution check this (rather than solver) to see if feasible and what objective value is.

```
- may also return heuristic solution
```

3 - NLP solver or similar - can't compute objective value just from solution check this (rather than solver) to see if feasible and what objective value is. Using Outer Approximation so called lp based

- may also return heuristic solution

Definition at line 196 of file OsiAuxInfo.hpp.

8.6.4.8 int OsiBabSolver::sizeSolution_ [protected]

Size of solution.

Definition at line 198 of file OsiAuxInfo.hpp.

8.6.4.9 int OsiBabSolver::extraCharacteristics_ [protected]

Bit mask for odd actions of solvers 1 - solution or bound arrays may move in mysterious ways e.g.

cplex 2 - solver may want bounds before branch

Definition at line 203 of file OsiAuxInfo.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiAuxInfo.hpp

8.7 OsiBranchingInformation Class Reference

```
#include <OsiBranchingObject.hpp>
```

Public Member Functions

- OsiBranchingInformation ()

  Default Constructor.
- OsiBranchingInformation (const OsiSolverInterface ∗solver, bool normalSolver, bool copySolution=false)

  Useful Constructor (normalSolver true if has matrix etc etc) copySolution true if constructot should make a copy.
- OsiBranchingInformation (const OsiBranchingInformation &)

  Copy constructor.
- OsiBranchingInformation & operator= (const OsiBranchingInformation &rhs)

  Assignment operator.
- virtual OsiBranchingInformation ∗ clone () const

  Clone.
- virtual ∼OsiBranchingInformation ()

  Destructor.

Public Attributes

- int stateOfSearch_

  data
- double objectiveValue_

  Value of objective function (in minimization sense)
- double cutoff_

  Value of objective cutoff (in minimization sense)
- double direction_

  Direction 1.0 for minimization, -1.0 for maximization.
- double integerTolerance_

  Integer tolerance.
- double primalTolerance_

  Primal tolerance.
- double timeRemaining_

  Maximum time remaining before stopping on time.
- double defaultDual_

  Dual to use if row bound violated (if negative then pseudoShadowPrices off)
- const OsiSolverInterface ∗ solver_

  Pointer to solver.
- int numberColumns_

  The number of columns.
- const double ∗ lower_

  Pointer to current lower bounds on columns.
- const double ∗ solution_

  Pointer to current solution.
- const double ∗ upper_

  Pointer to current upper bounds on columns.
- const double ∗ hotstartSolution_

  Highly optional target (hot start) solution.
- const double ∗ pi_

  Pointer to duals.
- const double ∗ rowActivity_

  Pointer to row activity.
- const double ∗ objective_

  Objective.
- const double ∗ rowLower_

  Pointer to current lower bounds on rows.
- const double ∗ rowUpper_

  Pointer to current upper bounds on rows.
- const double ∗ elementByColumn_

  Elements in column copy of matrix.
- const CoinBigIndex ∗ columnStart_

  Column starts.
- const int ∗ columnLength_

  Column lengths.
- const int ∗ row_

Row indices.

- double ∗ usefulRegion_

  Useful region of length CoinMax(numberColumns,2∗numberRows) This is allocated and deleted before OsiObject::infeasibility It is zeroed on entry and should be so on exit It only exists if defaultDual_>=0.0.

- int ∗ indexRegion_

  Useful index region to go with usefulRegion_.

- int numberSolutions_

  Number of solutions found.

- int numberBranchingSolutions_

  Number of branching solutions found (i.e. exclude heuristics)

- int depth_

  Depth in tree.

- bool owningSolution_

  TEMP.

8.7.1 Detailed Description

Definition at line 367 of file OsiBranchingObject.hpp.

8.7.2 Constructor & Destructor Documentation

8.7.2.1 OsiBranchingInformation::OsiBranchingInformation ( )

Default Constructor.

8.7.2.2 OsiBranchingInformation::OsiBranchingInformation (const **OsiSolverInterface** ∗ *solver,* bool *normalSolver,* bool *copySolution* = `false`)

Useful Constructor (normalSolver true if has matrix etc etc) copySolution true if constructot should make a copy.

8.7.2.3 OsiBranchingInformation::OsiBranchingInformation (const **OsiBranchingInformation** &)

Copy constructor.

8.7.2.4 virtual OsiBranchingInformation::∼OsiBranchingInformation ( ) `[virtual]`

Destructor.

8.7.3 Member Function Documentation

8.7.3.1 **OsiBranchingInformation**& OsiBranchingInformation::operator= (const **OsiBranchingInformation** & *rhs*)

Assignment operator.

8.7.3.2 virtual **OsiBranchingInformation**∗ OsiBranchingInformation::clone ( ) const `[virtual]`

Clone.

8.7.4 Member Data Documentation

8.7.4.1 int OsiBranchingInformation::stateOfSearch_

data

State of search 0 - no solution 1 - only heuristic solutions 2 - branched to a solution 3 - no solution but many nodes

Definition at line 402 of file OsiBranchingObject.hpp.

8.7.4.2 double OsiBranchingInformation::objectiveValue_

Value of objective function (in minimization sense)

Definition at line 404 of file OsiBranchingObject.hpp.

8.7.4.3 double OsiBranchingInformation::cutoff_

Value of objective cutoff (in minimization sense)

Definition at line 406 of file OsiBranchingObject.hpp.

8.7.4.4 double OsiBranchingInformation::direction_

Direction 1.0 for minimization, -1.0 for maximization.

Definition at line 408 of file OsiBranchingObject.hpp.

8.7.4.5 double OsiBranchingInformation::integerTolerance_

Integer tolerance.

Definition at line 410 of file OsiBranchingObject.hpp.

8.7.4.6 double OsiBranchingInformation::primalTolerance_

Primal tolerance.

Definition at line 412 of file OsiBranchingObject.hpp.

8.7.4.7 double OsiBranchingInformation::timeRemaining_

Maximum time remaining before stopping on time.

Definition at line 414 of file OsiBranchingObject.hpp.

8.7.4.8 double OsiBranchingInformation::defaultDual_

Dual to use if row bound violated (if negative then pseudoShadowPrices off)

Definition at line 416 of file OsiBranchingObject.hpp.

8.7.4.9 const OsiSolverInterface* OsiBranchingInformation::solver_ [mutable]

Pointer to solver.

Definition at line 418 of file OsiBranchingObject.hpp.

8.7.4.10 int OsiBranchingInformation::numberColumns_

The number of columns.

Definition at line 420 of file OsiBranchingObject.hpp.

8.7.4.11 const double∗ OsiBranchingInformation::lower_ [mutable]

Pointer to current lower bounds on columns.

Definition at line 422 of file OsiBranchingObject.hpp.

8.7.4.12 const double∗ OsiBranchingInformation::solution_ [mutable]

Pointer to current solution.

Definition at line 424 of file OsiBranchingObject.hpp.

8.7.4.13 const double∗ OsiBranchingInformation::upper_ [mutable]

Pointer to current upper bounds on columns.

Definition at line 426 of file OsiBranchingObject.hpp.

8.7.4.14 const double∗ OsiBranchingInformation::hotstartSolution_

Highly optional target (hot start) solution.

Definition at line 428 of file OsiBranchingObject.hpp.

8.7.4.15 const double∗ OsiBranchingInformation::pi_

Pointer to duals.

Definition at line 430 of file OsiBranchingObject.hpp.

8.7.4.16 const double∗ OsiBranchingInformation::rowActivity_

Pointer to row activity.

Definition at line 432 of file OsiBranchingObject.hpp.

8.7.4.17 const double∗ OsiBranchingInformation::objective_

Objective.

Definition at line 434 of file OsiBranchingObject.hpp.

8.7.4.18 const double∗ OsiBranchingInformation::rowLower_

Pointer to current lower bounds on rows.

Definition at line 436 of file OsiBranchingObject.hpp.

8.7.4.19 const double∗ OsiBranchingInformation::rowUpper_

Pointer to current upper bounds on rows.

Definition at line 438 of file OsiBranchingObject.hpp.

8.7.4.20 const double∗ OsiBranchingInformation::elementByColumn_

Elements in column copy of matrix.

Definition at line 440 of file OsiBranchingObject.hpp.

8.7.4.21 const CoinBigIndex∗ OsiBranchingInformation::columnStart_

Column starts.

Definition at line 442 of file OsiBranchingObject.hpp.

8.7.4.22 const int∗ OsiBranchingInformation::columnLength_

Column lengths.

Definition at line 444 of file OsiBranchingObject.hpp.

8.7.4.23 const int∗ OsiBranchingInformation::row_

Row indices.

Definition at line 446 of file OsiBranchingObject.hpp.

8.7.4.24 double∗ OsiBranchingInformation::usefulRegion_

Useful region of length CoinMax(numberColumns,2∗numberRows) This is allocated and deleted before OsiObject::infeasibility It is zeroed on entry and should be so on exit It only exists if defaultDual_>=0.0.

Definition at line 452 of file OsiBranchingObject.hpp.

8.7.4.25 int∗ OsiBranchingInformation::indexRegion_

Useful index region to go with usefulRegion_.

Definition at line 454 of file OsiBranchingObject.hpp.

8.7.4.26 int OsiBranchingInformation::numberSolutions_

Number of solutions found.

Definition at line 456 of file OsiBranchingObject.hpp.

8.7.4.27 int OsiBranchingInformation::numberBranchingSolutions_

Number of branching solutions found (i.e. exclude heuristics)

Definition at line 458 of file OsiBranchingObject.hpp.

8.7.4.28 int OsiBranchingInformation::depth_

Depth in tree.

Definition at line 460 of file OsiBranchingObject.hpp.

8.7.4.29 bool OsiBranchingInformation::owningSolution_

TEMP.

Definition at line 462 of file OsiBranchingObject.hpp.

The documentation for this class was generated from the following file:

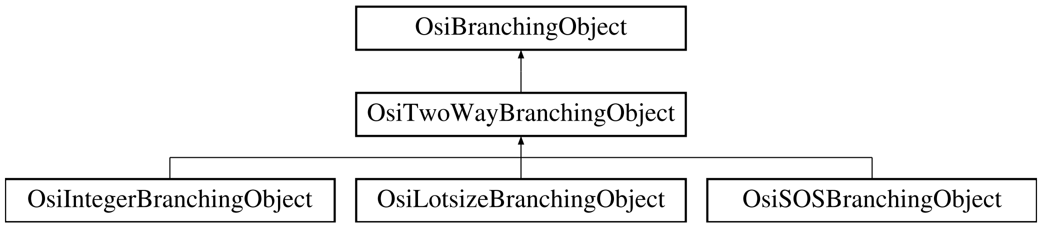
- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.8 OsiBranchingObject Class Reference

Abstract branching object base class.

`#include <OsiBranchingObject.hpp>`

Inheritance diagram for OsiBranchingObject:



Public Member Functions

- OsiBranchingObject ()

  Default Constructor.
- OsiBranchingObject (OsiSolverInterface ∗solver, double value)

  Constructor.
- OsiBranchingObject (const OsiBranchingObject &)

  Copy constructor.
- OsiBranchingObject & operator= (const OsiBranchingObject &rhs)

  Assignment operator.
- virtual OsiBranchingObject ∗ clone () const =0

  Clone.
- virtual ∼OsiBranchingObject ()

  Destructor.
- int numberBranches () const

  The number of branch arms created for this branching object.
- int numberBranchesLeft () const

  The number of branch arms left for this branching object.
- void incrementNumberBranchesLeft ()

  Increment the number of branch arms left for this branching object.
- void setNumberBranchesLeft (int)

  Set the number of branch arms left for this branching object Just for forcing.
- void decrementNumberBranchesLeft ()

  Decrement the number of branch arms left for this branching object.
- virtual double branch (OsiSolverInterface ∗solver)=0

  Execute the actions required to branch, as specified by the current state of the branching object, and advance the object's state.
- virtual double branch ()

  Execute the actions required to branch, as specified by the current state of the branching object, and advance the object's state.
- virtual bool boundBranch () const

  Return true if branch should fix variables.
- int branchIndex () const

Get the state of the branching object This is just the branch index.
- void setBranchingIndex (int branchIndex)

  Set the state of the branching object.
- double value () const

  Current value.
- const OsiObject ∗ originalObject () const

  Return pointer back to object which created.
- void setOriginalObject (const OsiObject ∗object)

  Set pointer back to object which created.
- virtual void checkIsCutoff (double)

  Double checks in case node can change its mind! Returns objective value Can change objective etc.
- int columnNumber () const

  For debug.
- virtual void print (const OsiSolverInterface ∗=NULL) const

  Print something about branch - only if log level high.

Protected Attributes

- double value_

  Current value - has some meaning about branch.
- const OsiObject ∗ originalObject_

  Pointer back to object which created.
- int numberBranches_

  Number of branches.
- short branchIndex_

  The state of the branching object.

8.8.1 Detailed Description

Abstract branching object base class.

In the abstract, an OsiBranchingObject contains instructions for how to branch. We want an abstract class so that we can describe how to branch on simple objects (*e.g.*, integers) and more exotic objects (*e.g.*, cliques or hyperplanes).

The branch() method is the crucial routine: it is expected to be able to step through a set of branch arms, executing the actions required to create each subproblem in turn. The base class is primarily virtual to allow for a wide range of problem modifications.

See OsiObject for an overview of the two classes (OsiObject and OsiBranchingObject) which make up Osi's branching model.

Definition at line 254 of file OsiBranchingObject.hpp.

8.8.2 Constructor & Destructor Documentation

8.8.2.1 OsiBranchingObject::OsiBranchingObject ( )

Default Constructor.

8.8.2.2 OsiBranchingObject::OsiBranchingObject (OsiSolverInterface ∗ *solver,* double *value*)

Constructor.

8.8.2.3 OsiBranchingObject::OsiBranchingObject (const **OsiBranchingObject** &)

Copy constructor.

8.8.2.4 virtual OsiBranchingObject::∼OsiBranchingObject ( ) [virtual]

Destructor.

8.8.3 Member Function Documentation

8.8.3.1 **OsiBranchingObject**& OsiBranchingObject::operator= (const **OsiBranchingObject** & *rhs*)

Assignment operator.

8.8.3.2 virtual **OsiBranchingObject**∗ OsiBranchingObject::clone ( ) const [pure virtual]

Clone.

Implemented in OsiLotsizeBranchingObject, OsiSOSBranchingObject, and OsiIntegerBranchingObject.

8.8.3.3 int OsiBranchingObject::numberBranches ( ) const [inline]

The number of branch arms created for this branching object.

Definition at line 277 of file OsiBranchingObject.hpp.

8.8.3.4 int OsiBranchingObject::numberBranchesLeft ( ) const [inline]

The number of branch arms left for this branching object.

Definition at line 281 of file OsiBranchingObject.hpp.

8.8.3.5 void OsiBranchingObject::incrementNumberBranchesLeft ( ) [inline]

Increment the number of branch arms left for this branching object.

Definition at line 285 of file OsiBranchingObject.hpp.

8.8.3.6 void OsiBranchingObject::setNumberBranchesLeft (int) [inline]

Set the number of branch arms left for this branching object Just for forcing.

Definition at line 291 of file OsiBranchingObject.hpp.

8.8.3.7 void OsiBranchingObject::decrementNumberBranchesLeft ( ) [inline]

Decrement the number of branch arms left for this branching object.

Definition at line 295 of file OsiBranchingObject.hpp.

8.8.3.8 virtual double OsiBranchingObject::branch (**OsiSolverInterface** ∗ *solver*) [pure virtual]

Execute the actions required to branch, as specified by the current state of the branching object, and advance the object's state.

Returns change in guessed objective on next branch

Implemented in OsiLotsizeBranchingObject, OsiSOSBranchingObject, OsiIntegerBranchingObject, and OsiTwoWayBranchingObject.

8.8.3.9 virtual double OsiBranchingObject::branch ( ) `[inline], [virtual]`

Execute the actions required to branch, as specified by the current state of the branching object, and advance the object's state.

Returns change in guessed objective on next branch

Definition at line 309 of file OsiBranchingObject.hpp.

8.8.3.10 virtual bool OsiBranchingObject::boundBranch ( ) const `[inline], [virtual]`

Return true if branch should fix variables.

Definition at line 312 of file OsiBranchingObject.hpp.

8.8.3.11 int OsiBranchingObject::branchIndex ( ) const `[inline]`

Get the state of the branching object This is just the branch index.

Definition at line 317 of file OsiBranchingObject.hpp.

8.8.3.12 void OsiBranchingObject::setBranchingIndex (int *branchIndex*) `[inline]`

Set the state of the branching object.

Definition at line 322 of file OsiBranchingObject.hpp.

8.8.3.13 double OsiBranchingObject::value ( ) const `[inline]`

Current value.

Definition at line 326 of file OsiBranchingObject.hpp.

8.8.3.14 const OsiObject∗ OsiBranchingObject::originalObject ( ) const `[inline]`

Return pointer back to object which created.

Definition at line 330 of file OsiBranchingObject.hpp.

8.8.3.15 void OsiBranchingObject::setOriginalObject (const OsiObject ∗ *object*) `[inline]`

Set pointer back to object which created.

Definition at line 333 of file OsiBranchingObject.hpp.

8.8.3.16 virtual void OsiBranchingObject::checkIsCutoff (double) `[inline], [virtual]`

Double checks in case node can change its mind! Returns objective value Can change objective etc.

Definition at line 338 of file OsiBranchingObject.hpp.

8.8.3.17 int OsiBranchingObject::columnNumber ( ) const

For debug.

8.8.3.18 virtual void OsiBranchingObject::print (const OsiSolverInterface ∗ = `NULL`) const `[inline], [virtual]`

Print something about branch - only if log level high.

Definition at line 343 of file OsiBranchingObject.hpp.

8.8.4 Member Data Documentation

8.8.4.1 double OsiBranchingObject::value_ [protected]

Current value - has some meaning about branch.

Definition at line 348 of file OsiBranchingObject.hpp.

8.8.4.2 const OsiObject∗ OsiBranchingObject::originalObject_ [protected]

Pointer back to object which created.

Definition at line 351 of file OsiBranchingObject.hpp.

8.8.4.3 int OsiBranchingObject::numberBranches_ [protected]

Number of branches.

Definition at line 355 of file OsiBranchingObject.hpp.

8.8.4.4 short OsiBranchingObject::branchIndex_ [protected]

The state of the branching object.

i.e. branch index This starts at 0 when created

Definition at line 360 of file OsiBranchingObject.hpp.

The documentation for this class was generated from the following file:

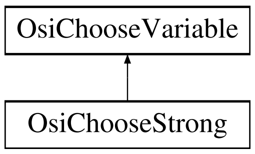
- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.9 OsiChooseStrong Class Reference

This class chooses a variable to branch on.

`#include <OsiChooseVariable.hpp>`

Inheritance diagram for OsiChooseStrong:



Public Member Functions

- OsiChooseStrong ()

  Default Constructor.
- OsiChooseStrong (const OsiSolverInterface ∗solver)

  Constructor from solver (so we can set up arrays etc)
- OsiChooseStrong (const OsiChooseStrong &)

  Copy constructor.
- OsiChooseStrong & operator= (const OsiChooseStrong &rhs)

  Assignment operator.

- virtual OsiChooseVariable ∗ clone () const

  Clone.
- virtual ∼OsiChooseStrong ()

  Destructor.
- virtual int setupList (OsiBranchingInformation ∗info, bool initialize)

  Sets up strong list and clears all if initialize is true.
- virtual int chooseVariable (OsiSolverInterface ∗solver, OsiBranchingInformation ∗info, bool fixVariables)

  Choose a variable Returns - -1 Node is infeasible 0 Normal termination - we have a candidate 1 All looks satisfied - no candidate 2 We can change the bound on a variable - but we also have a strong branching candidate 3 We can change the bound on a variable - but we have a non-strong branching candidate 4 We can change the bound on a variable - no other candidates We can pick up branch from bestObjectIndex() and bestWhichWay() We can pick up a forced branch (can change bound) from firstForcedObjectIndex() and firstForcedWhichWay() If we have a solution then we can pick up from goodObjectiveValue() and goodSolution() If fixVariables is true then 2,3,4 are all really same as problem changed.
- int shadowPriceMode () const

  Pseudo Shadow Price mode 0 - off 1 - use if no strong info 2 - use if strong not trusted 3 - use even if trusted.
- void setShadowPriceMode (int value)

  Set Shadow price mode.
- const OsiPseudoCosts & pseudoCosts () const

  Accessor method to pseudo cost object.
- OsiPseudoCosts & pseudoCosts ()

  Accessor method to pseudo cost object.
- int numberBeforeTrusted () const

  A feww pass-through methods to access members of pseudoCosts_ as if they were members of OsiChooseStrong object.
- void setNumberBeforeTrusted (int value)
- int numberObjects () const

Protected Member Functions

- int doStrongBranching (OsiSolverInterface ∗solver, OsiBranchingInformation ∗info, int numberToDo, int returnCriterion)

  This is a utility function which does strong branching on a list of objects and stores the results in OsiHotInfo.objects.
- void resetResults (int num)

  Clear out the results array.

Protected Attributes

- int shadowPriceMode_

  Pseudo Shadow Price mode 0 - off 1 - use and multiply by strong info 2 - use.
- OsiPseudoCosts pseudoCosts_

  The pseudo costs for the chooser.
- OsiHotInfo ∗ results_

  The results of the strong branching done on the candidates where the pseudocosts were not sufficient.
- int numResults_

  The number of OsiHotInfo objetcs that contain information.

8.9.1 Detailed Description

This class chooses a variable to branch on.

This chooses the variable and direction with reliability strong branching.

The flow is : a) initialize the process. This decides on strong branching list and stores indices of all infeasible objects b) do strong branching on list. If list is empty then just choose one candidate and return without strong branching. If not empty then go through list and return best. However we may find that the node is infeasible or that we can fix a variable. If so we return and it is up to user to call again (after fixing a variable).

Definition at line 318 of file OsiChooseVariable.hpp.

8.9.2 Constructor & Destructor Documentation

8.9.2.1 OsiChooseStrong::OsiChooseStrong ( )

Default Constructor.

8.9.2.2 OsiChooseStrong::OsiChooseStrong (const **OsiSolverInterface** ∗ *solver*)

Constructor from solver (so we can set up arrays etc)

8.9.2.3 OsiChooseStrong::OsiChooseStrong (const **OsiChooseStrong** &)

Copy constructor.

8.9.2.4 virtual OsiChooseStrong::∼OsiChooseStrong ( ) `[virtual]`

Destructor.

8.9.3 Member Function Documentation

8.9.3.1 **OsiChooseStrong**& OsiChooseStrong::operator= (const **OsiChooseStrong** & *rhs*)

Assignment operator.

8.9.3.2 virtual **OsiChooseVariable**∗ OsiChooseStrong::clone ( ) const `[virtual]`

Clone.

Reimplemented from OsiChooseVariable.

8.9.3.3 virtual int OsiChooseStrong::setupList (**OsiBranchingInformation** ∗ *info*, bool *initialize*) `[virtual]`

Sets up strong list and clears all if initialize is true.

Returns number of infeasibilities. If returns -1 then has worked out node is infeasible!

Reimplemented from OsiChooseVariable.

8.9.3.4 virtual int OsiChooseStrong::chooseVariable (**OsiSolverInterface** ∗ *solver*, **OsiBranchingInformation** ∗ *info*, bool *fixVariables*) `[virtual]`

Choose a variable Returns - -1 Node is infeasible 0 Normal termination - we have a candidate 1 All looks satisfied - no candidate 2 We can change the bound on a variable - but we also have a strong branching candidate 3 We can change the bound on a variable - but we have a non-strong branching candidate 4 We can change the bound on a variable - no other candidates We can pick up branch from bestObjectIndex() and bestWhichWay() We can pick up a forced branch (can change bound) from firstForcedObjectIndex() and firstForcedWhichWay() If we have a solution then we can pick up from goodObjectiveValue() and goodSolution() If fixVariables is true then 2,3,4 are all really same as problem changed.

Reimplemented from OsiChooseVariable.

8.9.3.5 int OsiChooseStrong::shadowPriceMode ( ) const [inline]

Pseudo Shadow Price mode 0 - off 1 - use if no strong info 2 - use if strong not trusted 3 - use even if trusted.

Definition at line 366 of file OsiChooseVariable.hpp.

8.9.3.6 void OsiChooseStrong::setShadowPriceMode (int *value*) [inline]

Set Shadow price mode.

Definition at line 369 of file OsiChooseVariable.hpp.

8.9.3.7 const **OsiPseudoCosts**& OsiChooseStrong::pseudoCosts ( ) const [inline]

Accessor method to pseudo cost object.

Definition at line 373 of file OsiChooseVariable.hpp.

8.9.3.8 **OsiPseudoCosts**& OsiChooseStrong::pseudoCosts ( ) [inline]

Accessor method to pseudo cost object.

Definition at line 377 of file OsiChooseVariable.hpp.

8.9.3.9 int OsiChooseStrong::numberBeforeTrusted ( ) const [inline]

A feww pass-through methods to access members of pseudoCosts_ as if they were members of OsiChooseStrong object.

Definition at line 382 of file OsiChooseVariable.hpp.

8.9.3.10 void OsiChooseStrong::setNumberBeforeTrusted (int *value*) [inline]

Definition at line 384 of file OsiChooseVariable.hpp.

8.9.3.11 int OsiChooseStrong::numberObjects ( ) const [inline]

Definition at line 386 of file OsiChooseVariable.hpp.

8.9.3.12 int OsiChooseStrong::doStrongBranching (**OsiSolverInterface** ∗ *solver*, **OsiBranchingInformation** ∗ *info*, int *numberToDo*, int *returnCriterion*) [protected]

This is a utility function which does strong branching on a list of objects and stores the results in OsiHotInfo.objects.

On entry the object sequence is stored in the OsiHotInfo object and maybe more. It returns - -1 - one branch was infeasible both ways 0 - all inspected - nothing can be fixed 1 - all inspected - some can be fixed (returnCriterion==0) 2 - may be returning early - one can be fixed (last one done) (returnCriterion==1) 3 - returning because max time

8.9.3.13 void OsiChooseStrong::resetResults (int *num*) [protected]

Clear out the results array.

8.9.4 Member Data Documentation

8.9.4.1 int OsiChooseStrong::shadowPriceMode_ [protected]

Pseudo Shadow Price mode 0 - off 1 - use and multiply by strong info 2 - use.

Definition at line 416 of file OsiChooseVariable.hpp.

8.9.4.2 OsiPseudoCosts OsiChooseStrong::pseudoCosts_ [protected]

The pseudo costs for the chooser.

Definition at line 419 of file OsiChooseVariable.hpp.

8.9.4.3 OsiHotInfo∗ OsiChooseStrong::results_ [protected]

The results of the strong branching done on the candidates where the pseudocosts were not sufficient.

Definition at line 423 of file OsiChooseVariable.hpp.

8.9.4.4 int OsiChooseStrong::numResults_ [protected]

The number of OsiHotInfo objetcs that contain information.

Definition at line 425 of file OsiChooseVariable.hpp.

The documentation for this class was generated from the following file:

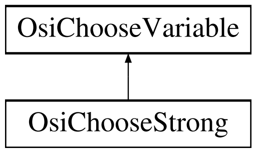
- /home/ted/COIN/trunk/Osi/src/Osi/OsiChooseVariable.hpp

8.10 OsiChooseVariable Class Reference

This class chooses a variable to branch on.

`#include <OsiChooseVariable.hpp>`

Inheritance diagram for OsiChooseVariable:



Public Member Functions

- OsiChooseVariable ()

  Default Constructor.
- OsiChooseVariable (const OsiSolverInterface ∗solver)

  Constructor from solver (so we can set up arrays etc)
- OsiChooseVariable (const OsiChooseVariable &)

  Copy constructor.
- OsiChooseVariable & operator= (const OsiChooseVariable &rhs)

  Assignment operator.
- virtual OsiChooseVariable ∗ clone () const

  Clone.
- virtual ∼OsiChooseVariable ()

Destructor.

- virtual int setupList (OsiBranchingInformation ∗info, bool initialize)

  Sets up strong list and clears all if initialize is true.
- virtual int chooseVariable (OsiSolverInterface ∗solver, OsiBranchingInformation ∗info, bool fixVariables)

  Choose a variable Returns - -1 Node is infeasible 0 Normal termination - we have a candidate 1 All looks satisfied - no candidate 2 We can change the bound on a variable - but we also have a strong branching candidate 3 We can change the bound on a variable - but we have a non-strong branching candidate 4 We can change the bound on a variable - no other candidates We can pick up branch from bestObjectIndex() and bestWhichWay() We can pick up a forced branch (can change bound) from firstForcedObjectIndex() and firstForcedWhichWay() If we have a solution then we can pick up from goodObjectiveValue() and goodSolution() If fixVariables is true then 2,3,4 are all really same as problem changed.
- virtual bool feasibleSolution (const OsiBranchingInformation ∗info, const double ∗solution, int numberObjects, const OsiObject ∗∗objects)

  Returns true if solution looks feasible against given objects.
- void saveSolution (const OsiSolverInterface ∗solver)

  Saves a good solution.
- void clearGoodSolution ()

  Clears out good solution after use.
- virtual void updateInformation (const OsiBranchingInformation ∗info, int branch, OsiHotInfo ∗hotInfo)

  Given a candidate fill in useful information e.g. estimates.
- virtual void updateInformation (int whichObject, int branch, double changeInObjective, double changeInValue, int status)

  Given a branch fill in useful information e.g. estimates.
- double goodObjectiveValue () const

  Objective value for feasible solution.
- double upChange () const

  Estimate of up change or change on chosen if n-way.
- double downChange () const

  Estimate of down change or max change on other possibilities if n-way.
- const double ∗ goodSolution () const

  Good solution - deleted by finalize.
- int bestObjectIndex () const

  Index of chosen object.
- void setBestObjectIndex (int value)

  Set index of chosen object.
- int bestWhichWay () const

  Preferred way of chosen object.
- void setBestWhichWay (int value)

  Set preferred way of chosen object.
- int firstForcedObjectIndex () const

  Index of forced object.
- void setFirstForcedObjectIndex (int value)

  Set index of forced object.
- int firstForcedWhichWay () const

  Preferred way of forced object.
- void setFirstForcedWhichWay (int value)

  Set preferred way of forced object.
- int numberUnsatisfied () const

  Get the number of objects unsatisfied at this node - accurate on first pass.

- int numberStrong () const

  Number of objects to choose for strong branching.
- void setNumberStrong (int value)

  Set number of objects to choose for strong branching.
- int numberOnList () const

  Number left on strong list.
- int numberStrongDone () const

  Number of strong branches actually done.
- int numberStrongIterations () const

  Number of strong iterations actually done.
- int numberStrongFixed () const

  Number of strong branches which changed bounds.
- const int ∗ candidates () const

  List of candidates.
- bool trustStrongForBound () const

  Trust results from strong branching for changing bounds.
- void setTrustStrongForBound (bool yesNo)

  Set trust results from strong branching for changing bounds.
- bool trustStrongForSolution () const

  Trust results from strong branching for valid solution.
- void setTrustStrongForSolution (bool yesNo)

  Set trust results from strong branching for valid solution.
- void setSolver (const OsiSolverInterface ∗solver)

  Set solver and redo arrays.
- int status () const

  Return status - -1 Node is infeasible 0 Normal termination - we have a candidate 1 All looks satisfied - no candidate 2 We can change the bound on a variable - but we also have a strong branching candidate 3 We can change the bound on a variable - but we have a non-strong branching candidate 4 We can change the bound on a variable - no other candidates We can pick up branch from bestObjectIndex() and bestWhichWay() We can pick up a forced branch (can change bound) from firstForcedObjectIndex() and firstForcedWhichWay() If we have a solution then we can pick up from goodObjectiveValue() and goodSolution()
- void setStatus (int value)

Protected Attributes

- double goodObjectiveValue_

  Objective value for feasible solution.
- double upChange_

  Estimate of up change or change on chosen if n-way.
- double downChange_

  Estimate of down change or max change on other possibilities if n-way.
- double ∗ goodSolution_

  Good solution - deleted by finalize.
- int ∗ list_

  List of candidates.
- double ∗ useful_

  Useful array (for sorting etc)
- const OsiSolverInterface ∗ solver_

Pointer to solver.

- int status_
- int bestObjectIndex_

  Index of chosen object.
- int bestWhichWay_

  Preferred way of chosen object.
- int firstForcedObjectIndex_

  Index of forced object.
- int firstForcedWhichWay_

  Preferred way of forced object.
- int numberUnsatisfied_

  The number of objects unsatisfied at this node.
- int numberStrong_

  Number of objects to choose for strong branching.
- int numberOnList_

  Number left on strong list.
- int numberStrongDone_

  Number of strong branches actually done.
- int numberStrongIterations_

  Number of strong iterations actually done.
- int numberStrongFixed_

  Number of bound changes due to strong branching.
- bool trustStrongForBound_

  List of unsatisfied objects - first numberOnList_ for strong branching Trust results from strong branching for changing bounds.
- bool trustStrongForSolution_

  Trust results from strong branching for valid solution.

8.10.1 Detailed Description

This class chooses a variable to branch on.

The base class just chooses the variable and direction without strong branching but it has information which would normally be used by strong branching e.g. to re-enter having fixed a variable but using same candidates for strong branching.

The flow is : a) initialize the process. This decides on strong branching list and stores indices of all infeasible objects b) do strong branching on list. If list is empty then just choose one candidate and return without strong branching. If not empty then go through list and return best. However we may find that the node is infeasible or that we can fix a variable. If so we return and it is up to user to call again (after fixing a variable).

Definition at line 33 of file OsiChooseVariable.hpp.

8.10.2 Constructor & Destructor Documentation

8.10.2.1 OsiChooseVariable::OsiChooseVariable ( )

Default Constructor.

8.10.2.2 OsiChooseVariable::OsiChooseVariable (const **OsiSolverInterface** $*$ *solver*)

Constructor from solver (so we can set up arrays etc)

8.10.2.3 OsiChooseVariable::OsiChooseVariable (const **OsiChooseVariable** &)

Copy constructor.

8.10.2.4 virtual OsiChooseVariable::∼OsiChooseVariable ( ) [virtual]

Destructor.

8.10.3 Member Function Documentation

8.10.3.1 **OsiChooseVariable**& OsiChooseVariable::operator= (const **OsiChooseVariable** & *rhs*)

Assignment operator.

8.10.3.2 virtual **OsiChooseVariable**∗ OsiChooseVariable::clone ( ) const [virtual]

Clone.

Reimplemented in OsiChooseStrong.

8.10.3.3 virtual int OsiChooseVariable::setupList (**OsiBranchingInformation** ∗ *info,* bool *initialize*) [virtual]

Sets up strong list and clears all if initialize is true.

Returns number of infeasibilities. If returns -1 then has worked out node is infeasible!

Reimplemented in OsiChooseStrong.

8.10.3.4 virtual int OsiChooseVariable::chooseVariable (**OsiSolverInterface** ∗ *solver,* **OsiBranchingInformation** ∗ *info,* bool *fixVariables*) [virtual]

Choose a variable Returns - -1 Node is infeasible 0 Normal termination - we have a candidate 1 All looks satisfied - no candidate 2 We can change the bound on a variable - but we also have a strong branching candidate 3 We can change the bound on a variable - but we have a non-strong branching candidate 4 We can change the bound on a variable - no other candidates We can pick up branch from bestObjectIndex() and bestWhichWay() We can pick up a forced branch (can change bound) from firstForcedObjectIndex() and firstForcedWhichWay() If we have a solution then we can pick up from goodObjectiveValue() and goodSolution() If fixVariables is true then 2,3,4 are all really same as problem changed.

Reimplemented in OsiChooseStrong.

8.10.3.5 virtual bool OsiChooseVariable::feasibleSolution (const **OsiBranchingInformation** ∗ *info,* const double ∗ *solution,* int *numberObjects,* const **OsiObject** ∗∗ *objects*) [virtual]

Returns true if solution looks feasible against given objects.

8.10.3.6 void OsiChooseVariable::saveSolution (const **OsiSolverInterface** ∗ *solver*)

Saves a good solution.

8.10.3.7 void OsiChooseVariable::clearGoodSolution ( )

Clears out good solution after use.

8.10.3.8 virtual void OsiChooseVariable::updateInformation (const **OsiBranchingInformation** ∗ *info,* int *branch,* **OsiHotInfo** ∗ *hotInfo*) [virtual]

Given a candidate fill in useful information e.g. estimates.

8.10.3.9 virtual void OsiChooseVariable::updateInformation (int *whichObject,* int *branch,* double *changeInObjective,* double *changeInValue,* int *status*) [virtual]

Given a branch fill in useful information e.g. estimates.

8.10.3.10 double OsiChooseVariable::goodObjectiveValue ( ) const [inline]

Objective value for feasible solution.

Definition at line 93 of file OsiChooseVariable.hpp.

8.10.3.11 double OsiChooseVariable::upChange ( ) const [inline]

Estimate of up change or change on chosen if n-way.

Definition at line 96 of file OsiChooseVariable.hpp.

8.10.3.12 double OsiChooseVariable::downChange ( ) const [inline]

Estimate of down change or max change on other possibilities if n-way.

Definition at line 99 of file OsiChooseVariable.hpp.

8.10.3.13 const double∗ OsiChooseVariable::goodSolution ( ) const [inline]

Good solution - deleted by finalize.

Definition at line 102 of file OsiChooseVariable.hpp.

8.10.3.14 int OsiChooseVariable::bestObjectIndex ( ) const [inline]

Index of chosen object.

Definition at line 105 of file OsiChooseVariable.hpp.

8.10.3.15 void OsiChooseVariable::setBestObjectIndex (int *value*) [inline]

Set index of chosen object.

Definition at line 108 of file OsiChooseVariable.hpp.

8.10.3.16 int OsiChooseVariable::bestWhichWay ( ) const [inline]

Preferred way of chosen object.

Definition at line 111 of file OsiChooseVariable.hpp.

8.10.3.17 void OsiChooseVariable::setBestWhichWay (int *value*) [inline]

Set preferred way of chosen object.

Definition at line 114 of file OsiChooseVariable.hpp.

8.10.3.18 int OsiChooseVariable::firstForcedObjectIndex ( ) const [inline]

Index of forced object.

Definition at line 117 of file OsiChooseVariable.hpp.

8.10.3.19 void OsiChooseVariable::setFirstForcedObjectIndex (int *value*) [inline]

Set index of forced object.

Definition at line 120 of file OsiChooseVariable.hpp.

8.10.3.20 int OsiChooseVariable::firstForcedWhichWay ( ) const [inline]

Preferred way of forced object.

Definition at line 123 of file OsiChooseVariable.hpp.

8.10.3.21 void OsiChooseVariable::setFirstForcedWhichWay (int *value*) [inline]

Set preferred way of forced object.

Definition at line 126 of file OsiChooseVariable.hpp.

8.10.3.22 int OsiChooseVariable::numberUnsatisfied ( ) const [inline]

Get the number of objects unsatisfied at this node - accurate on first pass.

Definition at line 129 of file OsiChooseVariable.hpp.

8.10.3.23 int OsiChooseVariable::numberStrong ( ) const [inline]

Number of objects to choose for strong branching.

Definition at line 132 of file OsiChooseVariable.hpp.

8.10.3.24 void OsiChooseVariable::setNumberStrong (int *value*) [inline]

Set number of objects to choose for strong branching.

Definition at line 135 of file OsiChooseVariable.hpp.

8.10.3.25 int OsiChooseVariable::numberOnList ( ) const [inline]

Number left on strong list.

Definition at line 138 of file OsiChooseVariable.hpp.

8.10.3.26 int OsiChooseVariable::numberStrongDone ( ) const [inline]

Number of strong branches actually done.

Definition at line 141 of file OsiChooseVariable.hpp.

8.10.3.27 int OsiChooseVariable::numberStrongIterations ( ) const [inline]

Number of strong iterations actually done.

Definition at line 144 of file OsiChooseVariable.hpp.

8.10.3.28 int OsiChooseVariable::numberStrongFixed ( ) const [inline]

Number of strong branches which changed bounds.

Definition at line 147 of file OsiChooseVariable.hpp.

8.10.3.29 const int* OsiChooseVariable::candidates ( ) const [inline]

List of candidates.

Definition at line 150 of file OsiChooseVariable.hpp.

8.10.3.30 bool OsiChooseVariable::trustStrongForBound ( ) const [inline]

Trust results from strong branching for changing bounds.

Definition at line 153 of file OsiChooseVariable.hpp.

8.10.3.31 void OsiChooseVariable::setTrustStrongForBound (bool *yesNo*) [inline]

Set trust results from strong branching for changing bounds.

Definition at line 156 of file OsiChooseVariable.hpp.

8.10.3.32 bool OsiChooseVariable::trustStrongForSolution ( ) const [inline]

Trust results from strong branching for valid solution.

Definition at line 159 of file OsiChooseVariable.hpp.

8.10.3.33 void OsiChooseVariable::setTrustStrongForSolution (bool *yesNo*) [inline]

Set trust results from strong branching for valid solution.

Definition at line 162 of file OsiChooseVariable.hpp.

8.10.3.34 void OsiChooseVariable::setSolver (const OsiSolverInterface $*$ *solver*)

Set solver and redo arrays.

8.10.3.35 int OsiChooseVariable::status ( ) const [inline]

Return status - -1 Node is infeasible 0 Normal termination - we have a candidate 1 All looks satisfied - no candidate 2 We can change the bound on a variable - but we also have a strong branching candidate 3 We can change the bound on a variable - but we have a non-strong branching candidate 4 We can change the bound on a variable - no other candidates We can pick up branch from bestObjectIndex() and bestWhichWay() We can pick up a forced branch (can change bound) from firstForcedObjectIndex() and firstForcedWhichWay() If we have a solution then we can pick up from goodObjectiveValue() and goodSolution()

Definition at line 177 of file OsiChooseVariable.hpp.

8.10.3.36 void OsiChooseVariable::setStatus (int *value*) [inline]

Definition at line 179 of file OsiChooseVariable.hpp.

8.10.4 Member Data Documentation

8.10.4.1 double OsiChooseVariable::goodObjectiveValue_ [protected]

Objective value for feasible solution.

Definition at line 186 of file OsiChooseVariable.hpp.

8.10.4.2 double OsiChooseVariable::upChange_ [protected]

Estimate of up change or change on chosen if n-way.

Definition at line 188 of file OsiChooseVariable.hpp.

8.10.4.3 double OsiChooseVariable::downChange_ [protected]

Estimate of down change or max change on other possibilities if n-way.

Definition at line 190 of file OsiChooseVariable.hpp.

8.10.4.4 double* OsiChooseVariable::goodSolution_ [protected]

Good solution - deleted by finalize.

Definition at line 192 of file OsiChooseVariable.hpp.

8.10.4.5 int* OsiChooseVariable::list_ [protected]

List of candidates.

Definition at line 194 of file OsiChooseVariable.hpp.

8.10.4.6 double* OsiChooseVariable::useful_ [protected]

Useful array (for sorting etc)

Definition at line 196 of file OsiChooseVariable.hpp.

8.10.4.7 const OsiSolverInterface* OsiChooseVariable::solver_ [protected]

Pointer to solver.

Definition at line 198 of file OsiChooseVariable.hpp.

8.10.4.8 int OsiChooseVariable::status_ [protected]

Definition at line 207 of file OsiChooseVariable.hpp.

8.10.4.9 int OsiChooseVariable::bestObjectIndex_ [protected]

Index of chosen object.

Definition at line 209 of file OsiChooseVariable.hpp.

8.10.4.10 int OsiChooseVariable::bestWhichWay_ [protected]

Preferred way of chosen object.

Definition at line 211 of file OsiChooseVariable.hpp.

8.10.4.11 int OsiChooseVariable::firstForcedObjectIndex_ [protected]

Index of forced object.

Definition at line 213 of file OsiChooseVariable.hpp.

8.10.4.12 int OsiChooseVariable::firstForcedWhichWay_ [protected]

Preferred way of forced object.

Definition at line 215 of file OsiChooseVariable.hpp.

8.10.4.13 int OsiChooseVariable::numberUnsatisfied_ [protected]

The number of objects unsatisfied at this node.

Definition at line 217 of file OsiChooseVariable.hpp.

8.10.4.14 int OsiChooseVariable::numberStrong_ `[protected]`

Number of objects to choose for strong branching.

Definition at line 219 of file OsiChooseVariable.hpp.

8.10.4.15 int OsiChooseVariable::numberOnList_ `[protected]`

Number left on strong list.

Definition at line 221 of file OsiChooseVariable.hpp.

8.10.4.16 int OsiChooseVariable::numberStrongDone_ `[protected]`

Number of strong branches actually done.

Definition at line 223 of file OsiChooseVariable.hpp.

8.10.4.17 int OsiChooseVariable::numberStrongIterations_ `[protected]`

Number of strong iterations actually done.

Definition at line 225 of file OsiChooseVariable.hpp.

8.10.4.18 int OsiChooseVariable::numberStrongFixed_ `[protected]`

Number of bound changes due to strong branching.

Definition at line 227 of file OsiChooseVariable.hpp.

8.10.4.19 bool OsiChooseVariable::trustStrongForBound_ `[protected]`

List of unsatisfied objects - first numberOnList_ for strong branching Trust results from strong branching for changing bounds.

Definition at line 230 of file OsiChooseVariable.hpp.

8.10.4.20 bool OsiChooseVariable::trustStrongForSolution_ `[protected]`

Trust results from strong branching for valid solution.

Definition at line 232 of file OsiChooseVariable.hpp.

The documentation for this class was generated from the following file:

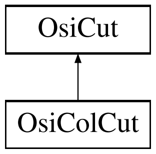
- /home/ted/COIN/trunk/Osi/src/Osi/OsiChooseVariable.hpp

8.11 OsiColCut Class Reference

Column Cut Class.

`#include <OsiColCut.hpp>`

Inheritance diagram for OsiColCut:



Public Member Functions

Setting column bounds

- void setLbs (int nElements, const int ∗colIndices, const double ∗lbElements)
  Set column lower bounds.
- void setLbs (const CoinPackedVector &lbs)
  Set column lower bounds from a packed vector.
- void setUbs (int nElements, const int ∗colIndices, const double ∗ubElements)
  Set column upper bounds.
- void setUbs (const CoinPackedVector &ubs)
  Set column upper bounds from a packed vector.

Getting column bounds

- const CoinPackedVector & lbs () const
  Get column lower bounds.
- const CoinPackedVector & ubs () const
  Get column upper bounds.

Comparison operators

- virtual bool operator== (const OsiColCut &rhs) const
  `equal - true if lower bounds, upper bounds,`
  and OsiCut are equal.
- virtual bool operator!= (const OsiColCut &rhs) const
  not equal

Sanity checks on cut

- virtual bool consistent () const
  Returns true if the cut is consistent with respect to itself.
- virtual bool consistent (const OsiSolverInterface &im) const
  `Returns true if cut is consistent with respect to the solver`
  interface's model.
- virtual bool infeasible (const OsiSolverInterface &im) const
  `Returns true if the cut is infeasible with respect to its bounds and the`
  column bounds in the solver interface's models.
- virtual double violated (const double ∗solution) const
  Returns infeasibility of the cut with respect to solution passed in i.e.

Constructors and destructors

- OsiColCut & operator= (const OsiColCut &rhs)
  Assignment operator.
- OsiColCut (const OsiColCut &)
  Copy constructor.

- OsiColCut ()
  Default Constructor.
- virtual OsiColCut ∗ clone () const
  Clone.
- virtual ∼OsiColCut ()
  Destructor.

Debug stuff

- virtual void print () const
  Print cuts in collection.

Private Attributes

Private member data

- CoinPackedVector lbs_
  Lower bounds.
- CoinPackedVector ubs_
  Upper bounds.

Friends

- void OsiColCutUnitTest (const OsiSolverInterface ∗baseSiP, const std::string &mpsDir)
  A function that tests the methods in the OsiColCut class.

Additional Inherited Members

8.11.1 Detailed Description

Column Cut Class.

Column Cut Class has:

- a sparse vector of column lower bounds
- a sparse vector of column upper bounds

Definition at line 23 of file OsiColCut.hpp.

8.11.2 Constructor & Destructor Documentation

8.11.2.1 OsiColCut::OsiColCut (const OsiColCut &)

Copy constructor.

8.11.2.2 OsiColCut::OsiColCut ( )

Default Constructor.

8.11.2.3 virtual OsiColCut::∼OsiColCut ( ) [virtual]

Destructor.

8.11.3 Member Function Documentation

8.11.3.1 void OsiColCut::setLbs (int *nElements*, const int ∗ *colIndices*, const double ∗ *lbElements*) [inline]

Set column lower bounds.

Definition at line 161 of file OsiColCut.hpp.

8.11.3.2 void OsiColCut::setLbs (const CoinPackedVector & *lbs*) [inline]

Set column lower bounds from a packed vector.

Definition at line 177 of file OsiColCut.hpp.

8.11.3.3 void OsiColCut::setUbs (int *nElements*, const int ∗ *colIndices*, const double ∗ *ubElements*) [inline]

Set column upper bounds.

Definition at line 169 of file OsiColCut.hpp.

8.11.3.4 void OsiColCut::setUbs (const CoinPackedVector & *ubs*) [inline]

Set column upper bounds from a packed vector.

Definition at line 182 of file OsiColCut.hpp.

8.11.3.5 const CoinPackedVector & OsiColCut::lbs ( ) const [inline]

Get column lower bounds.

Definition at line 190 of file OsiColCut.hpp.

8.11.3.6 const CoinPackedVector & OsiColCut::ubs ( ) const [inline]

Get column upper bounds.

Definition at line 195 of file OsiColCut.hpp.

8.11.3.7 bool OsiColCut::operator== (const OsiColCut & *rhs*) const [inline], [virtual]

```
equal - true if lower bounds, upper bounds,
```

and OsiCut are equal.

Definition at line 204 of file OsiColCut.hpp.

8.11.3.8 bool OsiColCut::operator!= (const OsiColCut & *rhs*) const [inline], [virtual]

not equal

Definition at line 217 of file OsiColCut.hpp.

8.11.3.9 bool OsiColCut::consistent ( ) const [inline], [virtual]

Returns true if the cut is consistent with respect to itself.

This checks to ensure that:

- The bound vectors do not have duplicate indices,
- The bound vectors indices are >=0

Implements OsiCut.

Definition at line 226 of file OsiColCut.hpp.

8.11.3.10 bool OsiColCut::consistent (const OsiSolverInterface & *im*) const [inline], [virtual]

```
Returns true if cut is consistent with respect to the solver
```

interface's model.

This checks to ensure that the lower & upperbound packed vectors:

- do not have an index >= the number of column is the model.

Implements OsiCut.

Definition at line 239 of file OsiColCut.hpp.

8.11.3.11 bool OsiColCut::infeasible (const OsiSolverInterface & *im*) const [inline], [virtual]

```
Returns true if the cut is infeasible with respect to its bounds and the
```

column bounds in the solver interface's models.

This checks whether:

- the maximum of the new and existing lower bounds is strictly greater than the minimum of the new and existing upper bounds.

Implements OsiCut.

Definition at line 290 of file OsiColCut.hpp.

8.11.3.12 virtual double OsiColCut::violated (const double ∗ *solution*) const [virtual]

Returns infeasibility of the cut with respect to solution passed in i.e.

is positive if cuts off that solution. solution is getNumCols() long..

Implements OsiCut.

8.11.3.13 OsiColCut& OsiColCut::operator= (const OsiColCut & *rhs*)

Assignment operator.

8.11.3.14 virtual OsiColCut∗ OsiColCut::clone ( ) const [virtual]

Clone.

8.11.3.15 virtual void OsiColCut::print ( ) const [virtual]

Print cuts in collection.

Reimplemented from OsiCut.

8.11.4 Friends And Related Function Documentation

8.11.4.1 void OsiColCutUnitTest (const OsiSolverInterface ∗ *baseSiP*, const std::string & *mpsDir*) [friend]

A function that tests the methods in the OsiColCut class.

8.11.5 Member Data Documentation

8.11.5.1 CoinPackedVector OsiColCut::lbs_ [private]

Lower bounds.

Definition at line 149 of file OsiColCut.hpp.

8.11.5.2 CoinPackedVector OsiColCut::ubs_ [private]

Upper bounds.

Definition at line 151 of file OsiColCut.hpp.

The documentation for this class was generated from the following file:

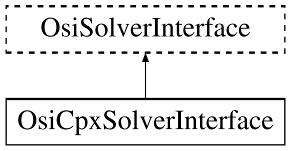
- /home/ted/COIN/trunk/Osi/src/Osi/OsiColCut.hpp

8.12 OsiCpxSolverInterface Class Reference

CPLEX Solver Interface.

`#include <OsiCpxSolverInterface.hpp>`

Inheritance diagram for OsiCpxSolverInterface:



Public Member Functions

- virtual void setObjSense (double s)

  Set objective function sense (1 for min (default), -1 for max,)
- virtual void setColSolution (const double ∗colsol)

  Set the primal solution column values.
- virtual void setRowPrice (const double ∗rowprice)

  Set dual solution vector.
- const char ∗ getCtype () const

  return a vector of variable types (continous, binary, integer)

Solve methods

- virtual void initialSolve ()

  Solve initial LP relaxation.
- virtual void resolve ()

  Resolve an LP relaxation after problem modification.
- virtual void branchAndBound ()

  Invoke solver's built-in enumeration algorithm.

Parameter set/get methods

The set methods return true if the parameter was set to the given value, false otherwise.

There can be various reasons for failure: the given parameter is not applicable for the solver (e.g., refactorization frequency for the volume algorithm), the parameter is not yet implemented for the solver or simply the value of the parameter is out of the range the solver accepts. If a parameter setting call returns false check the details of your solver.

The get methods return true if the given parameter is applicable for the solver and is implemented. In this case the value of the parameter is returned in the second argument. Otherwise they return false.

- bool setIntParam (OsiIntParam key, int value)
  Set an integer parameter.
- bool setDblParam (OsiDblParam key, double value)
  Set a double parameter.
- bool setStrParam (OsiStrParam key, const std::string &value)
  Set a string parameter.
- bool getIntParam (OsiIntParam key, int &value) const
  Get an integer parameter.
- bool getDblParam (OsiDblParam key, double &value) const
  Get a double parameter.
- bool getStrParam (OsiStrParam key, std::string &value) const
  Get a string parameter.
- void setMipStart (bool value)
- bool getMipStart () const

Methods returning info on how the solution process terminated

- virtual bool isAbandoned () const
  Are there a numerical difficulties?
- virtual bool isProvenOptimal () const
  Is optimality proven?
- virtual bool isProvenPrimalInfeasible () const
  Is primal infeasiblity proven?
- virtual bool isProvenDualInfeasible () const
  Is dual infeasiblity proven?
- virtual bool isPrimalObjectiveLimitReached () const
  Is the given primal objective limit reached?
- virtual bool isDualObjectiveLimitReached () const
  Is the given dual objective limit reached?
- virtual bool isIterationLimitReached () const
  Iteration limit reached?

WarmStart related methods

- CoinWarmStart ∗ getEmptyWarmStart () const
  Get an empty warm start object.
- virtual CoinWarmStart ∗ getWarmStart () const
  Get warmstarting information.
- virtual bool setWarmStart (const CoinWarmStart ∗warmstart)
  Set warmstarting information.

Hotstart related methods (primarily used in strong branching). <br>

The user can create a hotstart (a snapshot) of the optimization process then reoptimize over and over again always starting from there.

***NOTE**: between hotstarted optimizations only bound changes are allowed.*

- virtual void markHotStart ()

  Create a hotstart point of the optimization process.
- virtual void solveFromHotStart ()

  Optimize starting from the hotstart.
- virtual void unmarkHotStart ()

  Delete the snapshot.

Methods related to querying the input data

- virtual int getNumCols () const

  Get number of columns.
- virtual int getNumRows () const

  Get number of rows.
- virtual int getNumElements () const

  Get number of nonzero elements.
- virtual const double ∗ getColLower () const

  Get pointer to array[getNumCols()] of column lower bounds.
- virtual const double ∗ getColUpper () const

  Get pointer to array[getNumCols()] of column upper bounds.
- virtual const char ∗ getRowSense () const

  Get pointer to array[getNumRows()] of row constraint senses.
- virtual const double ∗ getRightHandSide () const

  Get pointer to array[getNumRows()] of rows right-hand sides.
- virtual const double ∗ getRowRange () const

  Get pointer to array[getNumRows()] of row ranges.
- virtual const double ∗ getRowLower () const

  Get pointer to array[getNumRows()] of row lower bounds.
- virtual const double ∗ getRowUpper () const

  Get pointer to array[getNumRows()] of row upper bounds.
- virtual const double ∗ getObjCoefficients () const

  Get pointer to array[getNumCols()] of objective function coefficients.
- virtual double getObjSense () const

  Get objective function sense (1 for min (default), -1 for max)
- virtual bool isContinuous (int colNumber) const

  Return true if column is continuous.
- virtual const CoinPackedMatrix ∗ getMatrixByRow () const

  Get pointer to row-wise copy of matrix.
- virtual const CoinPackedMatrix ∗ getMatrixByCol () const

  Get pointer to column-wise copy of matrix.
- virtual double getInfinity () const

  Get solver's value for infinity.

Methods related to querying the solution

- virtual const double ∗ getColSolution () const

  Get pointer to array[getNumCols()] of primal solution vector.
- virtual const double ∗ getRowPrice () const

  Get pointer to array[getNumRows()] of dual prices.
- virtual const double ∗ getReducedCost () const

  Get a pointer to array[getNumCols()] of reduced costs.
- virtual const double ∗ getRowActivity () const

  Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.
- virtual double getObjValue () const

  Get objective function value.

- virtual int getIterationCount () const

  Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.
- virtual std::vector< double ∗ > getDualRays (int maxNumRays, bool fullRay=false) const

  Get as many dual rays as the solver can provide.
- virtual std::vector< double ∗ > getPrimalRays (int maxNumRays) const

  Get as many primal rays as the solver can provide.

Changing bounds on variables and constraints

- virtual void setObjCoeff (int elementIndex, double elementValue)

  Set an objective function coefficient.
- virtual void setObjCoeffSet (const int ∗indexFirst, const int ∗indexLast, const double ∗coeffList)

  Set a a set of objective function coefficients.
- virtual void setColLower (int elementIndex, double elementValue)

  Set a single column lower bound
  Use -COIN_DBL_MAX for -infinity.
- virtual void setColUpper (int elementIndex, double elementValue)

  Set a single column upper bound
  Use COIN_DBL_MAX for infinity.
- virtual void setColBounds (int elementIndex, double lower, double upper)

  Set a single column lower and upper bound
  The default implementation just invokes `setColLower()` and `setColUpper()`
- virtual void setColSetBounds (const int ∗indexFirst, const int ∗indexLast, const double ∗boundList)

  Set the bounds on a number of columns simultaneously
  The default implementation just invokes `setCollower()` and `setColupper()` over and over again.
- virtual void setRowLower (int elementIndex, double elementValue)

  Set a single row lower bound
  Use -COIN_DBL_MAX for -infinity.
- virtual void setRowUpper (int elementIndex, double elementValue)

  Set a single row upper bound
  Use COIN_DBL_MAX for infinity.
- virtual void setRowBounds (int elementIndex, double lower, double upper)

  Set a single row lower and upper bound
  The default implementation just invokes `setRowLower()` and `setRowUpper()`
- virtual void setRowType (int index, char sense, double rightHandSide, double range)

  Set the type of a single row
- virtual void setRowSetBounds (const int ∗indexFirst, const int ∗indexLast, const double ∗boundList)

  Set the bounds on a number of rows simultaneously
  The default implementation just invokes `setRowLower()` and `setRowUpper()` over and over again.
- virtual void setRowSetTypes (const int ∗indexFirst, const int ∗indexLast, const char ∗senseList, const double ∗rhsList, const double ∗rangeList)

  Set the type of a number of rows simultaneously
  The default implementation just invokes `setRowType()` and over and over again.

Integrality related changing methods

- virtual void setContinuous (int index)

  Set the index-th variable to be a continuous variable.
- virtual void setInteger (int index)

  Set the index-th variable to be an integer variable.
- virtual void setContinuous (const int ∗indices, int len)

  Set the variables listed in indices (which is of length len) to be continuous variables.
- virtual void setInteger (const int ∗indices, int len)

  Set the variables listed in indices (which is of length len) to be integer variables.

Methods to expand a problem.<br>

Note that if a column is added then by default it will correspond to a continuous variable.

- virtual void addCol (const CoinPackedVectorBase &vec, const double collb, const double colub, const double obj)
  Add a column (primal variable) to the problem.
- virtual void addCols (const int numcols, const CoinPackedVectorBase ∗const ∗cols, const double ∗collb, const double ∗colub, const double ∗obj)
  Add a set of columns (primal variables) to the problem.
- virtual void deleteCols (const int num, const int ∗colIndices)
  Remove a set of columns (primal variables) from the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const double rowlb, const double rowub)
  Add a row (constraint) to the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const char rowsen, const double rowrhs, const double rowrng)
  Add a row (constraint) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const double ∗rowlb, const double ∗rowub)
  Add a set of rows (constraints) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)
  Add a set of rows (constraints) to the problem.
- virtual void deleteRows (const int num, const int ∗rowIndices)
  Delete a set of rows (constraints) from the problem.

Methods to input a problem

- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)
  Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, double ∗&rowlb, double ∗&rowub)
  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)
  Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, char ∗&rowsen, double ∗&rowrhs, double ∗&rowrng)
  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)
  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)
  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual int readMps (const char ∗filename, const char ∗extension="mps")
  Read an mps file from the given filename.
- virtual void writeMps (const char ∗filename, const char ∗extension="mps", double objSense=0.0) const
  Write the problem into an mps file of the given filename.

Message handling

- void passInMessageHandler (CoinMessageHandler ∗handler)

  Pass in a message handler It is the client's responsibility to destroy a message handler installed by this routine; it will not be destroyed when the solver interface is destroyed.

Constructors and destructor

- OsiCpxSolverInterface ()

  Default Constructor.
- virtual OsiSolverInterface ∗ clone (bool copyData=true) const

  Clone.
- OsiCpxSolverInterface (const OsiCpxSolverInterface &)

  Copy constructor.
- OsiCpxSolverInterface & operator= (const OsiCpxSolverInterface &rhs)

  Assignment operator.
- virtual ∼OsiCpxSolverInterface ()

  Destructor.
- virtual void reset ()

  Resets as if default constructor.

OsiSimplexInterface methods

Cplex adds a slack with coeff +1 in "<=" and "=" constraints, with coeff -1 in ">=", slack being non negative.

We switch in order to get a "Clp tableau" where all the slacks have coefficient +1 in the original tableau.

If a slack for ">=" is non basic, invB is not changed; column of the slack in the optimal tableau is flipped.

If a slack for ">=" is basic, corresp. row of invB is flipped; whole row of the optimal tableau is flipped; then whole column for the slack in opt tableau is flipped.

Ranged rows are not supported. It might work, but no garantee is given.

Code implemented only for Cplex9.0 and higher, lower version number of Cplex will abort the code.

- virtual int canDoSimplexInterface () const

  Returns 1 if can just do getBInv etc 2 if has all OsiSimplex methods and 0 if it has none.
- virtual void enableSimplexInterface (int doingPrimal)

  Useless function, defined only for compatibility with OsiSimplexInterface.
- virtual void disableSimplexInterface ()

  Useless function, defined only for compatibility with OsiSimplexInterface.
- virtual void enableFactorization () const

  Useless function, defined only for compatibility with OsiSimplexInterface.
- virtual void disableFactorization () const

  Useless function, defined only for compatibility with OsiSimplexInterface.
- virtual bool basisIsAvailable () const

  Returns true if a basis is available.
- virtual void getBasisStatus (int ∗cstat, int ∗rstat) const

  Returns a basis status of the structural/artificial variables At present as warm start i.e 0: free, 1: basic, 2: upper, 3: lower.
- virtual void getBInvARow (int row, double ∗z, double ∗slack=NULL) const

  Get a row of the tableau (slack part in slack if not NULL)
- virtual void getBInvRow (int row, double ∗z) const

  Get a row of the basis inverse.
- virtual void getBInvACol (int col, double ∗vec) const

  Get a column of the tableau.
- virtual void getBInvCol (int col, double ∗vec) const

  Get a column of the basis inverse.

- virtual void getBasics (int ∗index) const

  Get indices of the pivot variable in each row (order of indices corresponds to the order of elements in a vector retured by getBInvACol() and getBInvCol()).
- void switchToLP ()

  switches CPLEX to prob type LP
- void switchToMIP ()

  switches CPLEX to prob type MIP

Protected Member Functions

Protected methods

- virtual void applyRowCut (const OsiRowCut &rc)

  Apply a row cut. Return true if cut was applied.
- virtual void applyColCut (const OsiColCut &cc)

  Apply a column cut (bound adjustment).

Private Member Functions

Private static class functions

- void resizeColType (int minsize)

  resizes coltype_ vector to be able to store at least minsize elements
- void freeColType ()

  frees colsize_ vector

Private methods

- CPXLPptr getMutableLpPtr () const

  Get LP Pointer for const methods.
- void gutsOfCopy (const OsiCpxSolverInterface &source)

  The real work of a copy constructor (used by copy and assignment)
- void gutsOfConstructor ()

  The real work of the constructor.
- void gutsOfDestructor ()

  The real work of the destructor.
- void freeCachedColRim ()

  free cached column rim vectors
- void freeCachedRowRim ()

  free cached row rim vectors
- void freeCachedResults ()

  free cached result vectors
- void freeCachedMatrix ()

  free cached matrices
- void freeCachedData (int keepCached=KEEPCACHED_NONE)

  free all cached data (except specified entries, see getLpPtr())
- void freeAllMemory ()

  free all allocated memory

Private Attributes

Private member data

- CPXENVptr env_

    CPLEX environment used in this class instance.
- CPXLPptr lp_

    CPLEX model represented by this class instance.
- int ∗ hotStartCStat_

    Hotstart information.
- int hotStartCStatSize_
- int ∗ hotStartRStat_
- int hotStartRStatSize_
- int hotStartMaxIteration_

Cached information derived from the CPLEX model

- double ∗ obj_

    Pointer to objective vector.
- double ∗ collower_

    Pointer to dense vector of variable lower bounds.
- double ∗ colupper_

    Pointer to dense vector of variable lower bounds.
- char ∗ rowsense_

    Pointer to dense vector of row sense indicators.
- double ∗ rhs_

    Pointer to dense vector of row right-hand side values.
- double ∗ rowrange_

    Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)
- double ∗ rowlower_

    Pointer to dense vector of row lower bounds.
- double ∗ rowupper_

    Pointer to dense vector of row upper bounds.
- double ∗ colsol_

    Pointer to primal solution vector.
- double ∗ rowsol_

    Pointer to dual solution vector.
- double ∗ redcost_

    Pointer to reduced cost vector.
- double ∗ rowact_

    Pointer to row activity (slack) vector.
- CoinPackedMatrix ∗ matrixByRow_

    Pointer to row-wise copy of problem matrix coefficients.
- CoinPackedMatrix ∗ matrixByCol_

    Pointer to row-wise copy of problem matrix coefficients.

Additional information needed for storing MIP problems

- char ∗ coltype_

    Pointer to dense vector of variable types (continous, binary, integer)
- int coltypesize_

    Size of allocated memory for coltype_.
- bool probtypemip_

    Stores whether CPLEX' prob type is currently set to MIP.
- bool domipstart

    Whether to pass a column solution to CPLEX before starting MIP solve (copymipstart)
- bool disableadvbasis

    Whether to disable use of advanced basis (if given)

Friends

- void OsiCpxSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiCpxSolverInterface class.

CPLEX specific public interfaces

- enum keepCachedFlag {
  KEEPCACHED_NONE = 0, KEEPCACHED_COLUMN = 1, KEEPCACHED_ROW = 2, KEEPCACHED_MATRIX = 4,
  KEEPCACHED_RESULTS = 8, KEEPCACHED_PROBLEM = KEEPCACHED_COLUMN | KEEPCACHED_RO-W | KEEPCACHED_MATRIX, KEEPCACHED_ALL = KEEPCACHED_PROBLEM | KEEPCACHED_RESULTS,
  FREECACHED_COLUMN = KEEPCACHED_PROBLEM & ∼KEEPCACHED_COLUMN,
  FREECACHED_ROW = KEEPCACHED_PROBLEM & ∼KEEPCACHED_ROW, FREECACHED_MATRIX = K-EEPCACHED_PROBLEM & ∼KEEPCACHED_MATRIX, FREECACHED_RESULTS = KEEPCACHED_ALL & ∼KEEPCACHED_RESULTS }

  Get pointer to CPLEX model and free all specified cached data entries (combined with logical or-operator '|'):
- CPXLPptr getLpPtr (int keepCached=KEEPCACHED_NONE)
- CPXENVptr getEnvironmentPtr ()

  Method to access CPLEX environment pointer.

Additional Inherited Members

8.12.1 Detailed Description

CPLEX Solver Interface.

Instantiation of OsiCpxSolverInterface for CPLEX

Definition at line 29 of file OsiCpxSolverInterface.hpp.

8.12.2 Member Enumeration Documentation

8.12.2.1 enum OsiCpxSolverInterface::keepCachedFlag

Get pointer to CPLEX model and free all specified cached data entries (combined with logical or-operator '|'):

Enumerator

KEEPCACHED_NONE	discard all cached data (default)
KEEPCACHED_COLUMN	column information: objective values, lower and upper bounds, variable types
KEEPCACHED_ROW	row information: right hand sides, ranges and senses, lower and upper bounds for row
KEEPCACHED_MATRIX	problem matrix: matrix ordered by column and by row
KEEPCACHED_RESULTS	LP solution: primal and dual solution, reduced costs, row activities.
KEEPCACHED_PROBLEM	only discard cached LP solution
KEEPCACHED_ALL	keep all cached data (similar to getMutableLpPtr())
FREECACHED_COLUMN	free only cached column and LP solution information
FREECACHED_ROW	free only cached row and LP solution information
FREECACHED_MATRIX	free only cached matrix and LP solution information
FREECACHED_RESULTS	free only cached LP solution information

Definition at line 614 of file OsiCpxSolverInterface.hpp.

8.12.3 Constructor & Destructor Documentation

8.12.3.1 OsiCpxSolverInterface::OsiCpxSolverInterface ( )

Default Constructor.

8.12.3.2 OsiCpxSolverInterface::OsiCpxSolverInterface (const OsiCpxSolverInterface &)

Copy constructor.

8.12.3.3 virtual OsiCpxSolverInterface::∼OsiCpxSolverInterface ( ) [virtual]

Destructor.

8.12.4 Member Function Documentation

8.12.4.1 virtual void OsiCpxSolverInterface::initialSolve ( ) [virtual]

Solve initial LP relaxation.

Implements OsiSolverInterface.

8.12.4.2 virtual void OsiCpxSolverInterface::resolve ( ) [virtual]

Resolve an LP relaxation after problem modification.

Implements OsiSolverInterface.

8.12.4.3 virtual void OsiCpxSolverInterface::branchAndBound ( ) [virtual]

Invoke solver's built-in enumeration algorithm.

Implements OsiSolverInterface.

8.12.4.4 bool OsiCpxSolverInterface::setIntParam (OsiIntParam *key*, int *value*) [virtual]

Set an integer parameter.

Reimplemented from OsiSolverInterface.

8.12.4.5 bool OsiCpxSolverInterface::setDblParam (OsiDblParam *key*, double *value*) [virtual]

Set a double parameter.

Reimplemented from OsiSolverInterface.

8.12.4.6 bool OsiCpxSolverInterface::setStrParam (OsiStrParam *key*, const std::string & *value*) [virtual]

Set a string parameter.

Reimplemented from OsiSolverInterface.

8.12.4.7 bool OsiCpxSolverInterface::getIntParam (OsiIntParam *key*, int & *value*) const [virtual]

Get an integer parameter.

Reimplemented from OsiSolverInterface.

8.12.4.8 bool OsiCpxSolverInterface::getDblParam (OsiDblParam *key*, double & *value*) const [virtual]

Get a double parameter.

Reimplemented from OsiSolverInterface.

8.12.4.9 bool OsiCpxSolverInterface::getStrParam (OsiStrParam *key*, std::string & *value*) const [virtual]

Get a string parameter.

Reimplemented from OsiSolverInterface.

8.12.4.10 void OsiCpxSolverInterface::setMipStart (bool *value*) [inline]

Definition at line 76 of file OsiCpxSolverInterface.hpp.

8.12.4.11 bool OsiCpxSolverInterface::getMipStart ( ) const [inline]

Definition at line 78 of file OsiCpxSolverInterface.hpp.

8.12.4.12 virtual bool OsiCpxSolverInterface::isAbandoned ( ) const [virtual]

Are there a numerical difficulties?

Implements OsiSolverInterface.

8.12.4.13 virtual bool OsiCpxSolverInterface::isProvenOptimal ( ) const [virtual]

Is optimality proven?

Implements OsiSolverInterface.

8.12.4.14 virtual bool OsiCpxSolverInterface::isProvenPrimalInfeasible ( ) const [virtual]

Is primal infeasiblity proven?

Implements OsiSolverInterface.

8.12.4.15 virtual bool OsiCpxSolverInterface::isProvenDualInfeasible ( ) const [virtual]

Is dual infeasiblity proven?

Implements OsiSolverInterface.

8.12.4.16 virtual bool OsiCpxSolverInterface::isPrimalObjectiveLimitReached ( ) const [virtual]

Is the given primal objective limit reached?

Reimplemented from OsiSolverInterface.

8.12.4.17 virtual bool OsiCpxSolverInterface::isDualObjectiveLimitReached ( ) const [virtual]

Is the given dual objective limit reached?

Reimplemented from OsiSolverInterface.

8.12.4.18 virtual bool OsiCpxSolverInterface::isIterationLimitReached ( ) const [virtual]

Iteration limit reached?

Implements OsiSolverInterface.

8.12.4.19 CoinWarmStart∗ OsiCpxSolverInterface::getEmptyWarmStart ( ) const [virtual]

Get an empty warm start object.

This routine returns an empty CoinWarmStartBasis object. Its purpose is to provide a way to give a client a warm start basis object of the appropriate type, which can resized and modified as desired.

Implements OsiSolverInterface.

8.12.4.20 virtual CoinWarmStart∗ OsiCpxSolverInterface::getWarmStart ( ) const [virtual]

Get warmstarting information.

Implements OsiSolverInterface.

8.12.4.21 virtual bool OsiCpxSolverInterface::setWarmStart (const CoinWarmStart ∗ *warmstart*) [virtual]

Set warmstarting information.

Return true/false depending on whether the warmstart information was accepted or not.

Implements OsiSolverInterface.

8.12.4.22 virtual void OsiCpxSolverInterface::markHotStart ( ) [virtual]

Create a hotstart point of the optimization process.

Reimplemented from OsiSolverInterface.

8.12.4.23 virtual void OsiCpxSolverInterface::solveFromHotStart ( ) [virtual]

Optimize starting from the hotstart.

Reimplemented from OsiSolverInterface.

8.12.4.24 virtual void OsiCpxSolverInterface::unmarkHotStart ( ) [virtual]

Delete the snapshot.

Reimplemented from OsiSolverInterface.

8.12.4.25 virtual int OsiCpxSolverInterface::getNumCols ( ) const [virtual]

Get number of columns.

Implements OsiSolverInterface.

8.12.4.26 virtual int OsiCpxSolverInterface::getNumRows ( ) const [virtual]

Get number of rows.

Implements OsiSolverInterface.

8.12.4.27 virtual int OsiCpxSolverInterface::getNumElements ( ) const [virtual]

Get number of nonzero elements.

Implements OsiSolverInterface.

8.12.4.28 virtual const double∗ OsiCpxSolverInterface::getColLower ( ) const [virtual]

Get pointer to array[getNumCols()] of column lower bounds.

Implements OsiSolverInterface.

8.12.4.29 virtual const double∗ OsiCpxSolverInterface::getColUpper ( ) const [virtual]

Get pointer to array[getNumCols()] of column upper bounds.

Implements OsiSolverInterface.

8.12.4.30 virtual const char∗ OsiCpxSolverInterface::getRowSense ( ) const [virtual]

Get pointer to array[getNumRows()] of row constraint senses.

- 'L': <= constraint
- 'E': = constraint
- 'G': >= constraint
- 'R': ranged constraint
- 'N': free constraint

Implements OsiSolverInterface.

8.12.4.31 virtual const double∗ OsiCpxSolverInterface::getRightHandSide ( ) const [virtual]

Get pointer to array[getNumRows()] of rows right-hand sides.

- if rowsense()[i] == 'L' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'G' then rhs()[i] == rowlower()[i]
- if rowsense()[i] == 'R' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'N' then rhs()[i] == 0.0

Implements OsiSolverInterface.

8.12.4.32 virtual const double∗ OsiCpxSolverInterface::getRowRange ( ) const [virtual]

Get pointer to array[getNumRows()] of row ranges.

- if rowsense()[i] == 'R' then rowrange()[i] == rowupper()[i] - rowlower()[i]
- if rowsense()[i] != 'R' then rowrange()[i] is 0.0

Implements OsiSolverInterface.

8.12.4.33 virtual const double∗ OsiCpxSolverInterface::getRowLower ( ) const [virtual]

Get pointer to array[getNumRows()] of row lower bounds.

Implements OsiSolverInterface.

8.12.4.34 virtual const double∗ OsiCpxSolverInterface::getRowUpper ( ) const [virtual]

Get pointer to array[getNumRows()] of row upper bounds.

Implements OsiSolverInterface.

8.12.4.35 virtual const double∗ OsiCpxSolverInterface::getObjCoefficients ( ) const [virtual]

Get pointer to array[getNumCols()] of objective function coefficients.

Implements OsiSolverInterface.

8.12.4.36 virtual double OsiCpxSolverInterface::getObjSense ( ) const [virtual]

Get objective function sense (1 for min (default), -1 for max)

Implements OsiSolverInterface.

8.12.4.37 virtual bool OsiCpxSolverInterface::isContinuous (int *colNumber*) const [virtual]

Return true if column is continuous.

Implements OsiSolverInterface.

8.12.4.38 virtual const CoinPackedMatrix∗ OsiCpxSolverInterface::getMatrixByRow ( ) const [virtual]

Get pointer to row-wise copy of matrix.

Implements OsiSolverInterface.

8.12.4.39 virtual const CoinPackedMatrix∗ OsiCpxSolverInterface::getMatrixByCol ( ) const [virtual]

Get pointer to column-wise copy of matrix.

Implements OsiSolverInterface.

8.12.4.40 virtual double OsiCpxSolverInterface::getInfinity ( ) const [virtual]

Get solver's value for infinity.

Implements OsiSolverInterface.

8.12.4.41 virtual const double∗ OsiCpxSolverInterface::getColSolution ( ) const [virtual]

Get pointer to array[getNumCols()] of primal solution vector.

Implements OsiSolverInterface.

8.12.4.42 virtual const double∗ OsiCpxSolverInterface::getRowPrice ( ) const [virtual]

Get pointer to array[getNumRows()] of dual prices.

Implements OsiSolverInterface.

8.12.4.43 virtual const double∗ OsiCpxSolverInterface::getReducedCost ( ) const [virtual]

Get a pointer to array[getNumCols()] of reduced costs.

Implements OsiSolverInterface.

8.12.4.44 virtual const double∗ OsiCpxSolverInterface::getRowActivity ( ) const [virtual]

Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.

Implements OsiSolverInterface.

8.12.4.45 virtual double OsiCpxSolverInterface::getObjValue ( ) const [virtual]

Get objective function value.

Implements OsiSolverInterface.

8.12.4.46 virtual int OsiCpxSolverInterface::getIterationCount ( ) const [virtual]

Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.

Implements OsiSolverInterface.

8.12.4.47 virtual std::vector<double*> OsiCpxSolverInterface::getDualRays (int *maxNumRays*, bool *fullRay* = false) const [virtual]

Get as many dual rays as the solver can provide.

(In case of proven primal infeasibility there should be at least one.)

The first getNumRows() ray components will always be associated with the row duals (as returned by getRowPrice()). If `fullRay` is true, the final getNumCols() entries will correspond to the ray components associated with the nonbasic variables. If the full ray is requested and the method cannot provide it, it will throw an exception.

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumRows() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.12.4.48 virtual std::vector<double*> OsiCpxSolverInterface::getPrimalRays (int *maxNumRays*) const [virtual]

Get as many primal rays as the solver can provide.

(In case of proven dual infeasibility there should be at least one.)

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumCols() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.12.4.49 virtual void OsiCpxSolverInterface::setObjCoeff (int *elementIndex*, double *elementValue*) [virtual]

Set an objective function coefficient.

Implements OsiSolverInterface.

8.12.4.50 virtual void OsiCpxSolverInterface::setObjCoeffSet (const int * *indexFirst*, const int * *indexLast*, const double * *coeffList*) [virtual]

Set a a set of objective function coefficients.

Reimplemented from OsiSolverInterface.

8.12.4.51 virtual void OsiCpxSolverInterface::setColLower (int *elementIndex*, double *elementValue*) [virtual]

Set a single column lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.12.4.52 virtual void OsiCpxSolverInterface::setColUpper (int *elementIndex*, double *elementValue*) [virtual]

Set a single column upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.12.4.53 virtual void OsiCpxSolverInterface::setColBounds (int *elementIndex*, double *lower*, double *upper*) [virtual]

Set a single column lower and upper bound

The default implementation just invokes `setColLower()` and `setColUpper()`

Reimplemented from OsiSolverInterface.

8.12.4.54 virtual void OsiCpxSolverInterface::setColSetBounds (const int ∗ *indexFirst*, const int ∗ *indexLast*, const double ∗ *boundList*) [virtual]

Set the bounds on a number of columns simultaneously

The default implementation just invokes `setCollower()` and `setColupper()` over and over again.

Parameters

<code>[indexfirst,index-Last]</code>	contains the indices of the constraints whose either bound changes
boundList	the new lower/upper bound pairs for the variables

Reimplemented from OsiSolverInterface.

8.12.4.55 virtual void OsiCpxSolverInterface::setRowLower (int *elementIndex*, double *elementValue*) [virtual]

Set a single row lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.12.4.56 virtual void OsiCpxSolverInterface::setRowUpper (int *elementIndex*, double *elementValue*) [virtual]

Set a single row upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.12.4.57 virtual void OsiCpxSolverInterface::setRowBounds (int *elementIndex*, double *lower*, double *upper*) [virtual]

Set a single row lower and upper bound

The default implementation just invokes `setRowLower()` and `setRowUpper()`

Reimplemented from OsiSolverInterface.

8.12.4.58 virtual void OsiCpxSolverInterface::setRowType (int *index*, char *sense*, double *rightHandSide*, double *range*) [virtual]

Set the type of a single row

Implements OsiSolverInterface.

8.12.4.59 virtual void OsiCpxSolverInterface::setRowSetBounds (const int ∗ *indexFirst*, const int ∗ *indexLast*, const double ∗ *boundList*) [virtual]

Set the bounds on a number of rows simultaneously

The default implementation just invokes `setRowLower()` and `setRowUpper()` over and over again.

Parameters

<code>[indexfirst,index-Last]</code>	contains the indices of the constraints whose either bound changes
boundList	the new lower/upper bound pairs for the constraints

Reimplemented from OsiSolverInterface.

8.12.4.60 virtual void OsiCpxSolverInterface::setRowSetTypes (const int ∗ *indexFirst*, const int ∗ *indexLast*, const char ∗ *senseList*, const double ∗ *rhsList*, const double ∗ *rangeList*) [virtual]

Set the type of a number of rows simultaneously

The default implementation just invokes `setRowType()` and over and over again.

Parameters

<code>[indexfirst,index-Last]</code>	contains the indices of the constraints whose type changes
senseList	the new senses
rhsList	the new right hand sides
rangeList	the new ranges

Reimplemented from OsiSolverInterface.

8.12.4.61 virtual void OsiCpxSolverInterface::setContinuous (int *index*) [virtual]

Set the index-th variable to be a continuous variable.

Implements OsiSolverInterface.

8.12.4.62 virtual void OsiCpxSolverInterface::setInteger (int *index*) [virtual]

Set the index-th variable to be an integer variable.

Implements OsiSolverInterface.

8.12.4.63 virtual void OsiCpxSolverInterface::setContinuous (const int ∗ *indices*, int *len*) [virtual]

Set the variables listed in indices (which is of length len) to be continuous variables.

Reimplemented from OsiSolverInterface.

8.12.4.64 virtual void OsiCpxSolverInterface::setInteger (const int ∗ *indices*, int *len*) [virtual]

Set the variables listed in indices (which is of length len) to be integer variables.

Reimplemented from OsiSolverInterface.

8.12.4.65 virtual void OsiCpxSolverInterface::setObjSense (double *s*) [virtual]

Set objective function sense (1 for min (default), -1 for max,)

Implements OsiSolverInterface.

8.12.4.66 virtual void OsiCpxSolverInterface::setColSolution (const double ∗ *colsol*) [virtual]

Set the primal solution column values.

colsol[numcols()] is an array of values of the problem column variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of colsol() until changed by another call to setColsol() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.12.4.67 virtual void OsiCpxSolverInterface::setRowPrice (const double ∗ *rowprice*) [virtual]

Set dual solution vector.

rowprice[numrows()] is an array of values of the problem row dual variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of rowprice() until changed by another call to setRowprice() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.12.4.68 virtual void OsiCpxSolverInterface::addCol (const CoinPackedVectorBase & *vec*, const double *collb*, const double *colub*, const double *obj*) [virtual]

Add a column (primal variable) to the problem.

Implements OsiSolverInterface.

8.12.4.69 virtual void OsiCpxSolverInterface::addCols (const int *numcols*, const CoinPackedVectorBase ∗const ∗ *cols*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*) [virtual]

Add a set of columns (primal variables) to the problem.

The default implementation simply makes repeated calls to addCol().

Reimplemented from OsiSolverInterface.

8.12.4.70 virtual void OsiCpxSolverInterface::deleteCols (const int *num*, const int ∗ *colIndices*) [virtual]

Remove a set of columns (primal variables) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted variables are nonbasic.

Implements OsiSolverInterface.

8.12.4.71 virtual void OsiCpxSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const double *rowlb*, const double *rowub*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.12.4.72 virtual void OsiCpxSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const char *rowsen*, const double *rowrhs*, const double *rowrng*) `[virtual]`

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.12.4.73 virtual void OsiCpxSolverInterface::addRows (const int *numrows*, const CoinPackedVectorBase ∗const ∗ *rows*, const double ∗ *rowlb*, const double ∗ *rowub*) `[virtual]`

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented from OsiSolverInterface.

8.12.4.74 virtual void OsiCpxSolverInterface::addRows (const int *numrows*, const CoinPackedVectorBase ∗const ∗ *rows*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) `[virtual]`

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented from OsiSolverInterface.

8.12.4.75 virtual void OsiCpxSolverInterface::deleteRows (const int *num*, const int ∗ *rowIndices*) `[virtual]`

Delete a set of rows (constraints) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted rows are loose.

Implements OsiSolverInterface.

8.12.4.76 virtual void OsiCpxSolverInterface::loadProblem (const CoinPackedMatrix & *matrix*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const double ∗ *rowlb*, const double ∗ *rowub*) `[virtual]`

Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `rowub`: all rows have upper bound infinity
- `rowlb`: all rows have lower bound -infinity
- `obj`: all variables have 0 objective coefficient

Implements OsiSolverInterface.

8.12.4.77 virtual void OsiCpxSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix*, double ∗& *collb*, double ∗& *colub*, double ∗& *obj*, double ∗& *rowlb*, double ∗& *rowub*) `[virtual]`

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.12.4.78 virtual void OsiCpxSolverInterface::loadProblem (const CoinPackedMatrix & *matrix*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) `[virtual]`

Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `obj`: all variables have 0 objective coefficient
- `rowsen`: all rows are >=
- `rowrhs`: all right hand sides are 0
- `rowrng`: 0 for the ranged rows

Implements OsiSolverInterface.

8.12.4.79 virtual void OsiCpxSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix*, double ∗& *collb*, double ∗& *colub*, double ∗& *obj*, char ∗& *rowsen*, double ∗& *rowrhs*, double ∗& *rowrng*) `[virtual]`

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.12.4.80 virtual void OsiCpxSolverInterface::loadProblem (const int *numcols*, const int *numrows*, const int ∗ *start*, const int ∗ *index*, const double ∗ *value*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const double ∗ *rowlb*, const double ∗ *rowub*) `[virtual]`

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.12.4.81 virtual void OsiCpxSolverInterface::loadProblem (const int *numcols*, const int *numrows*, const int ∗ *start*, const int ∗ *index*, const double ∗ *value*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) `[virtual]`

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.12.4.82 virtual int OsiCpxSolverInterface::readMps (const char ∗ *filename*, const char ∗ *extension* = `"mps"`) `[virtual]`

Read an mps file from the given filename.

Reimplemented from OsiSolverInterface.

8.12.4.83 virtual void OsiCpxSolverInterface::writeMps (const char ∗ *filename*, const char ∗ *extension* = `"mps"`, double *objSense* = `0.0`) const `[virtual]`

Write the problem into an mps file of the given filename.

If objSense is non zero then -1.0 forces the code to write a maximization objective and +1.0 to write a minimization one. If 0.0 then solver can do what it wants

Implements OsiSolverInterface.

8.12.4.84 void OsiCpxSolverInterface::passInMessageHandler (CoinMessageHandler ∗ *handler*) `[virtual]`

Pass in a message handler It is the client's responsibility to destroy a message handler installed by this routine; it will not be destroyed when the solver interface is destroyed.

Reimplemented from OsiSolverInterface.

8.12.4.85 CPXLPptr OsiCpxSolverInterface::getLpPtr (int *keepCached* = KEEPCACHED_NONE)

8.12.4.86 CPXENVptr OsiCpxSolverInterface::getEnvironmentPtr ( )

Method to access CPLEX environment pointer.

8.12.4.87 const char∗ OsiCpxSolverInterface::getCtype ( ) const

return a vector of variable types (continous, binary, integer)

8.12.4.88 virtual OsiSolverInterface∗ OsiCpxSolverInterface::clone (bool *copyData* = `true`) const `[virtual]`

Clone.

Implements OsiSolverInterface.

8.12.4.89 OsiCpxSolverInterface& OsiCpxSolverInterface::operator= (const OsiCpxSolverInterface & *rhs*)

Assignment operator.

8.12.4.90 virtual void OsiCpxSolverInterface::reset ( ) `[virtual]`

Resets as if default constructor.

Reimplemented from OsiSolverInterface.

8.12.4.91 virtual int OsiCpxSolverInterface::canDoSimplexInterface ( ) const `[virtual]`

Returns 1 if can just do getBInv etc 2 if has all OsiSimplex methods and 0 if it has none.

Reimplemented from OsiSolverInterface.

8.12.4.92 virtual void OsiCpxSolverInterface::enableSimplexInterface (int *doingPrimal*) `[inline]`, `[virtual]`

Useless function, defined only for compatibility with OsiSimplexInterface.

Definition at line 700 of file OsiCpxSolverInterface.hpp.

8.12.4.93 virtual void OsiCpxSolverInterface::disableSimplexInterface ( ) `[inline]`, `[virtual]`

Useless function, defined only for compatibility with OsiSimplexInterface.

Reimplemented from OsiSolverInterface.

Definition at line 705 of file OsiCpxSolverInterface.hpp.

8.12.4.94 virtual void OsiCpxSolverInterface::enableFactorization ( ) const `[inline]`, `[virtual]`

Useless function, defined only for compatibility with OsiSimplexInterface.

Reimplemented from OsiSolverInterface.

Definition at line 710 of file OsiCpxSolverInterface.hpp.

8.12.4.95 virtual void OsiCpxSolverInterface::disableFactorization ( ) const [inline], [virtual]

Useless function, defined only for compatibility with OsiSimplexInterface.

Reimplemented from OsiSolverInterface.

Definition at line 715 of file OsiCpxSolverInterface.hpp.

8.12.4.96 virtual bool OsiCpxSolverInterface::basisIsAvailable ( ) const [virtual]

Returns true if a basis is available.

Reimplemented from OsiSolverInterface.

8.12.4.97 virtual void OsiCpxSolverInterface::getBasisStatus (int ∗ *cstat*, int ∗ *rstat*) const [virtual]

Returns a basis status of the structural/artificial variables At present as warm start i.e 0: free, 1: basic, 2: upper, 3: lower.

Reimplemented from OsiSolverInterface.

8.12.4.98 virtual void OsiCpxSolverInterface::getBInvARow (int *row*, double ∗ *z*, double ∗ *slack* = NULL) const [virtual]

Get a row of the tableau (slack part in slack if not NULL)

Reimplemented from OsiSolverInterface.

8.12.4.99 virtual void OsiCpxSolverInterface::getBInvRow (int *row*, double ∗ *z*) const [virtual]

Get a row of the basis inverse.

Reimplemented from OsiSolverInterface.

8.12.4.100 virtual void OsiCpxSolverInterface::getBInvACol (int *col*, double ∗ *vec*) const [virtual]

Get a column of the tableau.

Reimplemented from OsiSolverInterface.

8.12.4.101 virtual void OsiCpxSolverInterface::getBInvCol (int *col*, double ∗ *vec*) const [virtual]

Get a column of the basis inverse.

Reimplemented from OsiSolverInterface.

8.12.4.102 virtual void OsiCpxSolverInterface::getBasics (int ∗ *index*) const [virtual]

Get indices of the pivot variable in each row (order of indices corresponds to the order of elements in a vector retured by getBInvACol() and getBInvCol()).

Reimplemented from OsiSolverInterface.

8.12.4.103 void OsiCpxSolverInterface::switchToLP ( )

switches CPLEX to prob type LP

8.12.4.104 void OsiCpxSolverInterface::switchToMIP ( )

switches CPLEX to prob type MIP

8.12.4.105 virtual void OsiCpxSolverInterface::applyRowCut (const **OsiRowCut** & *rc*) [protected], [virtual]

Apply a row cut. Return true if cut was applied.

Implements OsiSolverInterface.

8.12.4.106 virtual void OsiCpxSolverInterface::applyColCut (const **OsiColCut** & *cc*) [protected], [virtual]

Apply a column cut (bound adjustment).

Return true if cut was applied.

Implements OsiSolverInterface.

8.12.4.107 void OsiCpxSolverInterface::resizeColType (int *minsize*) [private]

resizes coltype_ vector to be able to store at least minsize elements

8.12.4.108 void OsiCpxSolverInterface::freeColType ( ) [private]

frees colsize_ vector

8.12.4.109 **CPXLPptr** OsiCpxSolverInterface::getMutableLpPtr ( ) const [private]

Get LP Pointer for const methods.

8.12.4.110 void OsiCpxSolverInterface::gutsOfCopy (const **OsiCpxSolverInterface** & *source*) [private]

The real work of a copy constructor (used by copy and assignment)

8.12.4.111 void OsiCpxSolverInterface::gutsOfConstructor ( ) [private]

The real work of the constructor.

8.12.4.112 void OsiCpxSolverInterface::gutsOfDestructor ( ) [private]

The real work of the destructor.

8.12.4.113 void OsiCpxSolverInterface::freeCachedColRim ( ) [private]

free cached column rim vectors

8.12.4.114 void OsiCpxSolverInterface::freeCachedRowRim ( ) [private]

free cached row rim vectors

8.12.4.115 void OsiCpxSolverInterface::freeCachedResults ( ) [private]

free cached result vectors

8.12.4.116 void OsiCpxSolverInterface::freeCachedMatrix ( ) [private]

free cached matrices

8.12.4.117 void OsiCpxSolverInterface::freeCachedData (int *keepCached* = KEEPCACHED_NONE) [private]

free all cached data (except specified entries, see getLpPtr())

8.12.4.118 void OsiCpxSolverInterface::freeAllMemory ( ) [private]

free all allocated memory

8.12.5 Friends And Related Function Documentation

8.12.5.1 void OsiCpxSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*) [friend]

A function that tests the methods in the OsiCpxSolverInterface class.

8.12.6 Member Data Documentation

8.12.6.1 CPXENVptr OsiCpxSolverInterface::env_ [mutable], [private]

CPLEX environment used in this class instance.

Definition at line 815 of file OsiCpxSolverInterface.hpp.

8.12.6.2 CPXLPptr OsiCpxSolverInterface::lp_ [mutable], [private]

CPLEX model represented by this class instance.

Definition at line 817 of file OsiCpxSolverInterface.hpp.

8.12.6.3 int∗ OsiCpxSolverInterface::hotStartCStat_ [private]

Hotstart information.

Definition at line 820 of file OsiCpxSolverInterface.hpp.

8.12.6.4 int OsiCpxSolverInterface::hotStartCStatSize_ [private]

Definition at line 821 of file OsiCpxSolverInterface.hpp.

8.12.6.5 int∗ OsiCpxSolverInterface::hotStartRStat_ [private]

Definition at line 822 of file OsiCpxSolverInterface.hpp.

8.12.6.6 int OsiCpxSolverInterface::hotStartRStatSize_ [private]

Definition at line 823 of file OsiCpxSolverInterface.hpp.

8.12.6.7 int OsiCpxSolverInterface::hotStartMaxIteration_ [private]

Definition at line 824 of file OsiCpxSolverInterface.hpp.

8.12.6.8 double∗ OsiCpxSolverInterface::obj_ [mutable], [private]

Pointer to objective vector.

Definition at line 829 of file OsiCpxSolverInterface.hpp.

8.12.6.9 double∗ OsiCpxSolverInterface::collower_ [mutable], [private]

Pointer to dense vector of variable lower bounds.

Definition at line 832 of file OsiCpxSolverInterface.hpp.

8.12.6.10 double∗ OsiCpxSolverInterface::colupper_ [mutable], [private]

Pointer to dense vector of variable lower bounds.

Definition at line 835 of file OsiCpxSolverInterface.hpp.

8.12.6.11 char∗ OsiCpxSolverInterface::rowsense_ [mutable], [private]

Pointer to dense vector of row sense indicators.

Definition at line 838 of file OsiCpxSolverInterface.hpp.

8.12.6.12 double∗ OsiCpxSolverInterface::rhs_ [mutable], [private]

Pointer to dense vector of row right-hand side values.

Definition at line 841 of file OsiCpxSolverInterface.hpp.

8.12.6.13 double∗ OsiCpxSolverInterface::rowrange_ [mutable], [private]

Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)

Definition at line 844 of file OsiCpxSolverInterface.hpp.

8.12.6.14 double∗ OsiCpxSolverInterface::rowlower_ [mutable], [private]

Pointer to dense vector of row lower bounds.

Definition at line 847 of file OsiCpxSolverInterface.hpp.

8.12.6.15 double∗ OsiCpxSolverInterface::rowupper_ [mutable], [private]

Pointer to dense vector of row upper bounds.

Definition at line 850 of file OsiCpxSolverInterface.hpp.

8.12.6.16 double∗ OsiCpxSolverInterface::colsol_ [mutable], [private]

Pointer to primal solution vector.

Definition at line 853 of file OsiCpxSolverInterface.hpp.

8.12.6.17 double∗ OsiCpxSolverInterface::rowsol_ [mutable], [private]

Pointer to dual solution vector.

Definition at line 856 of file OsiCpxSolverInterface.hpp.

8.12.6.18 double∗ OsiCpxSolverInterface::redcost_ [mutable], [private]

Pointer to reduced cost vector.

Definition at line 859 of file OsiCpxSolverInterface.hpp.

8.12.6.19 double∗ OsiCpxSolverInterface::rowact_ `[mutable], [private]`

Pointer to row activity (slack) vector.

Definition at line 862 of file OsiCpxSolverInterface.hpp.

8.12.6.20 CoinPackedMatrix∗ OsiCpxSolverInterface::matrixByRow_ `[mutable], [private]`

Pointer to row-wise copy of problem matrix coefficients.

Definition at line 865 of file OsiCpxSolverInterface.hpp.

8.12.6.21 CoinPackedMatrix∗ OsiCpxSolverInterface::matrixByCol_ `[mutable], [private]`

Pointer to row-wise copy of problem matrix coefficients.

Definition at line 868 of file OsiCpxSolverInterface.hpp.

8.12.6.22 char∗ OsiCpxSolverInterface::coltype_ `[private]`

Pointer to dense vector of variable types (continous, binary, integer)

Definition at line 874 of file OsiCpxSolverInterface.hpp.

8.12.6.23 int OsiCpxSolverInterface::coltypesize_ `[private]`

Size of allocated memory for coltype_.

Definition at line 877 of file OsiCpxSolverInterface.hpp.

8.12.6.24 bool OsiCpxSolverInterface::probtypemip_ `[mutable], [private]`

Stores whether CPLEX' prob type is currently set to MIP.

Definition at line 880 of file OsiCpxSolverInterface.hpp.

8.12.6.25 bool OsiCpxSolverInterface::domipstart `[private]`

Whether to pass a column solution to CPLEX before starting MIP solve (copymipstart)

Definition at line 883 of file OsiCpxSolverInterface.hpp.

8.12.6.26 bool OsiCpxSolverInterface::disableadvbasis `[private]`

Whether to disable use of advanced basis (if given)

Definition at line 886 of file OsiCpxSolverInterface.hpp.

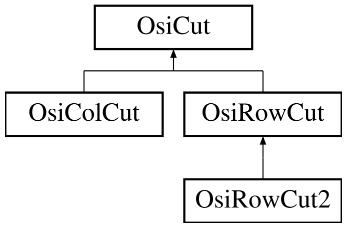
The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/OsiCpx/OsiCpxSolverInterface.hpp

8.13 OsiCut Class Reference

`#include <OsiCut.hpp>`

Inheritance diagram for OsiCut:



Public Member Functions

Effectiveness

- void setEffectiveness (double e)

  Set effectiveness.
- double effectiveness () const

  Get effectiveness.

GloballyValid

- void setGloballyValid (bool trueFalse)

  Set globallyValid (nonzero true)
- void setGloballyValid ()
- void setNotGloballyValid ()
- bool globallyValid () const

  Get globallyValid.
- void setGloballyValidAsInteger (int trueFalse)

  Set globallyValid as integer (nonzero true)
- int globallyValidAsInteger () const

  Get globallyValid.

Debug stuff

- virtual void print () const

  Print cuts in collection.

Comparison operators

- virtual bool operator== (const OsiCut &rhs) const

  equal. 2 cuts are equal if there effectiveness are equal
- virtual bool operator!= (const OsiCut &rhs) const

  not equal
- virtual bool operator$<$ (const OsiCut &rhs) const

  less than. True if this.effectiveness $<$ rhs.effectiveness
- virtual bool operator$>$ (const OsiCut &rhs) const

  less than. True if this.effectiveness $>$ rhs.effectiveness

Sanity checks on cut

- virtual bool consistent () const =0

  Returns true if the cut is consistent with respect to itself, without considering any data in the model.
- virtual bool consistent (const OsiSolverInterface &si) const =0

  Returns true if cut is consistent when considering the solver interface's model.
- virtual bool infeasible (const OsiSolverInterface &si) const =0

  Returns true if the cut is infeasible "with respect to itself" and cannot be satisfied.
- virtual double violated (const double $*$solution) const =0

  Returns infeasibility of the cut with respect to solution passed in i.e.

Protected Member Functions

Constructors and destructors

- OsiCut ()
  Default Constructor.
- OsiCut (const OsiCut &)
  Copy constructor.
- OsiCut & operator= (const OsiCut &rhs)
  Assignment operator.
- virtual ∼OsiCut ()
  Destructor.

Private Attributes

Private member data

- double effectiveness_
  Effectiveness.
- int globallyValid_
  If cut has global validity i.e. can be used anywhere in tree.

8.13.1 Detailed Description

Definition at line 36 of file OsiCut.hpp.

8.13.2 Constructor & Destructor Documentation

8.13.2.1 OsiCut::OsiCut ( ) `[protected]`

Default Constructor.

8.13.2.2 OsiCut::OsiCut (const **OsiCut** &) `[protected]`

Copy constructor.

8.13.2.3 virtual OsiCut::∼OsiCut ( ) `[protected], [virtual]`

Destructor.

8.13.3 Member Function Documentation

8.13.3.1 void OsiCut::setEffectiveness (double *e*) `[inline]`

Set effectiveness.

Definition at line 209 of file OsiCut.hpp.

8.13.3.2 double OsiCut::effectiveness ( ) const `[inline]`

Get effectiveness.

Definition at line 210 of file OsiCut.hpp.

8.13.3.3 void OsiCut::setGloballyValid (bool *trueFalse*) [inline]

Set globallyValid (nonzero true)

Definition at line 52 of file OsiCut.hpp.

8.13.3.4 void OsiCut::setGloballyValid ( ) [inline]

Definition at line 54 of file OsiCut.hpp.

8.13.3.5 void OsiCut::setNotGloballyValid ( ) [inline]

Definition at line 56 of file OsiCut.hpp.

8.13.3.6 bool OsiCut::globallyValid ( ) const [inline]

Get globallyValid.

Definition at line 59 of file OsiCut.hpp.

8.13.3.7 void OsiCut::setGloballyValidAsInteger (int *trueFalse*) [inline]

Set globallyValid as integer (nonzero true)

Definition at line 62 of file OsiCut.hpp.

8.13.3.8 int OsiCut::globallyValidAsInteger ( ) const [inline]

Get globallyValid.

Definition at line 65 of file OsiCut.hpp.

8.13.3.9 virtual void OsiCut::print ( ) const [inline], [virtual]

Print cuts in collection.

Reimplemented in OsiRowCut, and OsiColCut.

Definition at line 72 of file OsiCut.hpp.

8.13.3.10 bool OsiCut::operator== (const OsiCut & *rhs*) const [inline], [virtual]

equal. 2 cuts are equal if there effectiveness are equal

Definition at line 226 of file OsiCut.hpp.

8.13.3.11 bool OsiCut::operator!= (const OsiCut & *rhs*) const [inline], [virtual]

not equal

Definition at line 231 of file OsiCut.hpp.

8.13.3.12 bool OsiCut::operator< (const OsiCut & *rhs*) const [inline], [virtual]

less than. True if this.effectiveness < rhs.effectiveness

Definition at line 236 of file OsiCut.hpp.

8.13.3.13 bool OsiCut::operator> (const OsiCut & *rhs*) const [inline], [virtual]

less than. True if this.effectiveness > rhs.effectiveness

Definition at line 241 of file OsiCut.hpp.

8.13.3.14 virtual bool OsiCut::consistent ( ) const [inline], [pure virtual]

Returns true if the cut is consistent with respect to itself, without considering any data in the model.

For example, it might check to ensure that a column index is not negative.

Implemented in OsiRowCut, and OsiColCut.

8.13.3.15 virtual bool OsiCut::consistent (const OsiSolverInterface & *si*) const [inline], [pure virtual]

Returns true if cut is consistent when considering the solver interface's model.

For example, it might check to ensure that a column index is not greater than the number of columns in the model. Assumes consistent() is true.

Implemented in OsiRowCut, and OsiColCut.

8.13.3.16 virtual bool OsiCut::infeasible (const OsiSolverInterface & *si*) const [inline], [pure virtual]

Returns true if the cut is infeasible "with respect to itself" and cannot be satisfied.

This method does NOT check whether adding the cut to the solver interface's model will make the -model- infeasble. A cut which returns !infeasible(si) may very well make the model infeasible. (Of course, adding a cut with returns infeasible(si) will make the model infeasible.)

The "with respect to itself" is in quotes becaues in the case where the cut simply replaces existing bounds, it may make sense to test infeasibility with respect to the current bounds held in the solver interface's model. For example, if the cut has a single variable in it, it might check that the maximum of new and existing lower bounds is greater than the minium of the new and existing upper bounds.

Assumes that consistent(si) is true.

Infeasible cuts can be a useful mechanism for a cut generator to inform the solver interface that its detected infeasibility of the problem.

Implemented in OsiRowCut, and OsiColCut.

8.13.3.17 virtual double OsiCut::violated (const double $*$ *solution*) const [pure virtual]

Returns infeasibility of the cut with respect to solution passed in i.e.

is positive if cuts off that solution. solution is getNumCols() long..

Implemented in OsiRowCut, and OsiColCut.

8.13.3.18 OsiCut& OsiCut::operator= (const OsiCut & *rhs*) [protected]

Assignment operator.

8.13.4 Member Data Documentation

8.13.4.1 double OsiCut::effectiveness_ [private]

Effectiveness.

Definition at line 193 of file OsiCut.hpp.

8.13.4.2 int OsiCut::globallyValid_ [private]

If cut has global validity i.e. can be used anywhere in tree.

Definition at line 195 of file OsiCut.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiCut.hpp

8.14 OsiCuts::OsiCutCompare Class Reference

Public Member Functions

- bool operator() (const OsiCut ∗c1P, const OsiCut ∗c2P)

    Function for sorting cuts by effectiveness.

8.14.1 Detailed Description

Definition at line 275 of file OsiCuts.hpp.

8.14.2 Member Function Documentation

8.14.2.1 bool OsiCuts::OsiCutCompare::operator() (const **OsiCut** ∗ *c1P,* const **OsiCut** ∗ *c2P*) [inline]

Function for sorting cuts by effectiveness.

Definition at line 279 of file OsiCuts.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiCuts.hpp

8.15 OsiCuts Class Reference

Collections of row cuts and column cuts.

```
#include <OsiCuts.hpp>
```

Classes

- class const_iterator

    Const Iterator.
- class iterator

    Iterator.
- class OsiCutCompare

Public Member Functions

Inserting a cut into collection

- void insert (const OsiRowCut &rc)

Insert a row cut.
- void insertIfNotDuplicate (OsiRowCut &rc, CoinAbsFltEq treatAsSame=CoinAbsFltEq(1.0e-12))
  Insert a row cut unless it is a duplicate - cut may get sorted.
- void insertIfNotDuplicate (OsiRowCut &rc, CoinRelFltEq treatAsSame)
  Insert a row cut unless it is a duplicate - cut may get sorted.
- void insert (const OsiColCut &cc)
  Insert a column cut.
- void insert (OsiRowCut ∗&rcPtr)
  Insert a row cut.
- void insert (OsiColCut ∗&ccPtr)
  Insert a column cut.
- void insert (const OsiCuts &cs)
  Insert a set of cuts.

Number of cuts in collection

- int sizeRowCuts () const
  Number of row cuts in collection.
- int sizeColCuts () const
  Number of column cuts in collection.
- int sizeCuts () const
  Number of cuts in collection.

Debug stuff

- void printCuts () const
  Print cuts in collection.

Get a cut from collection

- OsiRowCut ∗ rowCutPtr (int i)
  Get pointer to i'th row cut.
- const OsiRowCut ∗ rowCutPtr (int i) const
  Get const pointer to i'th row cut.
- OsiColCut ∗ colCutPtr (int i)
  Get pointer to i'th column cut.
- const OsiColCut ∗ colCutPtr (int i) const
  Get const pointer to i'th column cut.
- OsiRowCut & rowCut (int i)
  Get reference to i'th row cut.
- const OsiRowCut & rowCut (int i) const
  Get const reference to i'th row cut.
- OsiColCut & colCut (int i)
  Get reference to i'th column cut.
- const OsiColCut & colCut (int i) const
  Get const reference to i'th column cut.
- const OsiCut ∗ mostEffectiveCutPtr () const
  Get const pointer to the most effective cut.
- OsiCut ∗ mostEffectiveCutPtr ()
  Get pointer to the most effective cut.

Deleting cut from collection

- void eraseRowCut (int i)

Remove i'th row cut from collection.
- void eraseColCut (int i)

    Remove i'th column cut from collection.
- OsiRowCut ∗ rowCutPtrAndZap (int i)

    Get pointer to i'th row cut and remove ptr from collection.
- void dumpCuts ()

    Clear all row cuts without deleting them.
- void eraseAndDumpCuts (const std::vector< int > to_erase)

    Selective delete and clear for row cuts.

Sorting collection

- void sort ()

    Cuts with greatest effectiveness are first.

Iterators

Example of using an iterator to sum effectiveness of all cuts in the collection.

```
double sumEff=0.0;
for ( OsiCuts::iterator it=cuts.begin(); it!=cuts.end(); ++it )
      sumEff+= (*it)->effectiveness();
```

- iterator begin ()

    Get iterator to beginning of collection.
- const_iterator begin () const

    Get const iterator to beginning of collection.
- iterator end ()

    Get iterator to end of collection.
- const_iterator end () const

    Get const iterator to end of collection.

Constructors and destructors

- OsiCuts ()

    Default constructor.
- OsiCuts (const OsiCuts &)

    Copy constructor.
- OsiCuts & operator= (const OsiCuts &rhs)

    Assignment operator.
- virtual ∼OsiCuts ()

    Destructor.

Private Member Functions

Private methods

- void gutsOfCopy (const OsiCuts &source)

    Copy internal data.
- void gutsOfDestructor ()

    Delete internal data.

Private Attributes

Private member data

- OsiVectorRowCutPtr rowCutPtrs_

  Vector of row cuts pointers.
- OsiVectorColCutPtr colCutPtrs_

  Vector of column cuts pointers.

Friends

- void OsiCutsUnitTest ()

  A function that tests the methods in the OsiCuts class.

8.15.1 Detailed Description

Collections of row cuts and column cuts.

Definition at line 19 of file OsiCuts.hpp.

8.15.2 Constructor & Destructor Documentation

8.15.2.1 OsiCuts::OsiCuts ( )

Default constructor.

8.15.2.2 OsiCuts::OsiCuts (const OsiCuts &)

Copy constructor.

8.15.2.3 virtual OsiCuts::∼OsiCuts ( ) [virtual]

Destructor.

8.15.3 Member Function Documentation

8.15.3.1 void OsiCuts::insert (const OsiRowCut & *rc*) [inline]

Insert a row cut.

Definition at line 306 of file OsiCuts.hpp.

8.15.3.2 void OsiCuts::insertIfNotDuplicate (OsiRowCut & *rc*, CoinAbsFltEq *treatAsSame* = CoinAbsFltEq(1.0e-12))

Insert a row cut unless it is a duplicate - cut may get sorted.

Duplicate is defined as CoinAbsFltEq says same

8.15.3.3 void OsiCuts::insertIfNotDuplicate (OsiRowCut & *rc*, CoinRelFltEq *treatAsSame*)

Insert a row cut unless it is a duplicate - cut may get sorted.

Duplicate is defined as CoinRelFltEq says same

8.15.3.4 void OsiCuts::insert (const **OsiColCut** & *cc*) `[inline]`

Insert a column cut.

Definition at line 312 of file OsiCuts.hpp.

8.15.3.5 void OsiCuts::insert (**OsiRowCut** ∗& *rcPtr*) `[inline]`

Insert a row cut.

The OsiCuts object takes control of the cut object. On return, `rcPtr` is NULL.

Definition at line 319 of file OsiCuts.hpp.

8.15.3.6 void OsiCuts::insert (**OsiColCut** ∗& *ccPtr*) `[inline]`

Insert a column cut.

The OsiCuts object takes control of the cut object. On return `ccPtr` is NULL.

Definition at line 324 of file OsiCuts.hpp.

8.15.3.7 void OsiCuts::insert (const **OsiCuts** & *cs*) `[inline]`

Insert a set of cuts.

Definition at line 347 of file OsiCuts.hpp.

8.15.3.8 int OsiCuts::sizeRowCuts ( ) const `[inline]`

Number of row cuts in collection.

Definition at line 374 of file OsiCuts.hpp.

8.15.3.9 int OsiCuts::sizeColCuts ( ) const `[inline]`

Number of column cuts in collection.

Definition at line 376 of file OsiCuts.hpp.

8.15.3.10 int OsiCuts::sizeCuts ( ) const `[inline]`

Number of cuts in collection.

Definition at line 378 of file OsiCuts.hpp.

8.15.3.11 void OsiCuts::printCuts ( ) const `[inline]`

Print cuts in collection.

Definition at line 423 of file OsiCuts.hpp.

8.15.3.12 **OsiRowCut** ∗ OsiCuts::rowCutPtr (int *i*) `[inline]`

Get pointer to i'th row cut.

Definition at line 386 of file OsiCuts.hpp.

8.15.3.13 const **OsiRowCut** ∗ OsiCuts::rowCutPtr (int *i*) const `[inline]`

Get const pointer to i'th row cut.

Definition at line 384 of file OsiCuts.hpp.

8.15.3.14 OsiColCut ∗ OsiCuts::colCutPtr (int *i*) [inline]

Get pointer to i'th column cut.

Definition at line 387 of file OsiCuts.hpp.

8.15.3.15 const OsiColCut ∗ OsiCuts::colCutPtr (int *i*) const [inline]

Get const pointer to i'th column cut.

Definition at line 385 of file OsiCuts.hpp.

8.15.3.16 OsiRowCut & OsiCuts::rowCut (int *i*) [inline]

Get reference to i'th row cut.

Definition at line 391 of file OsiCuts.hpp.

8.15.3.17 const OsiRowCut & OsiCuts::rowCut (int *i*) const [inline]

Get const reference to i'th row cut.

Definition at line 389 of file OsiCuts.hpp.

8.15.3.18 OsiColCut & OsiCuts::colCut (int *i*) [inline]

Get reference to i'th column cut.

Definition at line 392 of file OsiCuts.hpp.

8.15.3.19 const OsiColCut & OsiCuts::colCut (int *i*) const [inline]

Get const reference to i'th column cut.

Definition at line 390 of file OsiCuts.hpp.

8.15.3.20 const OsiCut ∗ OsiCuts::mostEffectiveCutPtr ( ) const [inline]

Get const pointer to the most effective cut.

Definition at line 397 of file OsiCuts.hpp.

8.15.3.21 OsiCut ∗ OsiCuts::mostEffectiveCutPtr ( ) [inline]

Get pointer to the most effective cut.

Definition at line 403 of file OsiCuts.hpp.

8.15.3.22 void OsiCuts::eraseRowCut (int *i*) [inline]

Remove i'th row cut from collection.

Definition at line 442 of file OsiCuts.hpp.

8.15.3.23 void OsiCuts::eraseColCut (int *i*) [inline]

Remove i'th column cut from collection.

Definition at line 447 of file OsiCuts.hpp.

8.15.3.24 OsiRowCut ∗ OsiCuts::rowCutPtrAndZap (int *i*) [inline]

Get pointer to i'th row cut and remove ptr from collection.

Definition at line 454 of file OsiCuts.hpp.

8.15.3.25 void OsiCuts::dumpCuts ( ) [inline]

Clear all row cuts without deleting them.

Handy in case one wants to use CGL without managing cuts in one of the OSI containers. Client is ultimately responsible for deleting the data structures holding the row cuts.

Definition at line 461 of file OsiCuts.hpp.

8.15.3.26 void OsiCuts::eraseAndDumpCuts (const std::vector< int > *to_erase*) [inline]

Selective delete and clear for row cuts.

Deletes the cuts specified in `to_erase` then clears remaining cuts without deleting them. A hybrid of eraseRowCut(int) and dumpCuts(). Client is ultimately responsible for deleting the data structures for row cuts not specified in `to_erase`.

Definition at line 465 of file OsiCuts.hpp.

8.15.3.27 void OsiCuts::sort ( ) [inline]

Cuts with greatest effectiveness are first.

Definition at line 364 of file OsiCuts.hpp.

8.15.3.28 iterator OsiCuts::begin ( ) [inline]

Get iterator to beginning of collection.

Definition at line 247 of file OsiCuts.hpp.

8.15.3.29 const_iterator OsiCuts::begin ( ) const [inline]

Get const iterator to beginning of collection.

Definition at line 249 of file OsiCuts.hpp.

8.15.3.30 iterator OsiCuts::end ( ) [inline]

Get iterator to end of collection.

Definition at line 251 of file OsiCuts.hpp.

8.15.3.31 const_iterator OsiCuts::end ( ) const [inline]

Get const iterator to end of collection.

Definition at line 253 of file OsiCuts.hpp.

8.15.3.32 OsiCuts& OsiCuts::operator= (const OsiCuts & *rhs*)

Assignment operator.

8.15.3.33 void OsiCuts::gutsOfCopy (const OsiCuts & *source*) [private]

Copy internal data.

8.15.3.34 void OsiCuts::gutsOfDestructor ( ) [private]

Delete internal data.

8.15.4 Friends And Related Function Documentation

8.15.4.1 void OsiCutsUnitTest ( ) [friend]

A function that tests the methods in the OsiCuts class.

8.15.5 Member Data Documentation

8.15.5.1 OsiVectorRowCutPtr OsiCuts::rowCutPtrs_ [private]

Vector of row cuts pointers.

Definition at line 295 of file OsiCuts.hpp.

8.15.5.2 OsiVectorColCutPtr OsiCuts::colCutPtrs_ [private]

Vector of column cuts pointers.

Definition at line 297 of file OsiCuts.hpp.

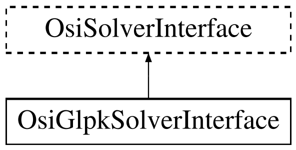
The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiCuts.hpp

8.16 OsiGlpkSolverInterface Class Reference

`#include <OsiGlpkSolverInterface.hpp>`

Inheritance diagram for OsiGlpkSolverInterface:



Public Member Functions

- virtual void setObjSense (double s)

  Set objective function sense (1 for min (default), -1 for max,)
- virtual void setColSolution (const double ∗colsol)

  Set the primal solution column values.
- virtual void setRowPrice (const double ∗rowprice)

  Set dual solution vector.

Solve methods

- virtual void initialSolve ()

Solve initial LP relaxation.
- virtual void resolve ()

  Resolve an LP relaxation after problem modification.
- virtual void branchAndBound ()

  Invoke solver's built-in enumeration algorithm.

Parameter set/get methods

The set methods return true if the parameter was set to the given value, false otherwise.

There can be various reasons for failure: the given parameter is not applicable for the solver (e.g., refactorization frequency for the volume algorithm), the parameter is not yet implemented for the solver or simply the value of the parameter is out of the range the solver accepts. If a parameter setting call returns false check the details of your solver.

The get methods return true if the given parameter is applicable for the solver and is implemented. In this case the value of the parameter is returned in the second argument. Otherwise they return false.

- bool setIntParam (OsiIntParam key, int value)

  Set an integer parameter.
- bool setDblParam (OsiDblParam key, double value)

  Set a double parameter.
- bool setStrParam (OsiStrParam key, const std::string &value)

  Set a string parameter.
- bool setHintParam (OsiHintParam key, bool sense=true, OsiHintStrength strength=OsiHintTry, void ∗info=0)

  Set a hint parameter.
- bool getIntParam (OsiIntParam key, int &value) const

  Get an integer parameter.
- bool getDblParam (OsiDblParam key, double &value) const

  Get a double parameter.
- bool getStrParam (OsiStrParam key, std::string &value) const

  Get a string parameter.

Methods returning info on how the solution process terminated

- virtual bool isAbandoned () const

  Are there a numerical difficulties?
- virtual bool isProvenOptimal () const

  Is optimality proven?
- virtual bool isProvenPrimalInfeasible () const

  Is primal infeasiblity proven?
- virtual bool isProvenDualInfeasible () const

  Is dual infeasiblity proven?
- virtual bool isPrimalObjectiveLimitReached () const

  Is the given primal objective limit reached?
- virtual bool isDualObjectiveLimitReached () const

  Is the given dual objective limit reached?
- virtual bool isIterationLimitReached () const

  Iteration limit reached?
- virtual bool isTimeLimitReached () const

  Time limit reached?
- virtual bool isFeasible () const

  (Integer) Feasible solution found?

WarmStart related methods

- CoinWarmStart ∗ getEmptyWarmStart () const

Get an empty warm start object.
- virtual CoinWarmStart ∗ getWarmStart () const

  Get warmstarting information.
- virtual bool setWarmStart (const CoinWarmStart ∗warmstart)

  Set warmstarting information.

Hotstart related methods (primarily used in strong branching). <br>

The user can create a hotstart (a snapshot) of the optimization process then reoptimize over and over again always starting from there.

***NOTE**: between hotstarted optimizations only bound changes are allowed.*

- virtual void markHotStart ()

  Create a hotstart point of the optimization process.
- virtual void solveFromHotStart ()

  Optimize starting from the hotstart.
- virtual void unmarkHotStart ()

  Delete the snapshot.

Methods related to querying the input data

- virtual int getNumCols () const

  Get number of columns.
- virtual int getNumRows () const

  Get number of rows.
- virtual int getNumElements () const

  Get number of nonzero elements.
- virtual const double ∗ getColLower () const

  Get pointer to array[getNumCols()] of column lower bounds.
- virtual const double ∗ getColUpper () const

  Get pointer to array[getNumCols()] of column upper bounds.
- virtual const char ∗ getRowSense () const

  Get pointer to array[getNumRows()] of row constraint senses.
- virtual const double ∗ getRightHandSide () const

  Get pointer to array[getNumRows()] of rows right-hand sides.
- virtual const double ∗ getRowRange () const

  Get pointer to array[getNumRows()] of row ranges.
- virtual const double ∗ getRowLower () const

  Get pointer to array[getNumRows()] of row lower bounds.
- virtual const double ∗ getRowUpper () const

  Get pointer to array[getNumRows()] of row upper bounds.
- virtual const double ∗ getObjCoefficients () const

  Get pointer to array[getNumCols()] of objective function coefficients.
- virtual double getObjSense () const

  Get objective function sense (1 for min (default), -1 for max)
- virtual bool isContinuous (int colNumber) const

  Return true if column is continuous.
- virtual const CoinPackedMatrix ∗ getMatrixByRow () const

  Get pointer to row-wise copy of matrix.
- virtual const CoinPackedMatrix ∗ getMatrixByCol () const

  Get pointer to column-wise copy of matrix.
- virtual double getInfinity () const

  Get solver's value for infinity.

Methods related to querying the solution

- virtual const double $*$ getColSolution () const

  Get pointer to array[getNumCols()] of primal solution vector.
- virtual const double $*$ getRowPrice () const

  Get pointer to array[getNumRows()] of dual prices.
- virtual const double $*$ getReducedCost () const

  Get a pointer to array[getNumCols()] of reduced costs.
- virtual const double $*$ getRowActivity () const

  Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.
- virtual double getObjValue () const

  Get objective function value.
- virtual int getIterationCount () const

  Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.
- virtual std::vector$<$ double $*$ $>$ getDualRays (int maxNumRays, bool fullRay=false) const

  Get as many dual rays as the solver can provide.
- virtual std::vector$<$ double $*$ $>$ getPrimalRays (int maxNumRays) const

  Get as many primal rays as the solver can provide.

Changing bounds on variables and constraints

- virtual void setObjCoeff (int elementIndex, double elementValue)

  Set an objective function coefficient.
- virtual void setColLower (int elementIndex, double elementValue)

  Set a single column lower bound
  Use -COIN_DBL_MAX for -infinity.
- virtual void setColUpper (int elementIndex, double elementValue)

  Set a single column upper bound
  Use COIN_DBL_MAX for infinity.
- virtual void setColBounds (int elementIndex, double lower, double upper)

  Set a single column lower and upper bound
  The default implementation just invokes setColLower() and setColUpper()
- virtual void setColSetBounds (const int $*$indexFirst, const int $*$indexLast, const double $*$boundList)

  Set the bounds on a number of columns simultaneously
  The default implementation just invokes setColLower() and setColUpper() over and over again.
- virtual void setRowLower (int elementIndex, double elementValue)

  Set a single row lower bound
  Use -COIN_DBL_MAX for -infinity.
- virtual void setRowUpper (int elementIndex, double elementValue)

  Set a single row upper bound
  Use COIN_DBL_MAX for infinity.
- virtual void setRowBounds (int elementIndex, double lower, double upper)

  Set a single row lower and upper bound
  The default implementation just invokes setRowLower() and setRowUpper()
- virtual void setRowType (int index, char sense, double rightHandSide, double range)

  Set the type of a single row
- virtual void setRowSetBounds (const int $*$indexFirst, const int $*$indexLast, const double $*$boundList)

  Set the bounds on a number of rows simultaneously
  The default implementation just invokes setRowLower() and setRowUpper() over and over again.
- virtual void setRowSetTypes (const int $*$indexFirst, const int $*$indexLast, const char $*$senseList, const double $*$rhsList, const double $*$rangeList)

  Set the type of a number of rows simultaneously
  The default implementation just invokes setRowType() over and over again.

Integrality related changing methods

- virtual void setContinuous (int index)

Set the index-th variable to be a continuous variable.

- virtual void setInteger (int index)

  Set the index-th variable to be an integer variable.
- virtual void setContinuous (const int ∗indices, int len)

  Set the variables listed in indices (which is of length len) to be continuous variables.
- virtual void setInteger (const int ∗indices, int len)

  Set the variables listed in indices (which is of length len) to be integer variables.

Methods to expand a problem.<br>

Note that if a column is added then by default it will correspond to a continuous variable.

- virtual void addCol (const CoinPackedVectorBase &vec, const double collb, const double colub, const double obj)

  Add a column (primal variable) to the problem.
- virtual void addCols (const int numcols, const CoinPackedVectorBase ∗const ∗cols, const double ∗collb, const double ∗colub, const double ∗obj)

  Add a set of columns (primal variables) to the problem.
- virtual void deleteCols (const int num, const int ∗colIndices)

  Remove a set of columns (primal variables) from the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const double rowlb, const double rowub)

  Add a row (constraint) to the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const char rowsen, const double rowrhs, const double rowrng)

  Add a row (constraint) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const double ∗rowlb, const double ∗rowub)

  Add a set of rows (constraints) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Add a set of rows (constraints) to the problem.
- virtual void deleteRows (const int num, const int ∗rowIndices)

  Delete a set of rows (constraints) from the problem.

Methods to input a problem

- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)

  Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, double ∗&rowlb, double ∗&rowub)

  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, char ∗&rowsen, double ∗&rowrhs, double ∗&rowrng)

  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)

  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual int readMps (const char ∗filename, const char ∗extension="mps")

  Read an mps file from the given filename.
- virtual void writeMps (const char ∗filename, const char ∗extension="mps", double objSense=0.0) const

  Write the problem into an mps file of the given filename.

Methods for row and column names.

Only the set methods need to be overridden to ensure consistent names between OsiGlpk and the OSI base class.

- void setObjName (std::string name)

  Set the objective function name.
- void setRowName (int ndx, std::string name)

  Set a row name.
- void setColName (int ndx, std::string name)

  Set a column name.

Constructors and destructor

- OsiGlpkSolverInterface ()

  Default Constructor.
- virtual OsiSolverInterface ∗ clone (bool copyData=true) const

  Clone.
- OsiGlpkSolverInterface (const OsiGlpkSolverInterface &)

  Copy constructor.
- OsiGlpkSolverInterface & operator= (const OsiGlpkSolverInterface &rhs)

  Assignment operator.
- virtual ∼OsiGlpkSolverInterface ()

  Destructor.
- virtual void reset ()

  Resets as if default constructor.

Static Public Member Functions

Static instance counter methods

- static void incrementInstanceCounter ()

  GLPK has a context which must be freed after all GLPK LPs (or MIPs) are freed.
- static void decrementInstanceCounter ()

  GLPK has a context which must be freed after all GLPK LPs (or MIPs) are freed.
- static unsigned int getNumInstances ()

  Return the number of LP/MIP instances of instantiated objects using the GLPK environment.

Protected Member Functions

Protected methods

- virtual void applyRowCut (const OsiRowCut &rc)

  Apply a row cut. Return true if cut was applied.
- virtual void applyColCut (const OsiColCut &cc)

  Apply a column cut (bound adjustment).
- LPX ∗ getMutableModelPtr () const

  Pointer to the model.

Private Member Functions

Private methods

- void gutsOfCopy (const OsiGlpkSolverInterface &source)
  The real work of a copy constructor (used by copy and assignment)
- void gutsOfConstructor ()
  The real work of the constructor.
- void gutsOfDestructor ()
  The real work of the destructor.
- void freeCachedColRim ()
  free cached column rim vectors
- void freeCachedRowRim ()
  free cached row rim vectors
- void freeCachedResults ()
  free cached result vectors
- void freeCachedMatrix ()
  free cached matrices
- void freeCachedData (int keepCached=KEEPCACHED_NONE)
  free all cached data (except specified entries, see getLpPtr())
- void freeAllMemory ()
  free all allocated memory
- void printBounds ()
  Just for testing purposes.
- void fillColBounds () const
  Fill cached collumn bounds.

Private Attributes

Cached information derived from the GLPK model

- int iter_used_
  Number of iterations.
- double $*$ obj_
  Pointer to objective vector.
- double $*$ collower_
  Pointer to dense vector of variable lower bounds.
- double $*$ colupper_
  Pointer to dense vector of variable lower bounds.
- char $*$ ctype_
  Pointer to dense vector of variable types (continous, binary, integer)
- char $*$ rowsense_
  Pointer to dense vector of row sense indicators.
- double $*$ rhs_
  Pointer to dense vector of row right-hand side values.
- double $*$ rowrange_
  Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)
- double $*$ rowlower_
  Pointer to dense vector of row lower bounds.
- double $*$ rowupper_
  Pointer to dense vector of row upper bounds.
- double $*$ colsol_
  Pointer to primal solution vector.
- double $*$ rowsol_

Pointer to dual solution vector.
- double ∗ redcost_

  Pointer to reduced cost vector.
- double ∗ rowact_

  Pointer to row activity (slack) vector.
- CoinPackedMatrix ∗ matrixByRow_

  Pointer to row-wise copy of problem matrix coefficients.
- CoinPackedMatrix ∗ matrixByCol_

  Pointer to row-wise copy of problem matrix coefficients.

Friends

- void OsiGlpkSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiGlpkSolverInterface class.

GLPK specific public interfaces

- enum keepCachedFlag {
  KEEPCACHED_NONE = 0, KEEPCACHED_COLUMN = 1, KEEPCACHED_ROW = 2, KEEPCACHED_MATRIX = 4,
  KEEPCACHED_RESULTS = 8, KEEPCACHED_PROBLEM = KEEPCACHED_COLUMN | KEEPCACHED_RO-W | KEEPCACHED_MATRIX, KEEPCACHED_ALL = KEEPCACHED_PROBLEM | KEEPCACHED_RESULTS,
  FREECACHED_COLUMN = KEEPCACHED_PROBLEM & ∼KEEPCACHED_COLUMN,
  FREECACHED_ROW = KEEPCACHED_PROBLEM & ∼KEEPCACHED_ROW, FREECACHED_MATRIX = K-EEPCACHED_PROBLEM & ∼KEEPCACHED_MATRIX, FREECACHED_RESULTS = KEEPCACHED_ALL & ∼KEEPCACHED_RESULTS }
- LPX ∗ getModelPtr ()

  Get pointer to GLPK model.

Private member data

- LPX ∗ lp_

  GPLK model represented by this class instance.
- int bbWasLast_
- int maxIteration_

  simplex iteration limit (per call to solver)
- int hotStartMaxIteration_

  simplex iteration limit (for hot start)
- int nameDisc_

  OSI name discipline.
- double dualObjectiveLimit_

  dual objective limit (measure of badness; stop if we're worse)
- double primalObjectiveLimit_

  primal objective limit (measure of goodness; stop if we're better)
- double dualTolerance_

  dual feasibility tolerance
- double primalTolerance_

  primal feasibility tolerance
- double objOffset_

constant offset for objective function
- std::string probName_

  Problem name.
- void ∗ info_ [OsiLastHintParam]

  Array for info blocks associated with hints.
- int hotStartCStatSize_

  Hotstart information.
- int ∗ hotStartCStat_

  column status array
- double ∗ hotStartCVal_

  primal variable values
- double ∗ hotStartCDualVal_

  dual variable values
- int hotStartRStatSize_

  size of row status and value arrays
- int ∗ hotStartRStat_

  row status array
- double ∗ hotStartRVal_

  row slack values
- double ∗ hotStartRDualVal_

  row dual values
- bool isIterationLimitReached_

  glpk stopped on iteration limit
- bool isTimeLimitReached_

  glpk stopped on time limit
- bool isAbandoned_

  glpk abandoned the problem
- bool isObjLowerLimitReached_

  glpk stopped on lower objective limit
- bool isObjUpperLimitReached_

  glpk stopped on upper objective limit
- bool isPrimInfeasible_

  glpk declared the problem primal infeasible
- bool isDualInfeasible_

  glpk declared the problem dual infeasible
- bool isFeasible_

  glpk declared the problem feasible
- static unsigned int numInstances_

  number of GLPK instances currently in use (counts only those created by OsiGlpk)

Additional Inherited Members

8.16.1 Detailed Description

Definition at line 34 of file OsiGlpkSolverInterface.hpp.

8.16.2 Member Enumeration Documentation

8.16.2.1 enum OsiGlpkSolverInterface::keepCachedFlag

Enumerator

KEEPCACHED_NONE	discard all cached data (default)
KEEPCACHED_COLUMN	column information: objective values, lower and upper bounds, variable types
KEEPCACHED_ROW	row information: right hand sides, ranges and senses, lower and upper bounds for row
KEEPCACHED_MATRIX	problem matrix: matrix ordered by column and by row
KEEPCACHED_RESULTS	LP solution: primal and dual solution, reduced costs, row activities.
KEEPCACHED_PROBLEM	only discard cached LP solution
KEEPCACHED_ALL	keep all cached data (similar to getMutableLpPtr())
FREECACHED_COLUMN	free only cached column and LP solution information
FREECACHED_ROW	free only cached row and LP solution information
FREECACHED_MATRIX	free only cached matrix and LP solution information
FREECACHED_RESULTS	free only cached LP solution information

Definition at line 635 of file OsiGlpkSolverInterface.hpp.

8.16.3 Constructor & Destructor Documentation

8.16.3.1 OsiGlpkSolverInterface::OsiGlpkSolverInterface ( )

Default Constructor.

8.16.3.2 OsiGlpkSolverInterface::OsiGlpkSolverInterface (const OsiGlpkSolverInterface &)

Copy constructor.

8.16.3.3 virtual OsiGlpkSolverInterface::∼OsiGlpkSolverInterface ( ) `[virtual]`

Destructor.

8.16.4 Member Function Documentation

8.16.4.1 virtual void OsiGlpkSolverInterface::initialSolve ( ) `[virtual]`

Solve initial LP relaxation.

Implements OsiSolverInterface.

8.16.4.2 virtual void OsiGlpkSolverInterface::resolve ( ) `[virtual]`

Resolve an LP relaxation after problem modification.

Implements OsiSolverInterface.

8.16.4.3 virtual void OsiGlpkSolverInterface::branchAndBound ( ) `[virtual]`

Invoke solver's built-in enumeration algorithm.

Implements OsiSolverInterface.

8.16.4.4 bool OsiGlpkSolverInterface::setIntParam (**OsiIntParam** *key,* int *value*) `[virtual]`

Set an integer parameter.

Reimplemented from OsiSolverInterface.

8.16.4.5 bool OsiGlpkSolverInterface::setDblParam (**OsiDblParam** *key,* double *value*) `[virtual]`

Set a double parameter.

Reimplemented from OsiSolverInterface.

8.16.4.6 bool OsiGlpkSolverInterface::setStrParam (**OsiStrParam** *key,* const std::string & *value*) `[virtual]`

Set a string parameter.

Reimplemented from OsiSolverInterface.

8.16.4.7 bool OsiGlpkSolverInterface::setHintParam (**OsiHintParam** *key,* bool *yesNo* = `true`, **OsiHintStrength** *strength* = **OsiHintTry**, void * = `0`) `[virtual]`

Set a hint parameter.

The `otherInformation` parameter can be used to pass in an arbitrary block of information which is interpreted by the OSI and the underlying solver. Users are cautioned that this hook is solver-specific.

Implementors: The default implementation completely ignores `otherInformation` and always throws an exception for OsiForceDo. This is almost certainly not the behaviour you want; you really should override this method.

Reimplemented from OsiSolverInterface.

8.16.4.8 bool OsiGlpkSolverInterface::getIntParam (**OsiIntParam** *key,* int & *value*) const `[virtual]`

Get an integer parameter.

Reimplemented from OsiSolverInterface.

8.16.4.9 bool OsiGlpkSolverInterface::getDblParam (**OsiDblParam** *key,* double & *value*) const `[virtual]`

Get a double parameter.

Reimplemented from OsiSolverInterface.

8.16.4.10 bool OsiGlpkSolverInterface::getStrParam (**OsiStrParam** *key,* std::string & *value*) const `[virtual]`

Get a string parameter.

Reimplemented from OsiSolverInterface.

8.16.4.11 virtual bool OsiGlpkSolverInterface::isAbandoned ( ) const `[virtual]`

Are there a numerical difficulties?

Implements OsiSolverInterface.

8.16.4.12 virtual bool OsiGlpkSolverInterface::isProvenOptimal ( ) const `[virtual]`

Is optimality proven?

Implements OsiSolverInterface.

8.16.4.13 virtual bool OsiGlpkSolverInterface::isProvenPrimalInfeasible ( ) const [virtual]

Is primal infeasiblity proven?

Implements OsiSolverInterface.

8.16.4.14 virtual bool OsiGlpkSolverInterface::isProvenDualInfeasible ( ) const [virtual]

Is dual infeasiblity proven?

Implements OsiSolverInterface.

8.16.4.15 virtual bool OsiGlpkSolverInterface::isPrimalObjectiveLimitReached ( ) const [virtual]

Is the given primal objective limit reached?

Reimplemented from OsiSolverInterface.

8.16.4.16 virtual bool OsiGlpkSolverInterface::isDualObjectiveLimitReached ( ) const [virtual]

Is the given dual objective limit reached?

Reimplemented from OsiSolverInterface.

8.16.4.17 virtual bool OsiGlpkSolverInterface::isIterationLimitReached ( ) const [virtual]

Iteration limit reached?

Implements OsiSolverInterface.

8.16.4.18 virtual bool OsiGlpkSolverInterface::isTimeLimitReached ( ) const [virtual]

Time limit reached?

8.16.4.19 virtual bool OsiGlpkSolverInterface::isFeasible ( ) const [virtual]

(Integer) Feasible solution found?

8.16.4.20 CoinWarmStart∗ OsiGlpkSolverInterface::getEmptyWarmStart ( ) const [inline], [virtual]

Get an empty warm start object.

This routine returns an empty CoinWarmStartBasis object. Its purpose is to provide a way to give a client a warm start basis object of the appropriate type, which can resized and modified as desired.

Implements OsiSolverInterface.

Definition at line 117 of file OsiGlpkSolverInterface.hpp.

8.16.4.21 virtual CoinWarmStart∗ OsiGlpkSolverInterface::getWarmStart ( ) const [virtual]

Get warmstarting information.

Implements OsiSolverInterface.

8.16.4.22 virtual bool OsiGlpkSolverInterface::setWarmStart (const CoinWarmStart ∗ *warmstart*) [virtual]

Set warmstarting information.

Return true/false depending on whether the warmstart information was accepted or not.

Implements OsiSolverInterface.

8.16.4.23 virtual void OsiGlpkSolverInterface::markHotStart ( ) [virtual]

Create a hotstart point of the optimization process.

Reimplemented from OsiSolverInterface.

8.16.4.24 virtual void OsiGlpkSolverInterface::solveFromHotStart ( ) [virtual]

Optimize starting from the hotstart.

Reimplemented from OsiSolverInterface.

8.16.4.25 virtual void OsiGlpkSolverInterface::unmarkHotStart ( ) [virtual]

Delete the snapshot.

Reimplemented from OsiSolverInterface.

8.16.4.26 virtual int OsiGlpkSolverInterface::getNumCols ( ) const [virtual]

Get number of columns.

Implements OsiSolverInterface.

8.16.4.27 virtual int OsiGlpkSolverInterface::getNumRows ( ) const [virtual]

Get number of rows.

Implements OsiSolverInterface.

8.16.4.28 virtual int OsiGlpkSolverInterface::getNumElements ( ) const [virtual]

Get number of nonzero elements.

Implements OsiSolverInterface.

8.16.4.29 virtual const double∗ OsiGlpkSolverInterface::getColLower ( ) const [virtual]

Get pointer to array[getNumCols()] of column lower bounds.

Implements OsiSolverInterface.

8.16.4.30 virtual const double∗ OsiGlpkSolverInterface::getColUpper ( ) const [virtual]

Get pointer to array[getNumCols()] of column upper bounds.

Implements OsiSolverInterface.

8.16.4.31 virtual const char∗ OsiGlpkSolverInterface::getRowSense ( ) const [virtual]

Get pointer to array[getNumRows()] of row constraint senses.

- ’L’: <= constraint
- ’E’: = constraint
- ’G’: >= constraint
- ’R’: ranged constraint
- ’N’: free constraint

Implements OsiSolverInterface.

8.16.4.32 virtual const double∗ OsiGlpkSolverInterface::getRightHandSide ( ) const [virtual]

Get pointer to array[getNumRows()] of rows right-hand sides.

- if rowsense()[i] == 'L' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'G' then rhs()[i] == rowlower()[i]
- if rowsense()[i] == 'R' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'N' then rhs()[i] == 0.0

Implements OsiSolverInterface.

8.16.4.33 virtual const double∗ OsiGlpkSolverInterface::getRowRange ( ) const [virtual]

Get pointer to array[getNumRows()] of row ranges.

- if rowsense()[i] == 'R' then rowrange()[i] == rowupper()[i] - rowlower()[i]
- if rowsense()[i] != 'R' then rowrange()[i] is 0.0

Implements OsiSolverInterface.

8.16.4.34 virtual const double∗ OsiGlpkSolverInterface::getRowLower ( ) const [virtual]

Get pointer to array[getNumRows()] of row lower bounds.

Implements OsiSolverInterface.

8.16.4.35 virtual const double∗ OsiGlpkSolverInterface::getRowUpper ( ) const [virtual]

Get pointer to array[getNumRows()] of row upper bounds.

Implements OsiSolverInterface.

8.16.4.36 virtual const double∗ OsiGlpkSolverInterface::getObjCoefficients ( ) const [virtual]

Get pointer to array[getNumCols()] of objective function coefficients.

Implements OsiSolverInterface.

8.16.4.37 virtual double OsiGlpkSolverInterface::getObjSense ( ) const [virtual]

Get objective function sense (1 for min (default), -1 for max)

Implements OsiSolverInterface.

8.16.4.38 virtual bool OsiGlpkSolverInterface::isContinuous (int *colNumber*) const [virtual]

Return true if column is continuous.

Implements OsiSolverInterface.

8.16.4.39 virtual const CoinPackedMatrix∗ OsiGlpkSolverInterface::getMatrixByRow ( ) const [virtual]

Get pointer to row-wise copy of matrix.

Implements OsiSolverInterface.

8.16.4.40 virtual const CoinPackedMatrix∗ OsiGlpkSolverInterface::getMatrixByCol ( ) const [virtual]

Get pointer to column-wise copy of matrix.

Implements OsiSolverInterface.

8.16.4.41 virtual double OsiGlpkSolverInterface::getInfinity ( ) const [virtual]

Get solver's value for infinity.

Implements OsiSolverInterface.

8.16.4.42 virtual const double∗ OsiGlpkSolverInterface::getColSolution ( ) const [virtual]

Get pointer to array[getNumCols()] of primal solution vector.

Implements OsiSolverInterface.

8.16.4.43 virtual const double∗ OsiGlpkSolverInterface::getRowPrice ( ) const [virtual]

Get pointer to array[getNumRows()] of dual prices.

Implements OsiSolverInterface.

8.16.4.44 virtual const double∗ OsiGlpkSolverInterface::getReducedCost ( ) const [virtual]

Get a pointer to array[getNumCols()] of reduced costs.

Implements OsiSolverInterface.

8.16.4.45 virtual const double∗ OsiGlpkSolverInterface::getRowActivity ( ) const [virtual]

Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.

Implements OsiSolverInterface.

8.16.4.46 virtual double OsiGlpkSolverInterface::getObjValue ( ) const [virtual]

Get objective function value.

Implements OsiSolverInterface.

8.16.4.47 virtual int OsiGlpkSolverInterface::getIterationCount ( ) const [virtual]

Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.

Implements OsiSolverInterface.

8.16.4.48 virtual std::vector<double∗> OsiGlpkSolverInterface::getDualRays (int *maxNumRays*, bool *fullRay* = false) const [virtual]

Get as many dual rays as the solver can provide.

(In case of proven primal infeasibility there should be at least one.)

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumRows() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.16.4.49 virtual std::vector<double∗> OsiGlpkSolverInterface::getPrimalRays (int *maxNumRays*) const [virtual]

Get as many primal rays as the solver can provide.

(In case of proven dual infeasibility there should be at least one.)

The first getNumRows() ray components will always be associated with the row duals (as returned by getRowPrice()). If `fullRay` is true, the final getNumCols() entries will correspond to the ray components associated with the nonbasic variables. If the full ray is requested and the method cannot provide it, it will throw an exception.

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumCols() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.16.4.50 virtual void OsiGlpkSolverInterface::setObjCoeff (int *elementIndex,* double *elementValue*) [virtual]

Set an objective function coefficient.

Implements OsiSolverInterface.

8.16.4.51 virtual void OsiGlpkSolverInterface::setColLower (int *elementIndex,* double *elementValue*) [virtual]

Set a single column lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.16.4.52 virtual void OsiGlpkSolverInterface::setColUpper (int *elementIndex,* double *elementValue*) [virtual]

Set a single column upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.16.4.53 virtual void OsiGlpkSolverInterface::setColBounds (int *elementIndex,* double *lower,* double *upper*) [virtual]

Set a single column lower and upper bound

The default implementation just invokes setColLower() and setColUpper()

Reimplemented from OsiSolverInterface.

8.16.4.54 virtual void OsiGlpkSolverInterface::setColSetBounds (const int ∗ *indexFirst,* const int ∗ *indexLast,* const double ∗ *boundList*) [virtual]

Set the bounds on a number of columns simultaneously

The default implementation just invokes setColLower() and setColUpper() over and over again.

Parameters

indexFirst,index-Last	pointers to the beginning and after the end of the array of the indices of the variables whose *either* bound changes

boundList	the new lower/upper bound pairs for the variables

Reimplemented from OsiSolverInterface.

8.16.4.55 virtual void OsiGlpkSolverInterface::setRowLower (int *elementIndex,* double *elementValue*) [virtual]

Set a single row lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.16.4.56 virtual void OsiGlpkSolverInterface::setRowUpper (int *elementIndex,* double *elementValue*) [virtual]

Set a single row upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.16.4.57 virtual void OsiGlpkSolverInterface::setRowBounds (int *elementIndex,* double *lower,* double *upper*) [virtual]

Set a single row lower and upper bound

The default implementation just invokes setRowLower() and setRowUpper()

Reimplemented from OsiSolverInterface.

8.16.4.58 virtual void OsiGlpkSolverInterface::setRowType (int *index,* char *sense,* double *rightHandSide,* double *range*) [virtual]

Set the type of a single row

Implements OsiSolverInterface.

8.16.4.59 virtual void OsiGlpkSolverInterface::setRowSetBounds (const int ∗ *indexFirst,* const int ∗ *indexLast,* const double ∗ *boundList*) [virtual]

Set the bounds on a number of rows simultaneously

The default implementation just invokes setRowLower() and setRowUpper() over and over again.

Parameters

indexFirst,index-Last	pointers to the beginning and after the end of the array of the indices of the constraints whose *either* bound changes
boundList	the new lower/upper bound pairs for the constraints

Reimplemented from OsiSolverInterface.

8.16.4.60 virtual void OsiGlpkSolverInterface::setRowSetTypes (const int ∗ *indexFirst,* const int ∗ *indexLast,* const char ∗ *senseList,* const double ∗ *rhsList,* const double ∗ *rangeList*) [virtual]

Set the type of a number of rows simultaneously

The default implementation just invokes setRowType() over and over again.

Parameters

indexFirst,index-Last	pointers to the beginning and after the end of the array of the indices of the constraints whose *any* characteristics changes
senseList	the new senses
rhsList	the new right hand sides
rangeList	the new ranges

Reimplemented from OsiSolverInterface.

8.16.4.61 virtual void OsiGlpkSolverInterface::setContinuous (int *index*) [virtual]

Set the index-th variable to be a continuous variable.

Implements OsiSolverInterface.

8.16.4.62 virtual void OsiGlpkSolverInterface::setInteger (int *index*) [virtual]

Set the index-th variable to be an integer variable.

Implements OsiSolverInterface.

8.16.4.63 virtual void OsiGlpkSolverInterface::setContinuous (const int ∗ *indices,* int *len*) [virtual]

Set the variables listed in indices (which is of length len) to be continuous variables.

Reimplemented from OsiSolverInterface.

8.16.4.64 virtual void OsiGlpkSolverInterface::setInteger (const int ∗ *indices,* int *len*) [virtual]

Set the variables listed in indices (which is of length len) to be integer variables.

Reimplemented from OsiSolverInterface.

8.16.4.65 virtual void OsiGlpkSolverInterface::setObjSense (double *s*) [virtual]

Set objective function sense (1 for min (default), -1 for max,)

Implements OsiSolverInterface.

8.16.4.66 virtual void OsiGlpkSolverInterface::setColSolution (const double ∗ *colsol*) [virtual]

Set the primal solution column values.

colsol[numcols()] is an array of values of the problem column variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of colsol() until changed by another call to setColsol() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.16.4.67 virtual void OsiGlpkSolverInterface::setRowPrice (const double ∗ *rowprice*) [virtual]

Set dual solution vector.

rowprice[numrows()] is an array of values of the problem row dual variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of rowprice() until changed by another call to setRowprice() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.16.4.68 virtual void OsiGlpkSolverInterface::addCol (const CoinPackedVectorBase & *vec*, const double *collb*, const double *colub*, const double *obj*) [virtual]

Add a column (primal variable) to the problem.

Implements OsiSolverInterface.

8.16.4.69 virtual void OsiGlpkSolverInterface::addCols (const int *numcols*, const CoinPackedVectorBase ∗const ∗ *cols*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*) [virtual]

Add a set of columns (primal variables) to the problem.

The default implementation simply makes repeated calls to addCol().

Reimplemented from OsiSolverInterface.

8.16.4.70 virtual void OsiGlpkSolverInterface::deleteCols (const int *num*, const int ∗ *colIndices*) [virtual]

Remove a set of columns (primal variables) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted variables are nonbasic.

Implements OsiSolverInterface.

8.16.4.71 virtual void OsiGlpkSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const double *rowlb*, const double *rowub*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.16.4.72 virtual void OsiGlpkSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const char *rowsen*, const double *rowrhs*, const double *rowrng*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.16.4.73 virtual void OsiGlpkSolverInterface::addRows (const int *numrows*, const CoinPackedVectorBase ∗const ∗ *rows*, const double ∗ *rowlb*, const double ∗ *rowub*) [virtual]

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented from OsiSolverInterface.

8.16.4.74 virtual void OsiGlpkSolverInterface::addRows (const int *numrows*, const CoinPackedVectorBase ∗const ∗ *rows*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) [virtual]

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented from OsiSolverInterface.

8.16.4.75 virtual void OsiGlpkSolverInterface::deleteRows (const int *num*, const int ∗ *rowIndices*) [virtual]

Delete a set of rows (constraints) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted rows are loose.

Implements OsiSolverInterface.

8.16.4.76 virtual void OsiGlpkSolverInterface::loadProblem (const CoinPackedMatrix & *matrix*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const double ∗ *rowlb*, const double ∗ *rowub*) [virtual]

Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `rowub`: all rows have upper bound infinity
- `rowlb`: all rows have lower bound -infinity
- `obj`: all variables have 0 objective coefficient

Implements OsiSolverInterface.

8.16.4.77 virtual void OsiGlpkSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix*, double ∗& *collb*, double ∗& *colub*, double ∗& *obj*, double ∗& *rowlb*, double ∗& *rowub*) [virtual]

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.16.4.78 virtual void OsiGlpkSolverInterface::loadProblem (const CoinPackedMatrix & *matrix*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) [virtual]

Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `obj`: all variables have 0 objective coefficient
- `rowsen`: all rows are >=
- `rowrhs`: all right hand sides are 0
- `rowrng`: 0 for the ranged rows

Implements OsiSolverInterface.

8.16.4.79 virtual void OsiGlpkSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix*, double ∗& *collb*, double ∗& *colub*, double ∗& *obj*, char ∗& *rowsen*, double ∗& *rowrhs*, double ∗& *rowrng*) [virtual]

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.16.4.80 virtual void OsiGlpkSolverInterface::loadProblem (const int *numcols*, const int *numrows*, const int ∗ *start*, const int ∗ *index*, const double ∗ *value*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const double ∗ *rowlb*, const double ∗ *rowub*) `[virtual]`

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.16.4.81 virtual void OsiGlpkSolverInterface::loadProblem (const int *numcols*, const int *numrows*, const int ∗ *start*, const int ∗ *index*, const double ∗ *value*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) `[virtual]`

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.16.4.82 virtual int OsiGlpkSolverInterface::readMps (const char ∗ *filename*, const char ∗ *extension* = `"mps"`) `[virtual]`

Read an mps file from the given filename.

Reimplemented from OsiSolverInterface.

8.16.4.83 virtual void OsiGlpkSolverInterface::writeMps (const char ∗ *filename*, const char ∗ *extension* = `"mps"`, double *objSense* = `0.0`) const `[virtual]`

Write the problem into an mps file of the given filename.

If objSense is non zero then -1.0 forces the code to write a maximization objective and +1.0 to write a minimization one. If 0.0 then solver can do what it wants

Implements OsiSolverInterface.

8.16.4.84 void OsiGlpkSolverInterface::setObjName (std::string *name*) `[virtual]`

Set the objective function name.

Reimplemented from OsiSolverInterface.

8.16.4.85 void OsiGlpkSolverInterface::setRowName (int *ndx*, std::string *name*) `[virtual]`

Set a row name.

Quietly does nothing if the name discipline (OsiNameDiscipline) is auto. Quietly fails if the row index is invalid.

Reimplemented from OsiSolverInterface.

8.16.4.86 void OsiGlpkSolverInterface::setColName (int *ndx*, std::string *name*) `[virtual]`

Set a column name.

Quietly does nothing if the name discipline (OsiNameDiscipline) is auto. Quietly fails if the column index is invalid.

Reimplemented from OsiSolverInterface.

8.16.4.87 LPX∗ OsiGlpkSolverInterface::getModelPtr ( )

Get pointer to GLPK model.

8.16.4.88 static void OsiGlpkSolverInterface::incrementInstanceCounter ( ) `[inline]`, `[static]`

GLPK has a context which must be freed after all GLPK LPs (or MIPs) are freed.

It is automatically created when the first LP is created. This method:

- Increments by 1 the number of uses of the GLPK environment.

Definition at line 674 of file OsiGlpkSolverInterface.hpp.

8.16.4.89 static void OsiGlpkSolverInterface::decrementInstanceCounter ( ) [static]

GLPK has a context which must be freed after all GLPK LPs (or MIPs) are freed.

This method:

- Decrements by 1 the number of uses of the GLPK environment.
- Deletes the GLPK environment when the number of uses is change to 0 from 1.

8.16.4.90 static unsigned int OsiGlpkSolverInterface::getNumInstances ( ) [inline], [static]

Return the number of LP/MIP instances of instantiated objects using the GLPK environment.

Definition at line 686 of file OsiGlpkSolverInterface.hpp.

8.16.4.91 virtual OsiSolverInterface∗ OsiGlpkSolverInterface::clone (bool *copyData* = true) const [virtual]

Clone.

Implements OsiSolverInterface.

8.16.4.92 OsiGlpkSolverInterface& OsiGlpkSolverInterface::operator= (const OsiGlpkSolverInterface & *rhs*)

Assignment operator.

8.16.4.93 virtual void OsiGlpkSolverInterface::reset ( ) [virtual]

Resets as if default constructor.

Reimplemented from OsiSolverInterface.

8.16.4.94 virtual void OsiGlpkSolverInterface::applyRowCut (const OsiRowCut & *rc*) [protected], [virtual]

Apply a row cut. Return true if cut was applied.

Implements OsiSolverInterface.

8.16.4.95 virtual void OsiGlpkSolverInterface::applyColCut (const OsiColCut & *cc*) [protected], [virtual]

Apply a column cut (bound adjustment).

Return true if cut was applied.

Implements OsiSolverInterface.

8.16.4.96 LPX∗ OsiGlpkSolverInterface::getMutableModelPtr ( ) const [protected]

Pointer to the model.

8.16.4.97 void OsiGlpkSolverInterface::gutsOfCopy (const OsiGlpkSolverInterface & *source*) [private]

The real work of a copy constructor (used by copy and assignment)

8.16.4.98 void OsiGlpkSolverInterface::gutsOfConstructor ( ) [private]

The real work of the constructor.

8.16.4.99 void OsiGlpkSolverInterface::gutsOfDestructor ( ) [private]

The real work of the destructor.

8.16.4.100 void OsiGlpkSolverInterface::freeCachedColRim ( ) [private]

free cached column rim vectors

8.16.4.101 void OsiGlpkSolverInterface::freeCachedRowRim ( ) [private]

free cached row rim vectors

8.16.4.102 void OsiGlpkSolverInterface::freeCachedResults ( ) [private]

free cached result vectors

8.16.4.103 void OsiGlpkSolverInterface::freeCachedMatrix ( ) [private]

free cached matrices

8.16.4.104 void OsiGlpkSolverInterface::freeCachedData (int *keepCached* = KEEPCACHED_NONE) [private]

free all cached data (except specified entries, see getLpPtr())

8.16.4.105 void OsiGlpkSolverInterface::freeAllMemory ( ) [private]

free all allocated memory

8.16.4.106 void OsiGlpkSolverInterface::printBounds ( ) [private]

Just for testing purposes.

8.16.4.107 void OsiGlpkSolverInterface::fillColBounds ( ) const [private]

Fill cached collumn bounds.

8.16.5 Friends And Related Function Documentation

8.16.5.1 void OsiGlpkSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*) [friend]

A function that tests the methods in the OsiGlpkSolverInterface class.

8.16.6 Member Data Documentation

8.16.6.1 LPX* OsiGlpkSolverInterface::lp_ [mutable], [private]

GPLK model represented by this class instance.

Definition at line 770 of file OsiGlpkSolverInterface.hpp.

8.16.6.2 unsigned int OsiGlpkSolverInterface::numInstances_ [static], [private]

number of GLPK instances currently in use (counts only those created by OsiGlpk)

Definition at line 773 of file OsiGlpkSolverInterface.hpp.

8.16.6.3 int OsiGlpkSolverInterface::bbWasLast_ [private]

Definition at line 778 of file OsiGlpkSolverInterface.hpp.

8.16.6.4 int OsiGlpkSolverInterface::maxIteration_ [private]

simplex iteration limit (per call to solver)

Definition at line 782 of file OsiGlpkSolverInterface.hpp.

8.16.6.5 int OsiGlpkSolverInterface::hotStartMaxIteration_ [private]

simplex iteration limit (for hot start)

Definition at line 784 of file OsiGlpkSolverInterface.hpp.

8.16.6.6 int OsiGlpkSolverInterface::nameDisc_ [private]

OSI name discipline.

Definition at line 786 of file OsiGlpkSolverInterface.hpp.

8.16.6.7 double OsiGlpkSolverInterface::dualObjectiveLimit_ [private]

dual objective limit (measure of badness; stop if we're worse)

Definition at line 790 of file OsiGlpkSolverInterface.hpp.

8.16.6.8 double OsiGlpkSolverInterface::primalObjectiveLimit_ [private]

primal objective limit (measure of goodness; stop if we're better)

Definition at line 792 of file OsiGlpkSolverInterface.hpp.

8.16.6.9 double OsiGlpkSolverInterface::dualTolerance_ [private]

dual feasibility tolerance

Definition at line 794 of file OsiGlpkSolverInterface.hpp.

8.16.6.10 double OsiGlpkSolverInterface::primalTolerance_ [private]

primal feasibility tolerance

Definition at line 796 of file OsiGlpkSolverInterface.hpp.

8.16.6.11 double OsiGlpkSolverInterface::objOffset_ [private]

constant offset for objective function

Definition at line 798 of file OsiGlpkSolverInterface.hpp.

8.16.6.12 std::string OsiGlpkSolverInterface::probName_ [private]

Problem name.

Definition at line 802 of file OsiGlpkSolverInterface.hpp.

8.16.6.13 void∗ OsiGlpkSolverInterface::info_[OsiLastHintParam] [mutable], [private]

Array for info blocks associated with hints.

Definition at line 805 of file OsiGlpkSolverInterface.hpp.

8.16.6.14 int OsiGlpkSolverInterface::hotStartCStatSize_ [private]

Hotstart information.

size of column status and value arrays

Definition at line 811 of file OsiGlpkSolverInterface.hpp.

8.16.6.15 int∗ OsiGlpkSolverInterface::hotStartCStat_ [private]

column status array

Definition at line 813 of file OsiGlpkSolverInterface.hpp.

8.16.6.16 double∗ OsiGlpkSolverInterface::hotStartCVal_ [private]

primal variable values

Definition at line 815 of file OsiGlpkSolverInterface.hpp.

8.16.6.17 double∗ OsiGlpkSolverInterface::hotStartCDualVal_ [private]

dual variable values

Definition at line 817 of file OsiGlpkSolverInterface.hpp.

8.16.6.18 int OsiGlpkSolverInterface::hotStartRStatSize_ [private]

size of row status and value arrays

Definition at line 820 of file OsiGlpkSolverInterface.hpp.

8.16.6.19 int∗ OsiGlpkSolverInterface::hotStartRStat_ [private]

row status array

Definition at line 822 of file OsiGlpkSolverInterface.hpp.

8.16.6.20 double∗ OsiGlpkSolverInterface::hotStartRVal_ [private]

row slack values

Definition at line 824 of file OsiGlpkSolverInterface.hpp.

8.16.6.21 double∗ OsiGlpkSolverInterface::hotStartRDualVal_ [private]

row dual values

Definition at line 826 of file OsiGlpkSolverInterface.hpp.

8.16.6.22 bool OsiGlpkSolverInterface::isIterationLimitReached_ [private]

glpk stopped on iteration limit

Definition at line 830 of file OsiGlpkSolverInterface.hpp.

8.16.6.23 bool OsiGlpkSolverInterface::isTimeLimitReached_ [private]

glpk stopped on time limit

Definition at line 832 of file OsiGlpkSolverInterface.hpp.

8.16.6.24 bool OsiGlpkSolverInterface::isAbandoned_ [private]

glpk abandoned the problem

Definition at line 834 of file OsiGlpkSolverInterface.hpp.

8.16.6.25 bool OsiGlpkSolverInterface::isObjLowerLimitReached_ [private]

glpk stopped on lower objective limit

When minimising, this is the primal limit; when maximising, the dual limit.

Definition at line 840 of file OsiGlpkSolverInterface.hpp.

8.16.6.26 bool OsiGlpkSolverInterface::isObjUpperLimitReached_ [private]

glpk stopped on upper objective limit

When minimising, this is the dual limit; when maximising, the primal limit.

Definition at line 846 of file OsiGlpkSolverInterface.hpp.

8.16.6.27 bool OsiGlpkSolverInterface::isPrimInfeasible_ [private]

glpk declared the problem primal infeasible

Definition at line 848 of file OsiGlpkSolverInterface.hpp.

8.16.6.28 bool OsiGlpkSolverInterface::isDualInfeasible_ [private]

glpk declared the problem dual infeasible

Definition at line 850 of file OsiGlpkSolverInterface.hpp.

8.16.6.29 bool OsiGlpkSolverInterface::isFeasible_ [private]

glpk declared the problem feasible

Definition at line 852 of file OsiGlpkSolverInterface.hpp.

8.16.6.30 int OsiGlpkSolverInterface::iter_used_ [mutable], [private]

Number of iterations.

Definition at line 858 of file OsiGlpkSolverInterface.hpp.

8.16.6.31 double* OsiGlpkSolverInterface::obj_ [mutable], [private]

Pointer to objective vector.

Definition at line 861 of file OsiGlpkSolverInterface.hpp.

8.16.6.32 double* OsiGlpkSolverInterface::collower_ [mutable], [private]

Pointer to dense vector of variable lower bounds.

Definition at line 864 of file OsiGlpkSolverInterface.hpp.

8.16.6.33 double* OsiGlpkSolverInterface::colupper_ [mutable], [private]

Pointer to dense vector of variable lower bounds.

Definition at line 867 of file OsiGlpkSolverInterface.hpp.

8.16.6.34 char∗ OsiGlpkSolverInterface::ctype_ [mutable], [private]

Pointer to dense vector of variable types (continous, binary, integer)

Definition at line 870 of file OsiGlpkSolverInterface.hpp.

8.16.6.35 char∗ OsiGlpkSolverInterface::rowsense_ [mutable], [private]

Pointer to dense vector of row sense indicators.

Definition at line 873 of file OsiGlpkSolverInterface.hpp.

8.16.6.36 double∗ OsiGlpkSolverInterface::rhs_ [mutable], [private]

Pointer to dense vector of row right-hand side values.

Definition at line 876 of file OsiGlpkSolverInterface.hpp.

8.16.6.37 double∗ OsiGlpkSolverInterface::rowrange_ [mutable], [private]

Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)

Definition at line 879 of file OsiGlpkSolverInterface.hpp.

8.16.6.38 double∗ OsiGlpkSolverInterface::rowlower_ [mutable], [private]

Pointer to dense vector of row lower bounds.

Definition at line 882 of file OsiGlpkSolverInterface.hpp.

8.16.6.39 double∗ OsiGlpkSolverInterface::rowupper_ [mutable], [private]

Pointer to dense vector of row upper bounds.

Definition at line 885 of file OsiGlpkSolverInterface.hpp.

8.16.6.40 double∗ OsiGlpkSolverInterface::colsol_ [mutable], [private]

Pointer to primal solution vector.

Definition at line 888 of file OsiGlpkSolverInterface.hpp.

8.16.6.41 double∗ OsiGlpkSolverInterface::rowsol_ [mutable], [private]

Pointer to dual solution vector.

Definition at line 891 of file OsiGlpkSolverInterface.hpp.

8.16.6.42 double∗ OsiGlpkSolverInterface::redcost_ [mutable], [private]

Pointer to reduced cost vector.

Definition at line 894 of file OsiGlpkSolverInterface.hpp.

8.16.6.43 double∗ OsiGlpkSolverInterface::rowact_ [mutable], [private]

Pointer to row activity (slack) vector.

Definition at line 897 of file OsiGlpkSolverInterface.hpp.

8.16.6.44 CoinPackedMatrix∗ OsiGlpkSolverInterface::matrixByRow_ [mutable], [private]

Pointer to row-wise copy of problem matrix coefficients.

Definition at line 900 of file OsiGlpkSolverInterface.hpp.

8.16.6.45 CoinPackedMatrix∗ OsiGlpkSolverInterface::matrixByCol_ [mutable], [private]

Pointer to row-wise copy of problem matrix coefficients.

Definition at line 903 of file OsiGlpkSolverInterface.hpp.

The documentation for this class was generated from the following file:

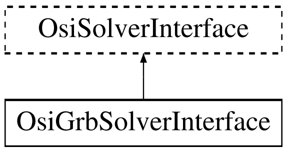
- /home/ted/COIN/trunk/Osi/src/OsiGlpk/OsiGlpkSolverInterface.hpp

8.17 OsiGrbSolverInterface Class Reference

Gurobi Solver Interface.

`#include <OsiGrbSolverInterface.hpp>`

Inheritance diagram for OsiGrbSolverInterface:



Public Member Functions

- virtual void setObjSense (double s)

  Set objective function sense (1 for min (default), -1 for max,)
- virtual void setColSolution (const double ∗colsol)

  Set the primal solution column values.
- virtual void setRowPrice (const double ∗rowprice)

  Set dual solution vector.
- const char ∗ getCtype () const

  return a vector of variable types (continous, binary, integer)
- virtual
  OsiSolverInterface::ApplyCutsReturnCode applyCuts (const OsiCuts &cs, double effectivenessLb=0.0)

  Apply a collection of cuts.

Solve methods

- virtual void initialSolve ()

  Solve initial LP relaxation.
- virtual void resolve ()

  Resolve an LP relaxation after problem modification.
- virtual void branchAndBound ()

  Invoke solver's built-in enumeration algorithm.

Parameter set/get methods

The set methods return true if the parameter was set to the given value, false otherwise.

There can be various reasons for failure: the given parameter is not applicable for the solver (e.g., refactorization frequency for the volume algorithm), the parameter is not yet implemented for the solver or simply the value of the parameter is out of the range the solver accepts. If a parameter setting call returns false check the details of your solver.

The get methods return true if the given parameter is applicable for the solver and is implemented. In this case the value of the parameter is returned in the second argument. Otherwise they return false.

- bool setIntParam (OsiIntParam key, int value)

  Set an integer parameter.
- bool setDblParam (OsiDblParam key, double value)

  Set a double parameter.
- bool setStrParam (OsiStrParam key, const std::string &value)

  Set a string parameter.
- bool setHintParam (OsiHintParam key, bool yesNo=true, OsiHintStrength strength=OsiHintTry, void ∗=NULL)

  Set a hint parameter.
- bool getIntParam (OsiIntParam key, int &value) const

  Get an integer parameter.
- bool getDblParam (OsiDblParam key, double &value) const

  Get a double parameter.
- bool getStrParam (OsiStrParam key, std::string &value) const

  Get a string parameter.
- bool getHintParam (OsiHintParam key, bool &yesNo, OsiHintStrength &strength, void ∗&otherInformation) const

  Get a hint parameter (all information)
- bool getHintParam (OsiHintParam key, bool &yesNo, OsiHintStrength &strength) const

  Get a hint parameter (sense and strength only)
- bool getHintParam (OsiHintParam key, bool &yesNo) const

  Get a hint parameter (sense only)
- void setMipStart (bool value)
- bool getMipStart () const

Methods returning info on how the solution process terminated

- virtual bool isAbandoned () const

  Are there a numerical difficulties?
- virtual bool isProvenOptimal () const

  Is optimality proven?
- virtual bool isProvenPrimalInfeasible () const

  Is primal infeasiblity proven?
- virtual bool isProvenDualInfeasible () const

  Is dual infeasiblity proven?
- virtual bool isPrimalObjectiveLimitReached () const

  Is the given primal objective limit reached?
- virtual bool isDualObjectiveLimitReached () const

  Is the given dual objective limit reached?
- virtual bool isIterationLimitReached () const

  Iteration limit reached?

WarmStart related methods

- CoinWarmStart ∗ getEmptyWarmStart () const

  Get an empty warm start object.

- virtual CoinWarmStart ∗ getWarmStart () const
  Get warmstarting information.
- virtual bool setWarmStart (const CoinWarmStart ∗warmstart)
  Set warmstarting information.

Hotstart related methods (primarily used in strong branching). <br>

The user can create a hotstart (a snapshot) of the optimization process then reoptimize over and over again always starting from there.

***NOTE**: between hotstarted optimizations only bound changes are allowed.*

- virtual void markHotStart ()
  Create a hotstart point of the optimization process.
- virtual void solveFromHotStart ()
  Optimize starting from the hotstart.
- virtual void unmarkHotStart ()
  Delete the snapshot.

Methods related to querying the input data

- virtual int getNumCols () const
  Get number of columns.
- virtual int getNumRows () const
  Get number of rows.
- virtual int getNumElements () const
  Get number of nonzero elements.
- virtual const double ∗ getColLower () const
  Get pointer to array[getNumCols()] of column lower bounds.
- virtual const double ∗ getColUpper () const
  Get pointer to array[getNumCols()] of column upper bounds.
- virtual const char ∗ getRowSense () const
  Get pointer to array[getNumRows()] of row constraint senses.
- virtual const double ∗ getRightHandSide () const
  Get pointer to array[getNumRows()] of rows right-hand sides.
- virtual const double ∗ getRowRange () const
  Get pointer to array[getNumRows()] of row ranges.
- virtual const double ∗ getRowLower () const
  Get pointer to array[getNumRows()] of row lower bounds.
- virtual const double ∗ getRowUpper () const
  Get pointer to array[getNumRows()] of row upper bounds.
- virtual const double ∗ getObjCoefficients () const
  Get pointer to array[getNumCols()] of objective function coefficients.
- virtual double getObjSense () const
  Get objective function sense (1 for min (default), -1 for max)
- virtual bool isContinuous (int colNumber) const
  Return true if column is continuous.
- virtual const CoinPackedMatrix ∗ getMatrixByRow () const
  Get pointer to row-wise copy of matrix.
- virtual const CoinPackedMatrix ∗ getMatrixByCol () const
  Get pointer to column-wise copy of matrix.
- virtual double getInfinity () const
  Get solver's value for infinity.

Methods related to querying the solution

- virtual const double ∗ getColSolution () const

  Get pointer to array[getNumCols()] of primal solution vector.
- virtual const double ∗ getRowPrice () const

  Get pointer to array[getNumRows()] of dual prices.
- virtual const double ∗ getReducedCost () const

  Get a pointer to array[getNumCols()] of reduced costs.
- virtual const double ∗ getRowActivity () const

  Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.
- virtual double getObjValue () const

  Get objective function value.
- virtual int getIterationCount () const

  Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.
- virtual std::vector< double ∗ > getDualRays (int maxNumRays, bool fullRay=false) const

  Get as many dual rays as the solver can provide.
- virtual std::vector< double ∗ > getPrimalRays (int maxNumRays) const

  Get as many primal rays as the solver can provide.

Changing bounds on variables and constraints

- virtual void setObjCoeff (int elementIndex, double elementValue)

  Set an objective function coefficient.
- virtual void setObjCoeffSet (const int ∗indexFirst, const int ∗indexLast, const double ∗coeffList)

  Set a a set of objective function coefficients.
- virtual void setColLower (int elementIndex, double elementValue)

  Set a single column lower bound
  Use -COIN_DBL_MAX for -infinity.
- virtual void setColUpper (int elementIndex, double elementValue)

  Set a single column upper bound
  Use COIN_DBL_MAX for infinity.
- virtual void setColBounds (int elementIndex, double lower, double upper)

  Set a single column lower and upper bound
  The default implementation just invokes `setColLower()` and `setColUpper()`
- virtual void setColSetBounds (const int ∗indexFirst, const int ∗indexLast, const double ∗boundList)

  Set the bounds on a number of columns simultaneously
  The default implementation just invokes `setCollower()` and `setColupper()` over and over again.
- virtual void setRowLower (int elementIndex, double elementValue)

  Set a single row lower bound
  Use -COIN_DBL_MAX for -infinity.
- virtual void setRowUpper (int elementIndex, double elementValue)

  Set a single row upper bound
  Use COIN_DBL_MAX for infinity.
- virtual void setRowBounds (int elementIndex, double lower, double upper)

  Set a single row lower and upper bound
  The default implementation just invokes `setRowLower()` and `setRowUpper()`
- virtual void setRowType (int index, char sense, double rightHandSide, double range)

  Set the type of a single row
- virtual void setRowSetBounds (const int ∗indexFirst, const int ∗indexLast, const double ∗boundList)

  Set the bounds on a number of rows simultaneously
  The default implementation just invokes `setRowLower()` and `setRowUpper()` over and over again.
- virtual void setRowSetTypes (const int ∗indexFirst, const int ∗indexLast, const char ∗senseList, const double ∗rhsList, const double ∗rangeList)

  Set the type of a number of rows simultaneously
  The default implementation just invokes `setRowType()` and over and over again.

Integrality related changing methods

- virtual void setContinuous (int index)

  Set the index-th variable to be a continuous variable.
- virtual void setInteger (int index)

  Set the index-th variable to be an integer variable.
- virtual void setContinuous (const int ∗indices, int len)

  Set the variables listed in indices (which is of length len) to be continuous variables.
- virtual void setInteger (const int ∗indices, int len)

  Set the variables listed in indices (which is of length len) to be integer variables.

Naming methods

- virtual void setRowName (int ndx, std::string name)

  Set a row name.
- virtual void setColName (int ndx, std::string name)

  Set a column name.

Methods to expand a problem.<br>

Note that if a column is added then by default it will correspond to a continuous variable.

- virtual void addCol (const CoinPackedVectorBase &vec, const double collb, const double colub, const double obj)

  Add a column (primal variable) to the problem.
- virtual void addCols (const int numcols, const CoinPackedVectorBase ∗const ∗cols, const double ∗collb, const double ∗colub, const double ∗obj)

  Add a set of columns (primal variables) to the problem.
- virtual void deleteCols (const int num, const int ∗colIndices)

  Remove a set of columns (primal variables) from the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const double rowlb, const double rowub)

  Add a row (constraint) to the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const char rowsen, const double rowrhs, const double rowrng)

  Add a row (constraint) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const double ∗rowlb, const double ∗rowub)

  Add a set of rows (constraints) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Add a set of rows (constraints) to the problem.
- virtual void deleteRows (const int num, const int ∗rowIndices)

  Delete a set of rows (constraints) from the problem.

Methods to input a problem

- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)

  Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, double ∗&rowlb, double ∗&rowub)

  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).

- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, char ∗&rowsen, double ∗&rowrhs, double ∗&rowrng)
  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)
  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)
  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual int readMps (const char ∗filename, const char ∗extension="mps")
  Read an mps file from the given filename.
- virtual void writeMps (const char ∗filename, const char ∗extension="mps", double objSense=0.0) const
  Write the problem into an mps file of the given filename.

Constructors and destructor

- OsiGrbSolverInterface (bool use_local_env=false)
  Default Constructor.
- OsiGrbSolverInterface (GRBenv ∗localgrbenv)
  Constructor that takes a gurobi environment and assumes membership.
- virtual OsiSolverInterface ∗ clone (bool copyData=true) const
  Clone.
- OsiGrbSolverInterface (const OsiGrbSolverInterface &)
  Copy constructor.
- OsiGrbSolverInterface & operator= (const OsiGrbSolverInterface &rhs)
  Assignment operator.
- virtual ∼OsiGrbSolverInterface ()
  Destructor.
- virtual void reset ()
  Resets as if default constructor.

OsiSimplexInterface methods

Gurobi adds a slack with coeff +1 in "<=" and "=" constraints, with coeff -1 in ">=", slack being non negative.

We switch in order to get a "Clp tableau" where all the slacks have coefficient +1 in the original tableau.

If a slack for ">=" is non basic, invB is not changed; column of the slack in the optimal tableau is flipped.

If a slack for ">=" is basic, corresp. row of invB is flipped; whole row of the optimal tableau is flipped; then whole column for the slack in opt tableau is flipped.

Ranged rows are not supported. It might work, but no garantee is given.

- virtual int canDoSimplexInterface () const
  Returns 1 if can just do getBInv etc 2 if has all OsiSimplex methods and 0 if it has none.
- virtual void enableSimplexInterface (int doingPrimal)
  Useless function, defined only for compatibility with OsiSimplexInterface.
- virtual void disableSimplexInterface ()
  Useless function, defined only for compatibility with OsiSimplexInterface.
- virtual void enableFactorization () const
  Useless function, defined only for compatibility with OsiSimplexInterface.
- virtual void disableFactorization () const
  Useless function, defined only for compatibility with OsiSimplexInterface.

- virtual bool basisIsAvailable () const

  Returns true if a basis is available.
- virtual void getBasisStatus (int ∗cstat, int ∗rstat) const

  Returns a basis status of the structural/artificial variables At present as warm start i.e 0: free, 1: basic, 2: upper, 3: lower.
- void switchToLP ()

  ```
                  Get indices of the pivot variable in each row
  ```
  (order of indices corresponds to the order of elements in a vector retured by getBInvACol() and getBInvCol()).
- void switchToMIP ()

  switches Gurobi to prob type MIP

Static Public Member Functions

Static instance counter methods

- static void incrementInstanceCounter ()

  Gurobi has a context which must be created prior to all other Gurobi calls.
- static void decrementInstanceCounter ()

  Gurobi has a context which should be deleted after Gurobi calls.
- static void setEnvironment (GRBenv ∗globalenv)

  sets the global gurobi environment to a user given one
- static unsigned int getNumInstances ()

  Return the number of instances of instantiated objects using Gurobi services.

Protected Member Functions

Protected methods

- virtual void applyRowCut (const OsiRowCut &rc)

  Apply a row cut. Return true if cut was applied.
- virtual void applyColCut (const OsiColCut &cc)

  Apply a column cut (bound adjustment).

Private Member Functions

Private static class functions

- void resizeColSpace (int minsize)

  resizes coltype_, colmap_O2G, colmap_G2O vectors to be able to store at least minsize elements
- void freeColSpace ()

  frees colsize_ vector
- void resizeAuxColSpace (int minsize)

  resizes colmap_G2O vector to be able to store at least minsize (auxiliary) elements
- void resizeAuxColIndSpace ()

  resizes auxcolind vector to current number of rows and inits values to -1

Private methods

- GRBmodel ∗ getMutableLpPtr () const

  Get LP Pointer for const methods.
- void gutsOfCopy (const OsiGrbSolverInterface &source)

  The real work of a copy constructor (used by copy and assignment)
- void gutsOfConstructor ()

The real work of the constructor.
- void gutsOfDestructor ()

  The real work of the destructor.
- void freeCachedColRim ()

  free cached column rim vectors
- void freeCachedRowRim ()

  free cached row rim vectors
- void freeCachedResults ()

  free cached result vectors
- void freeCachedMatrix ()

  free cached matrices
- void freeCachedData (int keepCached=KEEPCACHED_NONE)

  free all cached data (except specified entries, see getLpPtr())
- void freeAllMemory ()

  free all allocated memory
- void convertToRangedRow (int rowidx, double rhs, double range)

  converts a normal row into a ranged row by adding an auxiliary variable
- void convertToNormalRow (int rowidx, char sense, double rhs)

  converts a ranged row into a normal row by removing its auxiliary variable

Private Attributes

Private member data

- GRBenv ∗ localenv_

  Gurobi environment used only by this class instance.
- GRBmodel ∗ lp_

  Gurobi model represented by this class instance.
- int ∗ hotStartCStat_

  Hotstart information.
- int hotStartCStatSize_
- int ∗ hotStartRStat_
- int hotStartRStatSize_
- int hotStartMaxIteration_
- int nameDisc_

  OSI name discipline.

Cached information derived from the Gurobi model

- double ∗ obj_

  Pointer to objective vector.
- double ∗ collower_

  Pointer to dense vector of variable lower bounds.
- double ∗ colupper_

  Pointer to dense vector of variable lower bounds.
- char ∗ rowsense_

  Pointer to dense vector of row sense indicators.
- double ∗ rhs_

  Pointer to dense vector of row right-hand side values.
- double ∗ rowrange_

  Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)
- double ∗ rowlower_

  Pointer to dense vector of row lower bounds.
- double ∗ rowupper_

Pointer to dense vector of row upper bounds.
- double ∗ colsol_
  Pointer to primal solution vector.
- double ∗ rowsol_
  Pointer to dual solution vector.
- double ∗ redcost_
  Pointer to reduced cost vector.
- double ∗ rowact_
  Pointer to row activity (slack) vector.
- CoinPackedMatrix ∗ matrixByRow_
  Pointer to row-wise copy of problem matrix coefficients.
- CoinPackedMatrix ∗ matrixByCol_
  Pointer to row-wise copy of problem matrix coefficients.

Additional information needed for storing MIP problems and handling ranged rows

- bool probtypemip_
  Stores whether we currently see the problem as a MIP.
- bool domipstart
  Whether to pass a column solution to CPLEX before starting MIP solve (copymipstart)
- int colspace_
  Size of allocated memory for coltype_, colmap_O2G, and (with offset auxcolspace) colmap_G2O.
- char ∗ coltype_
  Pointer to dense vector of variable types (continous, binary, integer)
- int nauxcols
  Number of auxiliary columns in Gurobi model for handling of ranged rows.
- int auxcolspace
  Size of allocated memory for colmap_G2O that exceeds colspace_.
- int ∗ colmap_O2G
  Maps variable indices from Osi to Gurobi Is NULL if there are no ranged rows! (assume identity mapping then)
- int ∗ colmap_G2O
  Maps variable indices from Gurobi to Osi A negative value indicates that a variable is an auxiliary variable that was added to handle a ranged row -colmap_G2O[i]-1 gives the index of the ranged row in this case.
- int auxcolindspace
  Current length of auxcolind array.
- int ∗ auxcolind
  Gives for each row the index of the corresponding auxiliary variable, if it is a ranged row.

Static Private Attributes

Private static class data

- static GRBenv ∗ globalenv_
  Gurobi environment pointer.
- static bool globalenv_is_ours
  whether OsiGrb has created the global environment (and thus should free it)
- static unsigned int numInstances_
  Number of instances using the global Gurobi environment.

Friends

- void OsiGrbSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)
  A function that tests the methods in the OsiGrbSolverInterface class.

Gurobi specific public interfaces

- enum keepCachedFlag {
  KEEPCACHED_NONE = 0, KEEPCACHED_COLUMN = 1, KEEPCACHED_ROW = 2, KEEPCACHED_MATRIX = 4,
  KEEPCACHED_RESULTS = 8, KEEPCACHED_PROBLEM = KEEPCACHED_COLUMN | KEEPCACHED_ROW | KEEPCACHED_MATRIX, KEEPCACHED_ALL = KEEPCACHED_PROBLEM | KEEPCACHED_RESULTS,
  FREECACHED_COLUMN = KEEPCACHED_PROBLEM & ∼KEEPCACHED_COLUMN,
  FREECACHED_ROW = KEEPCACHED_PROBLEM & ∼KEEPCACHED_ROW, FREECACHED_MATRIX = KEEPCACHED_PROBLEM & ∼KEEPCACHED_MATRIX, FREECACHED_RESULTS = KEEPCACHED_ALL & ∼KEEPCACHED_RESULTS }

  Get pointer to Gurobi model and free all specified cached data entries (combined with logical or-operator '|'):
- GRBmodel ∗ getLpPtr (int keepCached=KEEPCACHED_NONE)
- GRBenv ∗ getEnvironmentPtr () const

  Method to access Gurobi environment pointer.
- bool isDemoLicense () const

  Return whether the current Gurobi environment runs in demo mode.

Additional Inherited Members

8.17.1 Detailed Description

Gurobi Solver Interface.

Instantiation of OsiGrbSolverInterface for Gurobi

Definition at line 29 of file OsiGrbSolverInterface.hpp.

8.17.2 Member Enumeration Documentation

8.17.2.1 enum **OsiGrbSolverInterface::keepCachedFlag**

Get pointer to Gurobi model and free all specified cached data entries (combined with logical or-operator '|'):

Enumerator

KEEPCACHED_NONE	discard all cached data (default)
KEEPCACHED_COLUMN	column information: objective values, lower and upper bounds, variable types
KEEPCACHED_ROW	row information: right hand sides, ranges and senses, lower and upper bounds for row
KEEPCACHED_MATRIX	problem matrix: matrix ordered by column and by row
KEEPCACHED_RESULTS	LP solution: primal and dual solution, reduced costs, row activities.
KEEPCACHED_PROBLEM	only discard cached LP solution
KEEPCACHED_ALL	keep all cached data (similar to getMutableLpPtr())
FREECACHED_COLUMN	free only cached column and LP solution information
FREECACHED_ROW	free only cached row and LP solution information
FREECACHED_MATRIX	free only cached matrix and LP solution information
FREECACHED_RESULTS	free only cached LP solution information

Definition at line 546 of file OsiGrbSolverInterface.hpp.

8.17.3 Constructor & Destructor Documentation

8.17.3.1 OsiGrbSolverInterface::OsiGrbSolverInterface (bool *use_local_env* = `false`)

Default Constructor.

8.17.3.2 OsiGrbSolverInterface::OsiGrbSolverInterface (GRBenv ∗ *localgrbenv*)

Constructor that takes a gurobi environment and assumes membership.

8.17.3.3 OsiGrbSolverInterface::OsiGrbSolverInterface (const OsiGrbSolverInterface &)

Copy constructor.

8.17.3.4 virtual OsiGrbSolverInterface::∼OsiGrbSolverInterface ( ) `[virtual]`

Destructor.

8.17.4 Member Function Documentation

8.17.4.1 virtual void OsiGrbSolverInterface::initialSolve ( ) `[virtual]`

Solve initial LP relaxation.

Implements OsiSolverInterface.

8.17.4.2 virtual void OsiGrbSolverInterface::resolve ( ) `[virtual]`

Resolve an LP relaxation after problem modification.

Implements OsiSolverInterface.

8.17.4.3 virtual void OsiGrbSolverInterface::branchAndBound ( ) `[virtual]`

Invoke solver's built-in enumeration algorithm.

Implements OsiSolverInterface.

8.17.4.4 bool OsiGrbSolverInterface::setIntParam (OsiIntParam *key*, int *value*) `[virtual]`

Set an integer parameter.

Reimplemented from OsiSolverInterface.

8.17.4.5 bool OsiGrbSolverInterface::setDblParam (OsiDblParam *key*, double *value*) `[virtual]`

Set a double parameter.

Reimplemented from OsiSolverInterface.

8.17.4.6 bool OsiGrbSolverInterface::setStrParam (OsiStrParam *key*, const std::string & *value*) `[virtual]`

Set a string parameter.

Reimplemented from OsiSolverInterface.

8.17.4.7 bool OsiGrbSolverInterface::setHintParam (**OsiHintParam** *key,* bool *yesNo* = `true`, **OsiHintStrength** *strength* = **OsiHintTry**, void ∗ = `NULL`) `[virtual]`

Set a hint parameter.

The `otherInformation` parameter can be used to pass in an arbitrary block of information which is interpreted by the OSI and the underlying solver. Users are cautioned that this hook is solver-specific.

Implementors: The default implementation completely ignores `otherInformation` and always throws an exception for OsiForceDo. This is almost certainly not the behaviour you want; you really should override this method.

Reimplemented from OsiSolverInterface.

8.17.4.8 bool OsiGrbSolverInterface::getIntParam (**OsiIntParam** *key,* int & *value*) const `[virtual]`

Get an integer parameter.

Reimplemented from OsiSolverInterface.

8.17.4.9 bool OsiGrbSolverInterface::getDblParam (**OsiDblParam** *key,* double & *value*) const `[virtual]`

Get a double parameter.

Reimplemented from OsiSolverInterface.

8.17.4.10 bool OsiGrbSolverInterface::getStrParam (**OsiStrParam** *key,* std::string & *value*) const `[virtual]`

Get a string parameter.

Reimplemented from OsiSolverInterface.

8.17.4.11 bool OsiGrbSolverInterface::getHintParam (**OsiHintParam** *key,* bool & *yesNo,* **OsiHintStrength** & *strength,* void ∗& *otherInformation*) const `[virtual]`

Get a hint parameter (all information)

Return all available information for the hint: sense, strength, and any extra information associated with the hint.

Implementors: The default implementation will always set `otherInformation` to NULL. This is almost certainly not the behaviour you want; you really should override this method.

Reimplemented from OsiSolverInterface.

8.17.4.12 bool OsiGrbSolverInterface::getHintParam (**OsiHintParam** *key,* bool & *yesNo,* **OsiHintStrength** & *strength*) const `[virtual]`

Get a hint parameter (sense and strength only)

Return only the sense and strength of the hint.

Reimplemented from OsiSolverInterface.

8.17.4.13 bool OsiGrbSolverInterface::getHintParam (**OsiHintParam** *key,* bool & *yesNo*) const `[virtual]`

Get a hint parameter (sense only)

Return only the sense (true/false) of the hint.

Reimplemented from OsiSolverInterface.

8.17.4.14 void OsiGrbSolverInterface::setMipStart (bool *value*) `[inline]`

Definition at line 84 of file OsiGrbSolverInterface.hpp.

8.17.4.15 bool OsiGrbSolverInterface::getMipStart ( ) const [inline]

Definition at line 86 of file OsiGrbSolverInterface.hpp.

8.17.4.16 virtual bool OsiGrbSolverInterface::isAbandoned ( ) const [virtual]

Are there a numerical difficulties?

Implements OsiSolverInterface.

8.17.4.17 virtual bool OsiGrbSolverInterface::isProvenOptimal ( ) const [virtual]

Is optimality proven?

Implements OsiSolverInterface.

8.17.4.18 virtual bool OsiGrbSolverInterface::isProvenPrimalInfeasible ( ) const [virtual]

Is primal infeasiblity proven?

Implements OsiSolverInterface.

8.17.4.19 virtual bool OsiGrbSolverInterface::isProvenDualInfeasible ( ) const [virtual]

Is dual infeasiblity proven?

Implements OsiSolverInterface.

8.17.4.20 virtual bool OsiGrbSolverInterface::isPrimalObjectiveLimitReached ( ) const [virtual]

Is the given primal objective limit reached?

Reimplemented from OsiSolverInterface.

8.17.4.21 virtual bool OsiGrbSolverInterface::isDualObjectiveLimitReached ( ) const [virtual]

Is the given dual objective limit reached?

Reimplemented from OsiSolverInterface.

8.17.4.22 virtual bool OsiGrbSolverInterface::isIterationLimitReached ( ) const [virtual]

Iteration limit reached?

Implements OsiSolverInterface.

8.17.4.23 CoinWarmStart* OsiGrbSolverInterface::getEmptyWarmStart ( ) const [virtual]

Get an empty warm start object.

This routine returns an empty CoinWarmStartBasis object. Its purpose is to provide a way to give a client a warm start basis object of the appropriate type, which can resized and modified as desired.

Implements OsiSolverInterface.

8.17.4.24 virtual CoinWarmStart* OsiGrbSolverInterface::getWarmStart ( ) const [virtual]

Get warmstarting information.

Implements OsiSolverInterface.

8.17.4.25 virtual bool OsiGrbSolverInterface::setWarmStart (const CoinWarmStart * *warmstart*) [virtual]

Set warmstarting information.

Return true/false depending on whether the warmstart information was accepted or not.

Implements OsiSolverInterface.

8.17.4.26 virtual void OsiGrbSolverInterface::markHotStart ( ) [virtual]

Create a hotstart point of the optimization process.

Reimplemented from OsiSolverInterface.

8.17.4.27 virtual void OsiGrbSolverInterface::solveFromHotStart ( ) [virtual]

Optimize starting from the hotstart.

Reimplemented from OsiSolverInterface.

8.17.4.28 virtual void OsiGrbSolverInterface::unmarkHotStart ( ) [virtual]

Delete the snapshot.

Reimplemented from OsiSolverInterface.

8.17.4.29 virtual int OsiGrbSolverInterface::getNumCols ( ) const [virtual]

Get number of columns.

Implements OsiSolverInterface.

8.17.4.30 virtual int OsiGrbSolverInterface::getNumRows ( ) const [virtual]

Get number of rows.

Implements OsiSolverInterface.

8.17.4.31 virtual int OsiGrbSolverInterface::getNumElements ( ) const [virtual]

Get number of nonzero elements.

Implements OsiSolverInterface.

8.17.4.32 virtual const double* OsiGrbSolverInterface::getColLower ( ) const [virtual]

Get pointer to array[getNumCols()] of column lower bounds.

Implements OsiSolverInterface.

8.17.4.33 virtual const double* OsiGrbSolverInterface::getColUpper ( ) const [virtual]

Get pointer to array[getNumCols()] of column upper bounds.

Implements OsiSolverInterface.

8.17.4.34 virtual const char* OsiGrbSolverInterface::getRowSense ( ) const [virtual]

Get pointer to array[getNumRows()] of row constraint senses.

- 'L': <= constraint

- 'E': = constraint
- 'G': >= constraint
- 'R': ranged constraint
- 'N': free constraint

Implements OsiSolverInterface.

8.17.4.35 virtual const double∗ OsiGrbSolverInterface::getRightHandSide ( ) const [virtual]

Get pointer to array[getNumRows()] of rows right-hand sides.

- if rowsense()[i] == 'L' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'G' then rhs()[i] == rowlower()[i]
- if rowsense()[i] == 'R' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'N' then rhs()[i] == 0.0

Implements OsiSolverInterface.

8.17.4.36 virtual const double∗ OsiGrbSolverInterface::getRowRange ( ) const [virtual]

Get pointer to array[getNumRows()] of row ranges.

- if rowsense()[i] == 'R' then rowrange()[i] == rowupper()[i] - rowlower()[i]
- if rowsense()[i] != 'R' then rowrange()[i] is 0.0

Implements OsiSolverInterface.

8.17.4.37 virtual const double∗ OsiGrbSolverInterface::getRowLower ( ) const [virtual]

Get pointer to array[getNumRows()] of row lower bounds.

Implements OsiSolverInterface.

8.17.4.38 virtual const double∗ OsiGrbSolverInterface::getRowUpper ( ) const [virtual]

Get pointer to array[getNumRows()] of row upper bounds.

Implements OsiSolverInterface.

8.17.4.39 virtual const double∗ OsiGrbSolverInterface::getObjCoefficients ( ) const [virtual]

Get pointer to array[getNumCols()] of objective function coefficients.

Implements OsiSolverInterface.

8.17.4.40 virtual double OsiGrbSolverInterface::getObjSense ( ) const [virtual]

Get objective function sense (1 for min (default), -1 for max)

Implements OsiSolverInterface.

8.17.4.41 virtual bool OsiGrbSolverInterface::isContinuous (int *colNumber*) const [virtual]

Return true if column is continuous.

Implements OsiSolverInterface.

8.17.4.42 virtual const CoinPackedMatrix∗ OsiGrbSolverInterface::getMatrixByRow ( ) const [virtual]

Get pointer to row-wise copy of matrix.

Implements OsiSolverInterface.

8.17.4.43 virtual const CoinPackedMatrix∗ OsiGrbSolverInterface::getMatrixByCol ( ) const [virtual]

Get pointer to column-wise copy of matrix.

Implements OsiSolverInterface.

8.17.4.44 virtual double OsiGrbSolverInterface::getInfinity ( ) const [virtual]

Get solver's value for infinity.

Implements OsiSolverInterface.

8.17.4.45 virtual const double∗ OsiGrbSolverInterface::getColSolution ( ) const [virtual]

Get pointer to array[getNumCols()] of primal solution vector.

Implements OsiSolverInterface.

8.17.4.46 virtual const double∗ OsiGrbSolverInterface::getRowPrice ( ) const [virtual]

Get pointer to array[getNumRows()] of dual prices.

Implements OsiSolverInterface.

8.17.4.47 virtual const double∗ OsiGrbSolverInterface::getReducedCost ( ) const [virtual]

Get a pointer to array[getNumCols()] of reduced costs.

Implements OsiSolverInterface.

8.17.4.48 virtual const double∗ OsiGrbSolverInterface::getRowActivity ( ) const [virtual]

Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.

Implements OsiSolverInterface.

8.17.4.49 virtual double OsiGrbSolverInterface::getObjValue ( ) const [virtual]

Get objective function value.

Implements OsiSolverInterface.

8.17.4.50 virtual int OsiGrbSolverInterface::getIterationCount ( ) const [virtual]

Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.

Implements OsiSolverInterface.

8.17.4.51 virtual std::vector<double*> OsiGrbSolverInterface::getDualRays (int *maxNumRays,* bool *fullRay* = `false`) const `[virtual]`

Get as many dual rays as the solver can provide.

(In case of proven primal infeasibility there should be at least one.)

The first getNumRows() ray components will always be associated with the row duals (as returned by getRowPrice()). If `fullRay` is true, the final getNumCols() entries will correspond to the ray components associated with the nonbasic variables. If the full ray is requested and the method cannot provide it, it will throw an exception.

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumRows() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.17.4.52 virtual std::vector<double*> OsiGrbSolverInterface::getPrimalRays (int *maxNumRays*) const `[virtual]`

Get as many primal rays as the solver can provide.

(In case of proven dual infeasibility there should be at least one.)

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumCols() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.17.4.53 virtual void OsiGrbSolverInterface::setObjCoeff (int *elementIndex,* double *elementValue*) `[virtual]`

Set an objective function coefficient.

Implements OsiSolverInterface.

8.17.4.54 virtual void OsiGrbSolverInterface::setObjCoeffSet (const int * *indexFirst,* const int * *indexLast,* const double * *coeffList*) `[virtual]`

Set a a set of objective function coefficients.

Reimplemented from OsiSolverInterface.

8.17.4.55 virtual void OsiGrbSolverInterface::setColLower (int *elementIndex,* double *elementValue*) `[virtual]`

Set a single column lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.17.4.56 virtual void OsiGrbSolverInterface::setColUpper (int *elementIndex,* double *elementValue*) `[virtual]`

Set a single column upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.17.4.57 virtual void OsiGrbSolverInterface::setColBounds (int *elementIndex,* double *lower,* double *upper*) `[virtual]`

Set a single column lower and upper bound

The default implementation just invokes `setColLower()` and `setColUpper()`

Reimplemented from OsiSolverInterface.

8.17.4.58 virtual void OsiGrbSolverInterface::setColSetBounds (const int ∗ *indexFirst,* const int ∗ *indexLast,* const double ∗ *boundList*) `[virtual]`

Set the bounds on a number of columns simultaneously

The default implementation just invokes `setCollower()` and `setColupper()` over and over again.

Parameters

<code>[indexfirst,indexLast]</code>	contains the indices of the constraints whose either bound changes
boundList	the new lower/upper bound pairs for the variables

Reimplemented from OsiSolverInterface.

8.17.4.59 virtual void OsiGrbSolverInterface::setRowLower (int *elementIndex,* double *elementValue*) `[virtual]`

Set a single row lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.17.4.60 virtual void OsiGrbSolverInterface::setRowUpper (int *elementIndex,* double *elementValue*) `[virtual]`

Set a single row upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.17.4.61 virtual void OsiGrbSolverInterface::setRowBounds (int *elementIndex,* double *lower,* double *upper*) `[virtual]`

Set a single row lower and upper bound

The default implementation just invokes `setRowLower()` and `setRowUpper()`

Reimplemented from OsiSolverInterface.

8.17.4.62 virtual void OsiGrbSolverInterface::setRowType (int *index,* char *sense,* double *rightHandSide,* double *range*) `[virtual]`

Set the type of a single row

Implements OsiSolverInterface.

8.17.4.63 virtual void OsiGrbSolverInterface::setRowSetBounds (const int ∗ *indexFirst,* const int ∗ *indexLast,* const double ∗ *boundList*) `[virtual]`

Set the bounds on a number of rows simultaneously

The default implementation just invokes `setRowLower()` and `setRowUpper()` over and over again.

Parameters

<code>[indexfirst,indexLast]</code>	contains the indices of the constraints whose either bound changes
boundList	the new lower/upper bound pairs for the constraints

Reimplemented from OsiSolverInterface.

8.17.4.64 virtual void OsiGrbSolverInterface::setRowSetTypes (const int ∗ *indexFirst,* const int ∗ *indexLast,* const char ∗ *senseList,* const double ∗ *rhsList,* const double ∗ *rangeList*) `[virtual]`

Set the type of a number of rows simultaneously

The default implementation just invokes `setRowType()` and over and over again.

Parameters

<code>[indexfirst,indexLast]</code>	contains the indices of the constraints whose type changes
senseList	the new senses
rhsList	the new right hand sides
rangeList	the new ranges

Reimplemented from OsiSolverInterface.

8.17.4.65 virtual void OsiGrbSolverInterface::setContinuous (int *index*) `[virtual]`

Set the index-th variable to be a continuous variable.

Implements OsiSolverInterface.

8.17.4.66 virtual void OsiGrbSolverInterface::setInteger (int *index*) `[virtual]`

Set the index-th variable to be an integer variable.

Implements OsiSolverInterface.

8.17.4.67 virtual void OsiGrbSolverInterface::setContinuous (const int ∗ *indices,* int *len*) `[virtual]`

Set the variables listed in indices (which is of length len) to be continuous variables.

Reimplemented from OsiSolverInterface.

8.17.4.68 virtual void OsiGrbSolverInterface::setInteger (const int ∗ *indices,* int *len*) `[virtual]`

Set the variables listed in indices (which is of length len) to be integer variables.

Reimplemented from OsiSolverInterface.

8.17.4.69 virtual void OsiGrbSolverInterface::setRowName (int *ndx,* std::string *name*) `[virtual]`

Set a row name.

Reimplemented from OsiSolverInterface.

8.17.4.70 virtual void OsiGrbSolverInterface::setColName (int *ndx,* std::string *name*) `[virtual]`

Set a column name.

Reimplemented from OsiSolverInterface.

8.17.4.71 virtual void OsiGrbSolverInterface::setObjSense (double *s*) [virtual]

Set objective function sense (1 for min (default), -1 for max,)

Implements OsiSolverInterface.

8.17.4.72 virtual void OsiGrbSolverInterface::setColSolution (const double ∗ *colsol*) [virtual]

Set the primal solution column values.

colsol[numcols()] is an array of values of the problem column variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of colsol() until changed by another call to setColsol() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.17.4.73 virtual void OsiGrbSolverInterface::setRowPrice (const double ∗ *rowprice*) [virtual]

Set dual solution vector.

rowprice[numrows()] is an array of values of the problem row dual variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of rowprice() until changed by another call to setRowprice() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.17.4.74 virtual void OsiGrbSolverInterface::addCol (const CoinPackedVectorBase & *vec,* const double *collb,* const double *colub,* const double *obj*) [virtual]

Add a column (primal variable) to the problem.

Implements OsiSolverInterface.

8.17.4.75 virtual void OsiGrbSolverInterface::addCols (const int *numcols,* const CoinPackedVectorBase ∗const ∗ *cols,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj*) [virtual]

Add a set of columns (primal variables) to the problem.

The default implementation simply makes repeated calls to addCol().

Reimplemented from OsiSolverInterface.

8.17.4.76 virtual void OsiGrbSolverInterface::deleteCols (const int *num,* const int ∗ *colIndices*) [virtual]

Remove a set of columns (primal variables) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted variables are nonbasic.

Implements OsiSolverInterface.

8.17.4.77 virtual void OsiGrbSolverInterface::addRow (const CoinPackedVectorBase & *vec,* const double *rowlb,* const double *rowub*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.17.4.78 virtual void OsiGrbSolverInterface::addRow (const CoinPackedVectorBase & *vec,* const char *rowsen,* const double *rowrhs,* const double *rowrng*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.17.4.79 virtual void OsiGrbSolverInterface::addRows (const int *numrows,* const CoinPackedVectorBase ∗const ∗ *rows,* const double ∗ *rowlb,* const double ∗ *rowub*) [virtual]

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented from OsiSolverInterface.

8.17.4.80 virtual void OsiGrbSolverInterface::addRows (const int *numrows,* const CoinPackedVectorBase ∗const ∗ *rows,* const char ∗ *rowsen,* const double ∗ *rowrhs,* const double ∗ *rowrng*) [virtual]

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented from OsiSolverInterface.

8.17.4.81 virtual void OsiGrbSolverInterface::deleteRows (const int *num,* const int ∗ *rowIndices*) [virtual]

Delete a set of rows (constraints) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted rows are loose.

Implements OsiSolverInterface.

8.17.4.82 virtual void OsiGrbSolverInterface::loadProblem (const CoinPackedMatrix & *matrix,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj,* const double ∗ *rowlb,* const double ∗ *rowub*) [virtual]

Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `rowub`: all rows have upper bound infinity
- `rowlb`: all rows have lower bound -infinity
- `obj`: all variables have 0 objective coefficient

Implements OsiSolverInterface.

8.17.4.83 virtual void OsiGrbSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix,* double ∗& *collb,* double ∗& *colub,* double ∗& *obj,* double ∗& *rowlb,* double ∗& *rowub*) [virtual]

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.17.4.84 virtual void OsiGrbSolverInterface::loadProblem (const CoinPackedMatrix & *matrix*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) [virtual]

Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `obj`: all variables have 0 objective coefficient
- `rowsen`: all rows are >=
- `rowrhs`: all right hand sides are 0
- `rowrng`: 0 for the ranged rows

Implements OsiSolverInterface.

8.17.4.85 virtual void OsiGrbSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix*, double ∗& *collb*, double ∗& *colub*, double ∗& *obj*, char ∗& *rowsen*, double ∗& *rowrhs*, double ∗& *rowrng*) [virtual]

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.17.4.86 virtual void OsiGrbSolverInterface::loadProblem (const int *numcols*, const int *numrows*, const int ∗ *start*, const int ∗ *index*, const double ∗ *value*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const double ∗ *rowlb*, const double ∗ *rowub*) [virtual]

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.17.4.87 virtual void OsiGrbSolverInterface::loadProblem (const int *numcols*, const int *numrows*, const int ∗ *start*, const int ∗ *index*, const double ∗ *value*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) [virtual]

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.17.4.88 virtual int OsiGrbSolverInterface::readMps (const char ∗ *filename*, const char ∗ *extension* = "mps") [virtual]

Read an mps file from the given filename.

Reimplemented from OsiSolverInterface.

8.17.4.89 virtual void OsiGrbSolverInterface::writeMps (const char ∗ *filename*, const char ∗ *extension* = "mps", double *objSense* = 0.0) const [virtual]

Write the problem into an mps file of the given filename.

If objSense is non zero then -1.0 forces the code to write a maximization objective and +1.0 to write a minimization one. If 0.0 then solver can do what it wants

Implements OsiSolverInterface.

8.17.4.90 GRBmodel∗ OsiGrbSolverInterface::getLpPtr (int *keepCached* = KEEPCACHED_NONE)

8.17.4.91 GRBenv∗ OsiGrbSolverInterface::getEnvironmentPtr ( ) const

Method to access Gurobi environment pointer.

8.17.4.92 bool OsiGrbSolverInterface::isDemoLicense ( ) const

Return whether the current Gurobi environment runs in demo mode.

8.17.4.93 const char∗ OsiGrbSolverInterface::getCtype ( ) const

return a vector of variable types (continous, binary, integer)

8.17.4.94 static void OsiGrbSolverInterface::incrementInstanceCounter ( ) [static]

Gurobi has a context which must be created prior to all other Gurobi calls.

This method:

- Increments by 1 the number of uses of the Gurobi environment.
- Creates the Gurobi context when the number of uses is change to 1 from 0.

8.17.4.95 static void OsiGrbSolverInterface::decrementInstanceCounter ( ) [static]

Gurobi has a context which should be deleted after Gurobi calls.

This method:

- Decrements by 1 the number of uses of the Gurobi environment.
- Deletes the Gurobi context when the number of uses is change to 0 from 1.

8.17.4.96 static void OsiGrbSolverInterface::setEnvironment (GRBenv ∗ *globalenv*) [static]

sets the global gurobi environment to a user given one

8.17.4.97 static unsigned int OsiGrbSolverInterface::getNumInstances ( ) [static]

Return the number of instances of instantiated objects using Gurobi services.

8.17.4.98 virtual OsiSolverInterface∗ OsiGrbSolverInterface::clone (bool *copyData* = true) const [virtual]

Clone.

Implements OsiSolverInterface.

8.17.4.99 OsiGrbSolverInterface& OsiGrbSolverInterface::operator= (const OsiGrbSolverInterface & *rhs*)

Assignment operator.

8.17.4.100 virtual void OsiGrbSolverInterface::reset ( ) [virtual]

Resets as if default constructor.

Reimplemented from OsiSolverInterface.

8.17.4.101 virtual int OsiGrbSolverInterface::canDoSimplexInterface ( ) const [virtual]

Returns 1 if can just do getBInv etc 2 if has all OsiSimplex methods and 0 if it has none.

Reimplemented from OsiSolverInterface.

8.17.4.102 virtual void OsiGrbSolverInterface::enableSimplexInterface (int *doingPrimal*) [inline], [virtual]

Useless function, defined only for compatibility with OsiSimplexInterface.

Definition at line 665 of file OsiGrbSolverInterface.hpp.

8.17.4.103 virtual void OsiGrbSolverInterface::disableSimplexInterface ( ) [inline], [virtual]

Useless function, defined only for compatibility with OsiSimplexInterface.

Reimplemented from OsiSolverInterface.

Definition at line 672 of file OsiGrbSolverInterface.hpp.

8.17.4.104 virtual void OsiGrbSolverInterface::enableFactorization ( ) const [inline], [virtual]

Useless function, defined only for compatibility with OsiSimplexInterface.

Reimplemented from OsiSolverInterface.

Definition at line 679 of file OsiGrbSolverInterface.hpp.

8.17.4.105 virtual void OsiGrbSolverInterface::disableFactorization ( ) const [inline], [virtual]

Useless function, defined only for compatibility with OsiSimplexInterface.

Reimplemented from OsiSolverInterface.

Definition at line 686 of file OsiGrbSolverInterface.hpp.

8.17.4.106 virtual bool OsiGrbSolverInterface::basisIsAvailable ( ) const [virtual]

Returns true if a basis is available.

Reimplemented from OsiSolverInterface.

8.17.4.107 virtual void OsiGrbSolverInterface::getBasisStatus (int * *cstat,* int * *rstat*) const [virtual]

Returns a basis status of the structural/artificial variables At present as warm start i.e 0: free, 1: basic, 2: upper, 3: lower.

Reimplemented from OsiSolverInterface.

8.17.4.108 void OsiGrbSolverInterface::switchToLP ( )

```
Get indices of the pivot variable in each row
```

(order of indices corresponds to the order of elements in a vector retured by getBInvACol() and getBInvCol()).

switches Gurobi to prob type LP

8.17.4.109 void OsiGrbSolverInterface::switchToMIP ( )

switches Gurobi to prob type MIP

8.17.4.110 virtual **OsiSolverInterface::ApplyCutsReturnCode** OsiGrbSolverInterface::applyCuts (const **OsiCuts** & *cs*, double *effectivenessLb* = `0.0`) `[virtual]`

Apply a collection of cuts.

Only cuts which have an `effectiveness >= effectivenessLb` are applied.

- ReturnCode.getNumineffective() – number of cuts which were not applied because they had an `effectiveness < effectivenessLb`
- ReturnCode.getNuminconsistent() – number of invalid cuts
- ReturnCode.getNuminconsistentWrtIntegerModel() – number of cuts that are invalid with respect to this integer model
- ReturnCode.getNuminfeasible() – number of cuts that would make this integer model infeasible
- ReturnCode.getNumApplied() – number of integer cuts which were applied to the integer model
- cs.size() == getNumineffective() + getNuminconsistent() + getNuminconsistentWrtIntegerModel() + getNuminfeasible() + getNumApplied()

Reimplemented from OsiSolverInterface.

8.17.4.111 virtual void OsiGrbSolverInterface::applyRowCut (const **OsiRowCut** & *rc*) `[protected]`, `[virtual]`

Apply a row cut. Return true if cut was applied.

Implements OsiSolverInterface.

8.17.4.112 virtual void OsiGrbSolverInterface::applyColCut (const **OsiColCut** & *cc*) `[protected]`, `[virtual]`

Apply a column cut (bound adjustment).

Return true if cut was applied.

Implements OsiSolverInterface.

8.17.4.113 void OsiGrbSolverInterface::resizeColSpace (int *minsize*) `[private]`

resizes coltype_, colmap_O2G, colmap_G2O vectors to be able to store at least minsize elements

8.17.4.114 void OsiGrbSolverInterface::freeColSpace ( ) `[private]`

frees colsize_ vector

8.17.4.115 void OsiGrbSolverInterface::resizeAuxColSpace (int *minsize*) `[private]`

resizes colmap_G2O vector to be able to store at least minsize (auxiliary) elements

8.17.4.116 void OsiGrbSolverInterface::resizeAuxColIndSpace ( ) `[private]`

resizes auxcolind vector to current number of rows and inits values to -1

8.17.4.117 **GRBmodel**$*$ OsiGrbSolverInterface::getMutableLpPtr ( ) const `[private]`

Get LP Pointer for const methods.

8.17.4.118 void OsiGrbSolverInterface::gutsOfCopy (const **OsiGrbSolverInterface** & *source*) `[private]`

The real work of a copy constructor (used by copy and assignment)

8.17.4.119 void OsiGrbSolverInterface::gutsOfConstructor ( ) [private]

The real work of the constructor.

8.17.4.120 void OsiGrbSolverInterface::gutsOfDestructor ( ) [private]

The real work of the destructor.

8.17.4.121 void OsiGrbSolverInterface::freeCachedColRim ( ) [private]

free cached column rim vectors

8.17.4.122 void OsiGrbSolverInterface::freeCachedRowRim ( ) [private]

free cached row rim vectors

8.17.4.123 void OsiGrbSolverInterface::freeCachedResults ( ) [private]

free cached result vectors

8.17.4.124 void OsiGrbSolverInterface::freeCachedMatrix ( ) [private]

free cached matrices

8.17.4.125 void OsiGrbSolverInterface::freeCachedData (int *keepCached* = KEEPCACHED_NONE) [private]

free all cached data (except specified entries, see getLpPtr())

8.17.4.126 void OsiGrbSolverInterface::freeAllMemory ( ) [private]

free all allocated memory

8.17.4.127 void OsiGrbSolverInterface::convertToRangedRow (int *rowidx,* double *rhs,* double *range*) [private]

converts a normal row into a ranged row by adding an auxiliary variable

8.17.4.128 void OsiGrbSolverInterface::convertToNormalRow (int *rowidx,* char *sense,* double *rhs*) [private]

converts a ranged row into a normal row by removing its auxiliary variable

8.17.5 Friends And Related Function Documentation

8.17.5.1 void OsiGrbSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*) [friend]

A function that tests the methods in the OsiGrbSolverInterface class.

8.17.6 Member Data Documentation

8.17.6.1 GRBenv∗ OsiGrbSolverInterface::globalenv_ [static], [private]

Gurobi environment pointer.

Definition at line 784 of file OsiGrbSolverInterface.hpp.

8.17.6.2 bool OsiGrbSolverInterface::globalenv_is_ours [static], [private]

whether OsiGrb has created the global environment (and thus should free it)

Definition at line 786 of file OsiGrbSolverInterface.hpp.

8.17.6.3 unsigned int OsiGrbSolverInterface::numInstances_ [static], [private]

Number of instances using the global Gurobi environment.

Definition at line 788 of file OsiGrbSolverInterface.hpp.

8.17.6.4 GRBenv∗ OsiGrbSolverInterface::localenv_ [mutable], [private]

Gurobi environment used only by this class instance.

Definition at line 835 of file OsiGrbSolverInterface.hpp.

8.17.6.5 GRBmodel∗ OsiGrbSolverInterface::lp_ [mutable], [private]

Gurobi model represented by this class instance.

Definition at line 838 of file OsiGrbSolverInterface.hpp.

8.17.6.6 int∗ OsiGrbSolverInterface::hotStartCStat_ [private]

Hotstart information.

Definition at line 841 of file OsiGrbSolverInterface.hpp.

8.17.6.7 int OsiGrbSolverInterface::hotStartCStatSize_ [private]

Definition at line 842 of file OsiGrbSolverInterface.hpp.

8.17.6.8 int∗ OsiGrbSolverInterface::hotStartRStat_ [private]

Definition at line 843 of file OsiGrbSolverInterface.hpp.

8.17.6.9 int OsiGrbSolverInterface::hotStartRStatSize_ [private]

Definition at line 844 of file OsiGrbSolverInterface.hpp.

8.17.6.10 int OsiGrbSolverInterface::hotStartMaxIteration_ [private]

Definition at line 845 of file OsiGrbSolverInterface.hpp.

8.17.6.11 int OsiGrbSolverInterface::nameDisc_ [private]

OSI name discipline.

Definition at line 848 of file OsiGrbSolverInterface.hpp.

8.17.6.12 double∗ OsiGrbSolverInterface::obj_ [mutable], [private]

Pointer to objective vector.

Definition at line 853 of file OsiGrbSolverInterface.hpp.

8.17.6.13 double∗ OsiGrbSolverInterface::collower_ [mutable], [private]

Pointer to dense vector of variable lower bounds.

Definition at line 856 of file OsiGrbSolverInterface.hpp.

8.17.6.14 double∗ OsiGrbSolverInterface::colupper_ [mutable], [private]

Pointer to dense vector of variable lower bounds.

Definition at line 859 of file OsiGrbSolverInterface.hpp.

8.17.6.15 char∗ OsiGrbSolverInterface::rowsense_ [mutable], [private]

Pointer to dense vector of row sense indicators.

Definition at line 862 of file OsiGrbSolverInterface.hpp.

8.17.6.16 double∗ OsiGrbSolverInterface::rhs_ [mutable], [private]

Pointer to dense vector of row right-hand side values.

Definition at line 865 of file OsiGrbSolverInterface.hpp.

8.17.6.17 double∗ OsiGrbSolverInterface::rowrange_ [mutable], [private]

Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)

Definition at line 868 of file OsiGrbSolverInterface.hpp.

8.17.6.18 double∗ OsiGrbSolverInterface::rowlower_ [mutable], [private]

Pointer to dense vector of row lower bounds.

Definition at line 871 of file OsiGrbSolverInterface.hpp.

8.17.6.19 double∗ OsiGrbSolverInterface::rowupper_ [mutable], [private]

Pointer to dense vector of row upper bounds.

Definition at line 874 of file OsiGrbSolverInterface.hpp.

8.17.6.20 double∗ OsiGrbSolverInterface::colsol_ [mutable], [private]

Pointer to primal solution vector.

Definition at line 877 of file OsiGrbSolverInterface.hpp.

8.17.6.21 double∗ OsiGrbSolverInterface::rowsol_ [mutable], [private]

Pointer to dual solution vector.

Definition at line 880 of file OsiGrbSolverInterface.hpp.

8.17.6.22 double∗ OsiGrbSolverInterface::redcost_ [mutable], [private]

Pointer to reduced cost vector.

Definition at line 883 of file OsiGrbSolverInterface.hpp.

8.17.6.23 double∗ OsiGrbSolverInterface::rowact_ [mutable], [private]

Pointer to row activity (slack) vector.

Definition at line 886 of file OsiGrbSolverInterface.hpp.

8.17.6.24 CoinPackedMatrix∗ OsiGrbSolverInterface::matrixByRow_ [mutable], [private]

Pointer to row-wise copy of problem matrix coefficients.

Definition at line 889 of file OsiGrbSolverInterface.hpp.

8.17.6.25 CoinPackedMatrix∗ OsiGrbSolverInterface::matrixByCol_ [mutable], [private]

Pointer to row-wise copy of problem matrix coefficients.

Definition at line 892 of file OsiGrbSolverInterface.hpp.

8.17.6.26 bool OsiGrbSolverInterface::probtypemip_ [mutable], [private]

Stores whether we currently see the problem as a MIP.

Definition at line 898 of file OsiGrbSolverInterface.hpp.

8.17.6.27 bool OsiGrbSolverInterface::domipstart [private]

Whether to pass a column solution to CPLEX before starting MIP solve (copymipstart)

Definition at line 901 of file OsiGrbSolverInterface.hpp.

8.17.6.28 int OsiGrbSolverInterface::colspace_ [private]

Size of allocated memory for coltype_, colmap_O2G, and (with offset auxcolspace) colmap_G2O.

Definition at line 904 of file OsiGrbSolverInterface.hpp.

8.17.6.29 char∗ OsiGrbSolverInterface::coltype_ [private]

Pointer to dense vector of variable types (continous, binary, integer)

Definition at line 907 of file OsiGrbSolverInterface.hpp.

8.17.6.30 int OsiGrbSolverInterface::nauxcols [private]

Number of auxiliary columns in Gurobi model for handling of ranged rows.

Definition at line 910 of file OsiGrbSolverInterface.hpp.

8.17.6.31 int OsiGrbSolverInterface::auxcolspace [private]

Size of allocated memory for colmap_G2O that exceeds colspace_.

Definition at line 913 of file OsiGrbSolverInterface.hpp.

8.17.6.32 int∗ OsiGrbSolverInterface::colmap_O2G [private]

Maps variable indices from Osi to Gurobi Is NULL if there are no ranged rows! (assume identity mapping then)

Definition at line 917 of file OsiGrbSolverInterface.hpp.

8.17.6.33 int∗ OsiGrbSolverInterface::colmap_G2O [private]

Maps variable indices from Gurobi to Osi A negative value indicates that a variable is an auxiliary variable that was added to handle a ranged row -colmap_G2O[i]-1 gives the index of the ranged row in this case.

Is NULL if there are no ranged rows! (assume identity mapping then)

Definition at line 923 of file OsiGrbSolverInterface.hpp.

8.17.6.34 int OsiGrbSolverInterface::auxcolindspace `[private]`

Current length of auxcolind array.

Definition at line 926 of file OsiGrbSolverInterface.hpp.

8.17.6.35 int∗ OsiGrbSolverInterface::auxcolind `[private]`

Gives for each row the index of the corresponding auxiliary variable, if it is a ranged row.

Otherwise, gives -1. Is NULL if there are no ranged rows! (assume -1 for each row then)

Definition at line 931 of file OsiGrbSolverInterface.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/OsiGrb/OsiGrbSolverInterface.hpp

8.18 OsiHotInfo Class Reference

This class contains the result of strong branching on a variable When created it stores enough information for strong branching.

`#include <OsiChooseVariable.hpp>`

Public Member Functions

- OsiHotInfo ()

  Default Constructor.
- OsiHotInfo (OsiSolverInterface ∗solver, const OsiBranchingInformation ∗info, const OsiObject ∗const ∗objects, int whichObject)

  Constructor from useful information.
- OsiHotInfo (const OsiHotInfo &)

  Copy constructor.
- OsiHotInfo & operator= (const OsiHotInfo &rhs)

  Assignment operator.
- virtual OsiHotInfo ∗ clone () const

  Clone.
- virtual ∼OsiHotInfo ()

  Destructor.
- int updateInformation (const OsiSolverInterface ∗solver, const OsiBranchingInformation ∗info, OsiChooseVariable ∗choose)

  Fill in useful information after strong branch.
- double originalObjectiveValue () const

  Original objective value.
- double upChange () const

  Up change - invalid if n-way.
- double downChange () const

  Down change - invalid if n-way.
- void setUpChange (double value)

  Set up change - invalid if n-way.
- void setDownChange (double value)

Set down change - invalid if n-way.

- double change (int k) const

  Change on way k.

- int upIterationCount () const

  Up iteration count - invalid if n-way.

- int downIterationCount () const

  Down iteration count - invalid if n-way.

- int iterationCount (int k) const

  Iteration count on way k.

- int upStatus () const

  Up status - invalid if n-way.

- int downStatus () const

  Down status - invalid if n-way.

- void setUpStatus (int value)

  Set up status - invalid if n-way.

- void setDownStatus (int value)

  Set down status - invalid if n-way.

- int status (int k) const

  Status on way k.

- OsiBranchingObject ∗ branchingObject () const

  Branching object.

- int whichObject () const

Protected Attributes

- double originalObjectiveValue_

  Original objective value.

- double ∗ changes_

  Objective changes.

- int ∗ iterationCounts_

  Iteration counts.

- int ∗ statuses_

  Status -1 - not done 0 - feasible and finished 1 - infeasible 2 - not finished.

- OsiBranchingObject ∗ branchingObject_

  Branching object.

- int whichObject_

  Which object on list.

8.18.1 Detailed Description

This class contains the result of strong branching on a variable When created it stores enough information for strong branching.

Definition at line 432 of file OsiChooseVariable.hpp.

8.18.2 Constructor & Destructor Documentation

8.18.2.1 OsiHotInfo::OsiHotInfo ( )

Default Constructor.

8.18.2.2 OsiHotInfo::OsiHotInfo (OsiSolverInterface ∗ *solver*, const OsiBranchingInformation ∗ *info*, const OsiObject ∗const ∗ *objects*, int *whichObject*)

Constructor from useful information.

8.18.2.3 OsiHotInfo::OsiHotInfo (const OsiHotInfo &)

Copy constructor.

8.18.2.4 virtual OsiHotInfo::∼OsiHotInfo ( ) [virtual]

Destructor.

8.18.3 Member Function Documentation

8.18.3.1 OsiHotInfo& OsiHotInfo::operator= (const OsiHotInfo & *rhs*)

Assignment operator.

8.18.3.2 virtual OsiHotInfo∗ OsiHotInfo::clone ( ) const [virtual]

Clone.

8.18.3.3 int OsiHotInfo::updateInformation (const OsiSolverInterface ∗ *solver*, const OsiBranchingInformation ∗ *info*, OsiChooseVariable ∗ *choose*)

Fill in useful information after strong branch.

Return status

8.18.3.4 double OsiHotInfo::originalObjectiveValue ( ) const [inline]

Original objective value.

Definition at line 463 of file OsiChooseVariable.hpp.

8.18.3.5 double OsiHotInfo::upChange ( ) const [inline]

Up change - invalid if n-way.

Definition at line 466 of file OsiChooseVariable.hpp.

8.18.3.6 double OsiHotInfo::downChange ( ) const [inline]

Down change - invalid if n-way.

Definition at line 469 of file OsiChooseVariable.hpp.

8.18.3.7 void OsiHotInfo::setUpChange (double *value*) [inline]

Set up change - invalid if n-way.

Definition at line 472 of file OsiChooseVariable.hpp.

8.18.3.8 void OsiHotInfo::setDownChange (double *value*) [inline]

Set down change - invalid if n-way.

Definition at line 475 of file OsiChooseVariable.hpp.

8.18.3.9 double OsiHotInfo::change (int *k*) const [inline]

Change on way k.

Definition at line 478 of file OsiChooseVariable.hpp.

8.18.3.10 int OsiHotInfo::upIterationCount ( ) const [inline]

Up iteration count - invalid if n-way.

Definition at line 482 of file OsiChooseVariable.hpp.

8.18.3.11 int OsiHotInfo::downIterationCount ( ) const [inline]

Down iteration count - invalid if n-way.

Definition at line 485 of file OsiChooseVariable.hpp.

8.18.3.12 int OsiHotInfo::iterationCount (int *k*) const [inline]

Iteration count on way k.

Definition at line 488 of file OsiChooseVariable.hpp.

8.18.3.13 int OsiHotInfo::upStatus ( ) const [inline]

Up status - invalid if n-way.

Definition at line 492 of file OsiChooseVariable.hpp.

8.18.3.14 int OsiHotInfo::downStatus ( ) const [inline]

Down status - invalid if n-way.

Definition at line 495 of file OsiChooseVariable.hpp.

8.18.3.15 void OsiHotInfo::setUpStatus (int *value*) [inline]

Set up status - invalid if n-way.

Definition at line 498 of file OsiChooseVariable.hpp.

8.18.3.16 void OsiHotInfo::setDownStatus (int *value*) [inline]

Set down status - invalid if n-way.

Definition at line 501 of file OsiChooseVariable.hpp.

8.18.3.17 int OsiHotInfo::status (int *k*) const [inline]

Status on way k.

Definition at line 504 of file OsiChooseVariable.hpp.

8.18.3.18 OsiBranchingObject∗ OsiHotInfo::branchingObject ( ) const [inline]

Branching object.

Definition at line 507 of file OsiChooseVariable.hpp.

8.18.3.19 int OsiHotInfo::whichObject ( ) const [inline]

Definition at line 509 of file OsiChooseVariable.hpp.

8.18.4 Member Data Documentation

8.18.4.1 double OsiHotInfo::originalObjectiveValue_ [protected]

Original objective value.

Definition at line 515 of file OsiChooseVariable.hpp.

8.18.4.2 double∗ OsiHotInfo::changes_ [protected]

Objective changes.

Definition at line 517 of file OsiChooseVariable.hpp.

8.18.4.3 int∗ OsiHotInfo::iterationCounts_ [protected]

Iteration counts.

Definition at line 519 of file OsiChooseVariable.hpp.

8.18.4.4 int∗ OsiHotInfo::statuses_ [protected]

Status -1 - not done 0 - feasible and finished 1 - infeasible 2 - not finished.

Definition at line 526 of file OsiChooseVariable.hpp.

8.18.4.5 OsiBranchingObject∗ OsiHotInfo::branchingObject_ [protected]

Branching object.

Definition at line 528 of file OsiChooseVariable.hpp.

8.18.4.6 int OsiHotInfo::whichObject_ [protected]

Which object on list.

Definition at line 530 of file OsiChooseVariable.hpp.

The documentation for this class was generated from the following file:

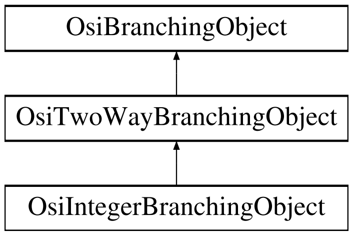
- /home/ted/COIN/trunk/Osi/src/Osi/OsiChooseVariable.hpp

8.19 OsiIntegerBranchingObject Class Reference

Simple branching object for an integer variable.

`#include <OsiBranchingObject.hpp>`

Inheritance diagram for OsiIntegerBranchingObject:



Public Member Functions

- OsiIntegerBranchingObject ()

  Default constructor.
- OsiIntegerBranchingObject (OsiSolverInterface ∗solver, const OsiSimpleInteger ∗originalObject, int way, double value)

  Create a standard floor/ceiling branch object.
- OsiIntegerBranchingObject (OsiSolverInterface ∗solver, const OsiSimpleInteger ∗originalObject, int way, double value, double downUpperBound, double upLowerBound)

  Create a standard floor/ceiling branch object.
- OsiIntegerBranchingObject (const OsiIntegerBranchingObject &)

  Copy constructor.
- OsiIntegerBranchingObject & operator= (const OsiIntegerBranchingObject &rhs)

  Assignment operator.
- virtual OsiBranchingObject ∗ clone () const

  Clone.
- virtual ∼OsiIntegerBranchingObject ()

  Destructor.
- virtual double branch (OsiSolverInterface ∗solver)

  Sets the bounds for the variable according to the current arm of the branch and advances the object state to the next arm.
- virtual void print (const OsiSolverInterface ∗solver=NULL)

  Print something about branch - only if log level high.

Protected Attributes

- double down_ [2]

  Lower [0] and upper [1] bounds for the down arm (way_ = -1)
- double up_ [2]

  Lower [0] and upper [1] bounds for the up arm (way_ = 1)

8.19.1 Detailed Description

Simple branching object for an integer variable.

This object can specify a two-way branch on an integer variable. For each arm of the branch, the upper and lower bounds on the variable can be independently specified. 0 -> down, 1-> up.

Definition at line 607 of file OsiBranchingObject.hpp.

8.19.2 Constructor & Destructor Documentation

8.19.2.1 OsiIntegerBranchingObject::OsiIntegerBranchingObject ( )

Default constructor.

8.19.2.2 OsiIntegerBranchingObject::OsiIntegerBranchingObject (**OsiSolverInterface** ∗ *solver*, const **OsiSimpleInteger** ∗ *originalObject*, int *way*, double *value*)

Create a standard floor/ceiling branch object.

Specifies a simple two-way branch. Let `value` = x∗. One arm of the branch will be lb <= x <= floor(x∗), the other ceil(x∗) <= x <= ub. Specify way = -1 to set the object state to perform the down arm first, way = 1 for the up arm.

8.19.2.3 OsiIntegerBranchingObject::OsiIntegerBranchingObject (**OsiSolverInterface** ∗ *solver*, const **OsiSimpleInteger** ∗ *originalObject*, int *way*, double *value*, double *downUpperBound*, double *upLowerBound*)

Create a standard floor/ceiling branch object.

Specifies a simple two-way branch in a more flexible way. One arm of the branch will be lb <= x <= downUpperBound, the other upLowerBound <= x <= ub. Specify way = -1 to set the object state to perform the down arm first, way = 1 for the up arm.

8.19.2.4 OsiIntegerBranchingObject::OsiIntegerBranchingObject (const **OsiIntegerBranchingObject** &)

Copy constructor.

8.19.2.5 virtual OsiIntegerBranchingObject::∼OsiIntegerBranchingObject ( ) `[virtual]`

Destructor.

8.19.3 Member Function Documentation

8.19.3.1 **OsiIntegerBranchingObject**& OsiIntegerBranchingObject::operator= (const **OsiIntegerBranchingObject** & *rhs*)

Assignment operator.

8.19.3.2 virtual **OsiBranchingObject**∗ OsiIntegerBranchingObject::clone ( ) const `[virtual]`

Clone.

Implements OsiBranchingObject.

8.19.3.3 virtual double OsiIntegerBranchingObject::branch (**OsiSolverInterface** ∗ *solver*) `[virtual]`

Sets the bounds for the variable according to the current arm of the branch and advances the object state to the next arm.

state. Returns change in guessed objective on next branch

Implements OsiTwoWayBranchingObject.

8.19.3.4 virtual void OsiIntegerBranchingObject::print (const **OsiSolverInterface** ∗ *solver* = `NULL`) `[virtual]`

Print something about branch - only if log level high.

8.19.4 Member Data Documentation

8.19.4.1 double OsiIntegerBranchingObject::down_[2] [protected]

Lower [0] and upper [1] bounds for the down arm (way_ = -1)

Definition at line 661 of file OsiBranchingObject.hpp.

8.19.4.2 double OsiIntegerBranchingObject::up_[2] [protected]

Lower [0] and upper [1] bounds for the up arm (way_ = 1)

Definition at line 663 of file OsiBranchingObject.hpp.

The documentation for this class was generated from the following file:

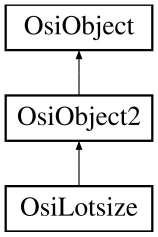
- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.20 OsiLotsize Class Reference

Lotsize class.

`#include <OsiBranchingObject.hpp>`

Inheritance diagram for OsiLotsize:



Public Member Functions

- OsiLotsize ()
- OsiLotsize (const OsiSolverInterface ∗solver, int iColumn, int numberPoints, const double ∗points, bool range=false)
- OsiLotsize (const OsiLotsize &)
- virtual OsiObject ∗ clone () const

  Clone.
- OsiLotsize & operator= (const OsiLotsize &rhs)
- virtual ∼OsiLotsize ()
- virtual double infeasibility (const OsiBranchingInformation ∗info, int &whichWay) const

  Infeasibility - large is 0.5.
- virtual double feasibleRegion (OsiSolverInterface ∗solver, const OsiBranchingInformation ∗info) const

  Set bounds to contain the current solution.
- virtual OsiBranchingObject ∗ createBranch (OsiSolverInterface ∗solver, const OsiBranchingInformation ∗info, int way) const

  Creates a branching object.
- void setColumnNumber (int value)

  Set solver column number.
- virtual int columnNumber () const

Column number if single column object -1 otherwise, so returns >= 0 Used by heuristics.
- virtual void resetBounds (const OsiSolverInterface ∗solver)

    Reset original upper and lower bound values from the solver.
- bool findRange (double value, double integerTolerance) const

    Finds range of interest so value is feasible in range range_ or infeasible between hi[range_] and lo[range_+1].
- virtual void floorCeiling (double &floorLotsize, double &ceilingLotsize, double value, double tolerance) const

    Returns floor and ceiling.
- double originalLowerBound () const

    Original bounds.
- double originalUpperBound () const
- int rangeType () const

    Type - 1 points, 2 ranges.
- int numberRanges () const

    Number of points.
- double ∗ bound () const

    Ranges.
- virtual void resetSequenceEtc (int numberColumns, const int ∗originalColumns)

    Change column numbers after preprocessing.
- virtual double upEstimate () const

    Return "up" estimate (default 1.0e-5)
- virtual double downEstimate () const

    Return "down" estimate (default 1.0e-5)
- virtual bool canHandleShadowPrices () const

    Return true if knows how to deal with Pseudo Shadow Prices.
- virtual bool canDoHeuristics () const

    Return true if object can take part in normal heuristics.

Private Attributes

- int columnNumber_

    data
- int rangeType_

    Type - 1 points, 2 ranges.
- int numberRanges_

    Number of points.
- double largestGap_
- double ∗ bound_

    Ranges.
- int range_

    Current range.

Additional Inherited Members

8.20.1 Detailed Description

Lotsize class.

Definition at line 827 of file OsiBranchingObject.hpp.

8.20.2 Constructor & Destructor Documentation

8.20.2.1 OsiLotsize::OsiLotsize ( )

8.20.2.2 OsiLotsize::OsiLotsize (const OsiSolverInterface ∗ *solver,* int *iColumn,* int *numberPoints,* const double ∗ *points,* bool *range* = `false`)

8.20.2.3 OsiLotsize::OsiLotsize (const OsiLotsize &)

8.20.2.4 virtual OsiLotsize::∼OsiLotsize ( ) `[virtual]`

8.20.3 Member Function Documentation

8.20.3.1 virtual OsiObject∗ OsiLotsize::clone ( ) const `[virtual]`

Clone.

Implements OsiObject.

8.20.3.2 OsiLotsize& OsiLotsize::operator= (const OsiLotsize & *rhs*)

8.20.3.3 virtual double OsiLotsize::infeasibility (const OsiBranchingInformation ∗ *info,* int & *whichWay*) const `[virtual]`

Infeasibility - large is 0.5.

Implements OsiObject.

8.20.3.4 virtual double OsiLotsize::feasibleRegion (OsiSolverInterface ∗ *solver,* const OsiBranchingInformation ∗ *info*) const `[virtual]`

Set bounds to contain the current solution.

More precisely, for the variable associated with this object, take the value given in the current solution, force it within the current bounds if required, then set the bounds to fix the variable at the integer nearest the solution value. Returns amount it had to move variable.

Implements OsiObject.

8.20.3.5 virtual OsiBranchingObject∗ OsiLotsize::createBranch (OsiSolverInterface ∗ *solver,* const OsiBranchingInformation ∗ *info,* int *way*) const `[virtual]`

Creates a branching object.

The preferred direction is set by `way`, 0 for down, 1 for up.

Reimplemented from OsiObject.

8.20.3.6 void OsiLotsize::setColumnNumber (int *value*) `[inline]`

Set solver column number.

Definition at line 874 of file OsiBranchingObject.hpp.

8.20.3.7 virtual int OsiLotsize::columnNumber ( ) const `[virtual]`

Column number if single column object -1 otherwise, so returns >= 0 Used by heuristics.

Reimplemented from OsiObject.

8.20.3.8 virtual void OsiLotsize::resetBounds (const OsiSolverInterface * *solver*) [virtual]

Reset original upper and lower bound values from the solver.

Handy for updating bounds held in this object after bounds held in the solver have been tightened.

Reimplemented from OsiObject.

8.20.3.9 bool OsiLotsize::findRange (double *value,* double *integerTolerance*) const

Finds range of interest so value is feasible in range range_ or infeasible between hi[range_] and lo[range_+1].

Returns true if feasible.

8.20.3.10 virtual void OsiLotsize::floorCeiling (double & *floorLotsize,* double & *ceilingLotsize,* double *value,* double *tolerance*) const [virtual]

Returns floor and ceiling.

8.20.3.11 double OsiLotsize::originalLowerBound ( ) const [inline]

Original bounds.

Definition at line 900 of file OsiBranchingObject.hpp.

8.20.3.12 double OsiLotsize::originalUpperBound ( ) const [inline]

Definition at line 902 of file OsiBranchingObject.hpp.

8.20.3.13 int OsiLotsize::rangeType ( ) const [inline]

Type - 1 points, 2 ranges.

Definition at line 905 of file OsiBranchingObject.hpp.

8.20.3.14 int OsiLotsize::numberRanges ( ) const [inline]

Number of points.

Definition at line 908 of file OsiBranchingObject.hpp.

8.20.3.15 double* OsiLotsize::bound ( ) const [inline]

Ranges.

Definition at line 911 of file OsiBranchingObject.hpp.

8.20.3.16 virtual void OsiLotsize::resetSequenceEtc (int *numberColumns,* const int * *originalColumns*) [virtual]

Change column numbers after preprocessing.

Reimplemented from OsiObject.

8.20.3.17 virtual double OsiLotsize::upEstimate ( ) const [virtual]

Return "up" estimate (default 1.0e-5)

Reimplemented from OsiObject.

8.20.3.18 virtual double OsiLotsize::downEstimate ( ) const [virtual]

Return "down" estimate (default 1.0e-5)

Reimplemented from OsiObject.

8.20.3.19 virtual bool OsiLotsize::canHandleShadowPrices ( ) const [inline], [virtual]

Return true if knows how to deal with Pseudo Shadow Prices.

Reimplemented from OsiObject.

Definition at line 922 of file OsiBranchingObject.hpp.

8.20.3.20 virtual bool OsiLotsize::canDoHeuristics ( ) const [inline], [virtual]

Return true if object can take part in normal heuristics.

Reimplemented from OsiObject.

Definition at line 926 of file OsiBranchingObject.hpp.

8.20.4 Member Data Documentation

8.20.4.1 int OsiLotsize::columnNumber_ [private]

data

Column number in model

Definition at line 933 of file OsiBranchingObject.hpp.

8.20.4.2 int OsiLotsize::rangeType_ [private]

Type - 1 points, 2 ranges.

Definition at line 935 of file OsiBranchingObject.hpp.

8.20.4.3 int OsiLotsize::numberRanges_ [private]

Number of points.

Definition at line 937 of file OsiBranchingObject.hpp.

8.20.4.4 double OsiLotsize::largestGap_ [private]

Definition at line 939 of file OsiBranchingObject.hpp.

8.20.4.5 double* OsiLotsize::bound_ [private]

Ranges.

Definition at line 941 of file OsiBranchingObject.hpp.

8.20.4.6 int OsiLotsize::range_ [mutable], [private]

Current range.

Definition at line 943 of file OsiBranchingObject.hpp.

The documentation for this class was generated from the following file:

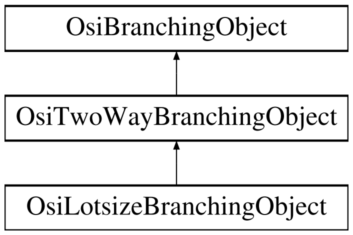
- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.21 OsiLotsizeBranchingObject Class Reference

Lotsize branching object.

`#include <OsiBranchingObject.hpp>`

Inheritance diagram for OsiLotsizeBranchingObject:



Public Member Functions

- OsiLotsizeBranchingObject ()

    Default constructor.
- OsiLotsizeBranchingObject (OsiSolverInterface ∗solver, const OsiLotsize ∗originalObject, int way, double value)

    Create a lotsize floor/ceiling branch object.
- OsiLotsizeBranchingObject (const OsiLotsizeBranchingObject &)

    Copy constructor.
- OsiLotsizeBranchingObject & operator= (const OsiLotsizeBranchingObject &rhs)

    Assignment operator.
- virtual OsiBranchingObject ∗ clone () const

    Clone.
- virtual ∼OsiLotsizeBranchingObject ()

    Destructor.
- virtual double branch (OsiSolverInterface ∗solver)

    Sets the bounds for the variable according to the current arm of the branch and advances the object state to the next arm.
- virtual void print (const OsiSolverInterface ∗solver=NULL)

    Print something about branch - only if log level high.

Protected Attributes

- double down_ [2]

    Lower [0] and upper [1] bounds for the down arm (way_ = -1)
- double up_ [2]

    Lower [0] and upper [1] bounds for the up arm (way_ = 1)

8.21.1 Detailed Description

Lotsize branching object.

This object can specify a two-way branch on an integer variable. For each arm of the branch, the upper and lower bounds on the variable can be independently specified.

Variable_ holds the index of the integer variable in the integerVariable_ array of the model.

Definition at line 957 of file OsiBranchingObject.hpp.

8.21.2 Constructor & Destructor Documentation

8.21.2.1 OsiLotsizeBranchingObject::OsiLotsizeBranchingObject ( )

Default constructor.

8.21.2.2 OsiLotsizeBranchingObject::OsiLotsizeBranchingObject (**OsiSolverInterface** ∗ *solver,* const **OsiLotsize** ∗ *originalObject,* int *way,* double *value*)

Create a lotsize floor/ceiling branch object.

Specifies a simple two-way branch. Let `value` = x∗. One arm of the branch will be is lb <= x <= valid range below(x∗), the other valid range above(x∗) <= x <= ub. Specify way = -1 to set the object state to perform the down arm first, way = 1 for the up arm.

8.21.2.3 OsiLotsizeBranchingObject::OsiLotsizeBranchingObject (const **OsiLotsizeBranchingObject** &)

Copy constructor.

8.21.2.4 virtual OsiLotsizeBranchingObject::∼OsiLotsizeBranchingObject ( ) `[virtual]`

Destructor.

8.21.3 Member Function Documentation

8.21.3.1 **OsiLotsizeBranchingObject**& OsiLotsizeBranchingObject::operator= (const **OsiLotsizeBranchingObject** & *rhs*)

Assignment operator.

8.21.3.2 virtual **OsiBranchingObject**∗ OsiLotsizeBranchingObject::clone ( ) const `[virtual]`

Clone.

Implements OsiBranchingObject.

8.21.3.3 virtual double OsiLotsizeBranchingObject::branch (**OsiSolverInterface** ∗ *solver*) `[virtual]`

Sets the bounds for the variable according to the current arm of the branch and advances the object state to the next arm.

state. Returns change in guessed objective on next branch

Implements OsiTwoWayBranchingObject.

8.21.3.4 virtual void OsiLotsizeBranchingObject::print (const **OsiSolverInterface** ∗ *solver* = `NULL`) `[virtual]`

Print something about branch - only if log level high.

8.21.4 Member Data Documentation

8.21.4.1 double OsiLotsizeBranchingObject::down_[2] `[protected]`

Lower [0] and upper [1] bounds for the down arm (way_ = -1)

Definition at line 1001 of file OsiBranchingObject.hpp.

8.21.4.2 double OsiLotsizeBranchingObject::up_[2] `[protected]`

Lower [0] and upper [1] bounds for the up arm (way_ = 1)

Definition at line 1003 of file OsiBranchingObject.hpp.

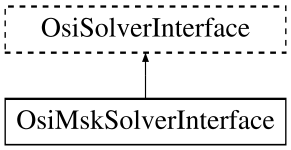
The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.22 OsiMskSolverInterface Class Reference

`#include <OsiMskSolverInterface.hpp>`

Inheritance diagram for OsiMskSolverInterface:



Public Member Functions

- virtual void setObjSense (double s)

  Set objective function sense (1 for min (default), -1 for max,)
- virtual void setColSolution (const double ∗colsol)

  Set the primal solution column values.
- virtual void setRowPrice (const double ∗rowprice)

  Set dual solution vector.
- const char ∗ getCtype () const

  return a vector of variable types (continous, binary, integer)

Solve methods

- virtual void initialSolve ()

  Solve initial LP relaxation.
- virtual void resolve ()

  Resolve an LP relaxation after problem modification.
- virtual void branchAndBound ()

  Invoke solver's built-in enumeration algorithm.

Parameter set/get methods

The set methods return true if the parameter was set to the given value, false otherwise.

There can be various reasons for failure: the given parameter is not applicable for the solver (e.g., refactorization frequency for the volume algorithm), the parameter is not yet implemented for the solver or simply the value of the parameter is out of the range the solver accepts. If a parameter setting call returns false check the details of your solver.

The get methods return true if the given parameter is applicable for the solver and is implemented. In this case the value of the parameter is returned in the second argument. Otherwise they return false.

- bool setIntParam (OsiIntParam key, int value)

Set an integer parameter.
- bool setDblParam (OsiDblParam key, double value)

    Set a double parameter.
- bool setStrParam (OsiStrParam key, const std::string &value)

    Set a string parameter.
- bool getIntParam (OsiIntParam key, int &value) const

    Get an integer parameter.
- bool getDblParam (OsiDblParam key, double &value) const

    Get a double parameter.
- bool getStrParam (OsiStrParam key, std::string &value) const

    Get a string parameter.

Methods returning info on how the solution process terminated

- virtual bool isAbandoned () const

    Are there a numerical difficulties?
- virtual bool isProvenOptimal () const

    Is optimality proven?
- virtual bool isProvenPrimalInfeasible () const

    Is primal infeasiblity proven?
- virtual bool isProvenDualInfeasible () const

    Is dual infeasiblity proven?
- virtual bool isPrimalObjectiveLimitReached () const

    Is the given primal objective limit reached?
- virtual bool isDualObjectiveLimitReached () const

    Is the given dual objective limit reached?
- virtual bool isIterationLimitReached () const

    Iteration limit reached?
- virtual bool isLicenseError () const

    Has there been a license problem?
- int getRescode () const

    Get rescode return of last Mosek optimizer call.

WarmStart related methods

- CoinWarmStart ∗ getEmptyWarmStart () const

    Get an empty warm start object.
- virtual CoinWarmStart ∗ getWarmStart () const

    Get warmstarting information.
- virtual bool setWarmStart (const CoinWarmStart ∗warmstart)

    Set warmstarting information.

Hotstart related methods (primarily used in strong branching). <br>

The user can create a hotstart (a snapshot) of the optimization process then reoptimize over and over again always starting from there.

***NOTE**: between hotstarted optimizations only bound changes are allowed.*

- virtual void markHotStart ()

    Create a hotstart point of the optimization process.
- virtual void solveFromHotStart ()

    Optimize starting from the hotstart.
- virtual void unmarkHotStart ()

    Delete the snapshot.

Methods related to querying the input data

- virtual int getNumCols () const
  Get number of columns.
- virtual int getNumRows () const
  Get number of rows.
- virtual int getNumElements () const
  Get number of nonzero elements.
- virtual const double ∗ getColLower () const
  Get pointer to array[getNumCols()] of column lower bounds.
- virtual const double ∗ getColUpper () const
  Get pointer to array[getNumCols()] of column upper bounds.
- virtual const char ∗ getRowSense () const
  Get pointer to array[getNumRows()] of row constraint senses.
- virtual const double ∗ getRightHandSide () const
  Get pointer to array[getNumRows()] of rows right-hand sides.
- virtual const double ∗ getRowRange () const
  Get pointer to array[getNumRows()] of row ranges.
- virtual const double ∗ getRowLower () const
  Get pointer to array[getNumRows()] of row lower bounds.
- virtual const double ∗ getRowUpper () const
  Get pointer to array[getNumRows()] of row upper bounds.
- virtual const double ∗ getObjCoefficients () const
  Get pointer to array[getNumCols()] of objective function coefficients.
- virtual double getObjSense () const
  Get objective function sense (1 for min (default), -1 for max)
- virtual bool isContinuous (int colNumber) const
  Return true if column is continuous.
- virtual const CoinPackedMatrix ∗ getMatrixByRow () const
  Get pointer to row-wise copy of matrix.
- virtual const CoinPackedMatrix ∗ getMatrixByCol () const
  Get pointer to column-wise copy of matrix.
- virtual double getInfinity () const
  Get solver's value for infinity.

Methods related to querying the solution

- virtual const double ∗ getColSolution () const
  Get pointer to array[getNumCols()] of primal solution vector.
- virtual const double ∗ getRowPrice () const
  Get pointer to array[getNumRows()] of dual prices.
- virtual const double ∗ getReducedCost () const
  Get a pointer to array[getNumCols()] of reduced costs.
- virtual const double ∗ getRowActivity () const
  Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.
- virtual double getObjValue () const
  Get objective function value.
- virtual int getIterationCount () const
  Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.
- virtual std::vector< double ∗ > getDualRays (int maxNumRays, bool fullRay=false) const
  Get as many dual rays as the solver can provide.
- virtual std::vector< double ∗ > getPrimalRays (int maxNumRays) const
  Get as many primal rays as the solver can provide.

Changing bounds on variables and constraints

- virtual void setObjCoeff (int elementIndex, double elementValue)

  Set an objective function coefficient.
- virtual void setObjCoeffSet (const int ∗indexFirst, const int ∗indexLast, const double ∗coeffList)

  Set a a set of objective function coefficients.
- virtual void setColLower (int elementIndex, double elementValue)

  Set a single column lower bound
  Use -COIN_DBL_MAX for -infinity.
- virtual void setColUpper (int elementIndex, double elementValue)

  Set a single column upper bound
  Use COIN_DBL_MAX for infinity.
- virtual void setColBounds (int elementIndex, double lower, double upper)

  Set a single column lower and upper bound
  The default implementation just invokes `setColLower()` and `setColUpper()`
- virtual void setColSetBounds (const int ∗indexFirst, const int ∗indexLast, const double ∗boundList)

  Set the bounds on a number of columns simultaneously
  The default implementation just invokes `setCollower()` and `setColupper()` over and over again.
- virtual void setRowLower (int elementIndex, double elementValue)

  Set a single row lower bound
  Use -COIN_DBL_MAX for -infinity.
- virtual void setRowUpper (int elementIndex, double elementValue)

  Set a single row upper bound
  Use COIN_DBL_MAX for infinity.
- virtual void setRowBounds (int elementIndex, double lower, double upper)

  Set a single row lower and upper bound
  The default implementation just invokes `setRowLower()` and `setRowUpper()`
- virtual void setRowType (int index, char sense, double rightHandSide, double range)

  Set the type of a single row
- virtual void setRowSetBounds (const int ∗indexFirst, const int ∗indexLast, const double ∗boundList)

  Set the bounds on a number of rows simultaneously
  The default implementation just invokes `setRowLower()` and `setRowUpper()` over and over again.
- virtual void setRowSetTypes (const int ∗indexFirst, const int ∗indexLast, const char ∗senseList, const double ∗rhsList, const double ∗rangeList)

  Set the type of a number of rows simultaneously
  The default implementation just invokes `setRowType()` and over and over again.

Integrality related changing methods

- virtual void setContinuous (int index)

  Set the index-th variable to be a continuous variable.
- virtual void setInteger (int index)

  Set the index-th variable to be an integer variable.
- virtual void setContinuous (const int ∗indices, int len)

  Set the variables listed in indices (which is of length len) to be continuous variables.
- virtual void setInteger (const int ∗indices, int len)

  Set the variables listed in indices (which is of length len) to be integer variables.

Methods to expand a problem.<br>

Note that if a column is added then by default it will correspond to a continuous variable.

- virtual void addCol (const CoinPackedVectorBase &vec, const double collb, const double colub, const double obj)

  Add a column (primal variable) to the problem.
- virtual void addCols (const int numcols, const CoinPackedVectorBase ∗const ∗cols, const double ∗collb, const double ∗colub, const double ∗obj)

  Add a set of columns (primal variables) to the problem.

- virtual void deleteCols (const int num, const int ∗colIndices)

  Remove a set of columns (primal variables) from the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const double rowlb, const double rowub)

  Add a row (constraint) to the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const char rowsen, const double rowrhs, const double rowrng)

  Add a row (constraint) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const double ∗rowlb, const double ∗rowub)

  Add a set of rows (constraints) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Add a set of rows (constraints) to the problem.
- virtual void deleteRows (const int num, const int ∗rowIndices)

  Delete a set of rows (constraints) from the problem.

Methods to input a problem

- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)

  Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, double ∗&rowlb, double ∗&rowub)

  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, char ∗&rowsen, double ∗&rowrhs, double ∗&rowrng)

  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)

  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual int readMps (const char ∗filename, const char ∗extension="mps")

  Read an mps file from the given filename.
- virtual void writeMps (const char ∗filename, const char ∗extension="mps", double objSense=0.0) const

  Write the problem into an mps file of the given filename.

Message handling

- void passInMessageHandler (CoinMessageHandler ∗handler)

  Pass in a message handler It is the client's responsibility to destroy a message handler installed by this routine; it will not be destroyed when the solver interface is destroyed.

Constructors and destructor

- OsiMskSolverInterface (MSKenv_t mskenv=NULL)

Default Constructor optional argument mskenv can be used to reach in an initialized user environment OsiMsk assumes membership of mskenv, so it will be freed when the last instanciation of OsiMsk is deleted.

- virtual OsiSolverInterface ∗ clone (bool copyData=true) const

  Clone.
- OsiMskSolverInterface (const OsiMskSolverInterface &)

  Copy constructor.
- OsiMskSolverInterface & operator= (const OsiMskSolverInterface &rhs)

  Assignment operator.
- virtual ∼OsiMskSolverInterface ()

  Destructor.

Static Public Member Functions

Static instance counter methods

- static void incrementInstanceCounter ()

  MOSEK has a context which must be created prior to all other MOSEK calls.
- static void decrementInstanceCounter ()

  MOSEK has a context which should be deleted after MOSEK calls.
- static unsigned int getNumInstances ()

  Return the number of instances of instantiated objects using MOSEK services.

Public Attributes

Private member data

- MSKtask_t task_

  MOSEK model represented by this class instance.
- int ∗ hotStartCStat_

  Hotstart information.
- int hotStartCStatSize_
- int ∗ hotStartRStat_
- int hotStartRStatSize_
- int hotStartMaxIteration_

Cached information derived from the MOSEK model

- double ∗ obj_

  Pointer to objective vector.
- double ∗ collower_

  Pointer to dense vector of variable lower bounds.
- double ∗ colupper_

  Pointer to dense vector of variable lower bounds.
- char ∗ rowsense_

  Pointer to dense vector of row sense indicators.
- double ∗ rhs_

  Pointer to dense vector of row right-hand side values.
- double ∗ rowrange_

  Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)
- double ∗ rowlower_

  Pointer to dense vector of row lower bounds.
- double ∗ rowupper_

  Pointer to dense vector of row upper bounds.
- double ∗ colsol_

Pointer to primal solution vector.
- double ∗ rowsol_

  Pointer to dual solution vector.
- double ∗ redcost_

  Pointer to reduced cost vector.
- double ∗ rowact_

  Pointer to row activity (slack) vector.
- CoinPackedMatrix ∗ matrixByRow_

  Pointer to row-wise copy of problem matrix coefficients.
- CoinPackedMatrix ∗ matrixByCol_

  Pointer to row-wise copy of problem matrix coefficients.

Additional information needed for storing MIP problems

- char ∗ coltype_

  Pointer to dense vector of variable types (continous, binary, integer)
- int coltypesize_

  Size of allocated memory for coltype_.
- bool probtypemip_

  Stores whether MOSEK' prob type is currently set to MIP.

Protected Member Functions

Protected methods

- virtual void applyRowCut (const OsiRowCut &rc)

  Apply a row cut. Return true if cut was applied.
- virtual void applyColCut (const OsiColCut &cc)

  Apply a column cut (bound adjustment).

Private Member Functions

Private static class functions

- void switchToLP ()

  switches MOSEK to prob type LP
- void switchToMIP ()

  switches MOSEK to prob type MIP
- void resizeColType (int minsize)

  resizes coltype_ vector to be able to store at least minsize elements
- void freeColType ()

  frees colsize_ vector
- bool definedSolution (int solution) const
- int solverUsed () const

Static Private Attributes

- static unsigned int numInstances_

  Number of live problem instances.

Private static class data

- static MSKenv_t env_

  MOSEK environment pointer.

Friends

- void OsiMskSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiMskSolverInterface class.

MOSEK specific public interfaces

- enum keepCachedFlag {
  KEEPCACHED_NONE = 0, KEEPCACHED_COLUMN = 1, KEEPCACHED_ROW = 2, KEEPCACHED_MATRIX = 4,
  KEEPCACHED_RESULTS = 8, KEEPCACHED_PROBLEM = KEEPCACHED_COLUMN | KEEPCACHED_ROW | KEEPCACHED_MATRIX, KEEPCACHED_ALL = KEEPCACHED_PROBLEM | KEEPCACHED_RESULTS,
  FREECACHED_COLUMN = KEEPCACHED_PROBLEM & ∼KEEPCACHED_COLUMN,
  FREECACHED_ROW = KEEPCACHED_PROBLEM & ∼KEEPCACHED_ROW, FREECACHED_MATRIX = KEEPCACHED_PROBLEM & ∼KEEPCACHED_MATRIX, FREECACHED_RESULTS = KEEPCACHED_ALL & ∼KEEPCACHED_RESULTS }

  Get pointer to MOSEK model and free all specified cached data entries (combined with logical or-operator '|'):
- MSKtask_t getLpPtr (int keepCached=KEEPCACHED_NONE)
- MSKenv_t getEnvironmentPtr ()

  Method to access MOSEK environment pointer.

Private methods

- int Mskerr
- int MSKsolverused_
- double ObjOffset_
- int InitialSolver
- MSKtask_t getMutableLpPtr () const

  Get task Pointer for const methods.
- void gutsOfCopy (const OsiMskSolverInterface &source)

  The real work of a copy constructor (used by copy and assignment)
- void gutsOfConstructor ()

  The real work of the constructor.
- void gutsOfDestructor ()

  The real work of the destructor.
- void freeCachedColRim ()

  free cached column rim vectors
- void freeCachedRowRim ()

  free cached row rim vectors
- void freeCachedResults ()

  free cached result vectors
- void freeCachedMatrix ()

  free cached matrices
- void freeCachedData (int keepCached=KEEPCACHED_NONE)

  free all cached data (except specified entries, see getLpPtr())
- void freeAllMemory ()

  free all allocated memory

Additional Inherited Members

8.22.1 Detailed Description

Definition at line 23 of file OsiMskSolverInterface.hpp.

8.22.2 Member Enumeration Documentation

8.22.2.1 enum **OsiMskSolverInterface::keepCachedFlag**

Get pointer to MOSEK model and free all specified cached data entries (combined with logical or-operator '|'):

Enumerator

KEEPCACHED_NONE discard all cached data (default)

KEEPCACHED_COLUMN column information: objective values, lower and upper bounds, variable types

KEEPCACHED_ROW row information: right hand sides, ranges and senses, lower and upper bounds for row

KEEPCACHED_MATRIX problem matrix: matrix ordered by column and by row

KEEPCACHED_RESULTS LP solution: primal and dual solution, reduced costs, row activities.

KEEPCACHED_PROBLEM only discard cached LP solution

KEEPCACHED_ALL keep all cached data (similar to getMutableLpPtr())

FREECACHED_COLUMN free only cached column and LP solution information

FREECACHED_ROW free only cached row and LP solution information

FREECACHED_MATRIX free only cached matrix and LP solution information

FREECACHED_RESULTS free only cached LP solution information

Definition at line 598 of file OsiMskSolverInterface.hpp.

8.22.3 Constructor & Destructor Documentation

8.22.3.1 OsiMskSolverInterface::OsiMskSolverInterface (**MSKenv_t** *mskenv* = `NULL`)

Default Constructor optional argument mskenv can be used to reach in an initialized user environment OsiMsk assumes membership of mskenv, so it will be freed when the last instanciation of OsiMsk is deleted.

8.22.3.2 OsiMskSolverInterface::OsiMskSolverInterface (const **OsiMskSolverInterface** &)

Copy constructor.

8.22.3.3 virtual OsiMskSolverInterface::∼OsiMskSolverInterface ( ) `[virtual]`

Destructor.

8.22.4 Member Function Documentation

8.22.4.1 virtual void OsiMskSolverInterface::initialSolve ( ) `[virtual]`

Solve initial LP relaxation.

Implements OsiSolverInterface.

8.22.4.2 virtual void OsiMskSolverInterface::resolve ( ) [virtual]

Resolve an LP relaxation after problem modification.

Implements OsiSolverInterface.

8.22.4.3 virtual void OsiMskSolverInterface::branchAndBound ( ) [virtual]

Invoke solver's built-in enumeration algorithm.

Implements OsiSolverInterface.

8.22.4.4 bool OsiMskSolverInterface::setIntParam (OsiIntParam *key*, int *value*) [virtual]

Set an integer parameter.

Reimplemented from OsiSolverInterface.

8.22.4.5 bool OsiMskSolverInterface::setDblParam (OsiDblParam *key*, double *value*) [virtual]

Set a double parameter.

Reimplemented from OsiSolverInterface.

8.22.4.6 bool OsiMskSolverInterface::setStrParam (OsiStrParam *key*, const std::string & *value*) [virtual]

Set a string parameter.

Reimplemented from OsiSolverInterface.

8.22.4.7 bool OsiMskSolverInterface::getIntParam (OsiIntParam *key*, int & *value*) const [virtual]

Get an integer parameter.

Reimplemented from OsiSolverInterface.

8.22.4.8 bool OsiMskSolverInterface::getDblParam (OsiDblParam *key*, double & *value*) const [virtual]

Get a double parameter.

Reimplemented from OsiSolverInterface.

8.22.4.9 bool OsiMskSolverInterface::getStrParam (OsiStrParam *key*, std::string & *value*) const [virtual]

Get a string parameter.

Reimplemented from OsiSolverInterface.

8.22.4.10 virtual bool OsiMskSolverInterface::isAbandoned ( ) const [virtual]

Are there a numerical difficulties?

Implements OsiSolverInterface.

8.22.4.11 virtual bool OsiMskSolverInterface::isProvenOptimal ( ) const [virtual]

Is optimality proven?

Implements OsiSolverInterface.

8.22.4.12 virtual bool OsiMskSolverInterface::isProvenPrimalInfeasible ( ) const [virtual]

Is primal infeasiblity proven?

Implements OsiSolverInterface.

8.22.4.13 virtual bool OsiMskSolverInterface::isProvenDualInfeasible ( ) const [virtual]

Is dual infeasiblity proven?

Implements OsiSolverInterface.

8.22.4.14 virtual bool OsiMskSolverInterface::isPrimalObjectiveLimitReached ( ) const [virtual]

Is the given primal objective limit reached?

Reimplemented from OsiSolverInterface.

8.22.4.15 virtual bool OsiMskSolverInterface::isDualObjectiveLimitReached ( ) const [virtual]

Is the given dual objective limit reached?

Reimplemented from OsiSolverInterface.

8.22.4.16 virtual bool OsiMskSolverInterface::isIterationLimitReached ( ) const [virtual]

Iteration limit reached?

Implements OsiSolverInterface.

8.22.4.17 virtual bool OsiMskSolverInterface::isLicenseError ( ) const [virtual]

Has there been a license problem?

8.22.4.18 int OsiMskSolverInterface::getRescode ( ) const [inline]

Get rescode return of last Mosek optimizer call.

Definition at line 91 of file OsiMskSolverInterface.hpp.

8.22.4.19 CoinWarmStart* OsiMskSolverInterface::getEmptyWarmStart ( ) const [virtual]

Get an empty warm start object.

This routine returns an empty CoinWarmStartBasis object. Its purpose is to provide a way to give a client a warm start basis object of the appropriate type, which can resized and modified as desired.

Implements OsiSolverInterface.

8.22.4.20 virtual CoinWarmStart* OsiMskSolverInterface::getWarmStart ( ) const [virtual]

Get warmstarting information.

Implements OsiSolverInterface.

8.22.4.21 virtual bool OsiMskSolverInterface::setWarmStart (const CoinWarmStart * *warmstart*) [virtual]

Set warmstarting information.

Return true/false depending on whether the warmstart information was accepted or not.

Implements OsiSolverInterface.

8.22.4.22 virtual void OsiMskSolverInterface::markHotStart ( ) [virtual]

Create a hotstart point of the optimization process.

Reimplemented from OsiSolverInterface.

8.22.4.23 virtual void OsiMskSolverInterface::solveFromHotStart ( ) [virtual]

Optimize starting from the hotstart.

Reimplemented from OsiSolverInterface.

8.22.4.24 virtual void OsiMskSolverInterface::unmarkHotStart ( ) [virtual]

Delete the snapshot.

Reimplemented from OsiSolverInterface.

8.22.4.25 virtual int OsiMskSolverInterface::getNumCols ( ) const [virtual]

Get number of columns.

Implements OsiSolverInterface.

8.22.4.26 virtual int OsiMskSolverInterface::getNumRows ( ) const [virtual]

Get number of rows.

Implements OsiSolverInterface.

8.22.4.27 virtual int OsiMskSolverInterface::getNumElements ( ) const [virtual]

Get number of nonzero elements.

Implements OsiSolverInterface.

8.22.4.28 virtual const double* OsiMskSolverInterface::getColLower ( ) const [virtual]

Get pointer to array[getNumCols()] of column lower bounds.

Implements OsiSolverInterface.

8.22.4.29 virtual const double* OsiMskSolverInterface::getColUpper ( ) const [virtual]

Get pointer to array[getNumCols()] of column upper bounds.

Implements OsiSolverInterface.

8.22.4.30 virtual const char* OsiMskSolverInterface::getRowSense ( ) const [virtual]

Get pointer to array[getNumRows()] of row constraint senses.

- 'L': <= constraint
- 'E': = constraint
- 'G': >= constraint
- 'R': ranged constraint
- 'N': free constraint

Implements OsiSolverInterface.

8.22.4.31 virtual const double∗ OsiMskSolverInterface::getRightHandSide ( ) const [virtual]

Get pointer to array[getNumRows()] of rows right-hand sides.

- if rowsense()[i] == 'L' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'G' then rhs()[i] == rowlower()[i]
- if rowsense()[i] == 'R' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'N' then rhs()[i] == 0.0

Implements OsiSolverInterface.

8.22.4.32 virtual const double∗ OsiMskSolverInterface::getRowRange ( ) const [virtual]

Get pointer to array[getNumRows()] of row ranges.

- if rowsense()[i] == 'R' then rowrange()[i] == rowupper()[i] - rowlower()[i]
- if rowsense()[i] != 'R' then rowrange()[i] is 0.0

Implements OsiSolverInterface.

8.22.4.33 virtual const double∗ OsiMskSolverInterface::getRowLower ( ) const [virtual]

Get pointer to array[getNumRows()] of row lower bounds.

Implements OsiSolverInterface.

8.22.4.34 virtual const double∗ OsiMskSolverInterface::getRowUpper ( ) const [virtual]

Get pointer to array[getNumRows()] of row upper bounds.

Implements OsiSolverInterface.

8.22.4.35 virtual const double∗ OsiMskSolverInterface::getObjCoefficients ( ) const [virtual]

Get pointer to array[getNumCols()] of objective function coefficients.

Implements OsiSolverInterface.

8.22.4.36 virtual double OsiMskSolverInterface::getObjSense ( ) const [virtual]

Get objective function sense (1 for min (default), -1 for max)

Implements OsiSolverInterface.

8.22.4.37 virtual bool OsiMskSolverInterface::isContinuous (int *colNumber*) const [virtual]

Return true if column is continuous.

Implements OsiSolverInterface.

8.22.4.38 virtual const CoinPackedMatrix∗ OsiMskSolverInterface::getMatrixByRow ( ) const [virtual]

Get pointer to row-wise copy of matrix.

Implements OsiSolverInterface.

8.22.4.39 virtual const CoinPackedMatrix* OsiMskSolverInterface::getMatrixByCol ( ) const [virtual]

Get pointer to column-wise copy of matrix.

Implements OsiSolverInterface.

8.22.4.40 virtual double OsiMskSolverInterface::getInfinity ( ) const [virtual]

Get solver's value for infinity.

Implements OsiSolverInterface.

8.22.4.41 virtual const double* OsiMskSolverInterface::getColSolution ( ) const [virtual]

Get pointer to array[getNumCols()] of primal solution vector.

Implements OsiSolverInterface.

8.22.4.42 virtual const double* OsiMskSolverInterface::getRowPrice ( ) const [virtual]

Get pointer to array[getNumRows()] of dual prices.

Implements OsiSolverInterface.

8.22.4.43 virtual const double* OsiMskSolverInterface::getReducedCost ( ) const [virtual]

Get a pointer to array[getNumCols()] of reduced costs.

Implements OsiSolverInterface.

8.22.4.44 virtual const double* OsiMskSolverInterface::getRowActivity ( ) const [virtual]

Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.

Implements OsiSolverInterface.

8.22.4.45 virtual double OsiMskSolverInterface::getObjValue ( ) const [virtual]

Get objective function value.

Implements OsiSolverInterface.

8.22.4.46 virtual int OsiMskSolverInterface::getIterationCount ( ) const [virtual]

Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.

Implements OsiSolverInterface.

8.22.4.47 virtual std::vector<double*> OsiMskSolverInterface::getDualRays (int *maxNumRays*, bool *fullRay* = false) const [virtual]

Get as many dual rays as the solver can provide.

(In case of proven primal infeasibility there should be at least one.)

The first getNumRows() ray components will always be associated with the row duals (as returned by getRowPrice()). If `fullRay` is true, the final getNumCols() entries will correspond to the ray components associated with the nonbasic variables. If the full ray is requested and the method cannot provide it, it will throw an exception.

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumRows() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.22.4.48 virtual std::vector<double∗> OsiMskSolverInterface::getPrimalRays (int *maxNumRays*) const [virtual]

Get as many primal rays as the solver can provide.

(In case of proven dual infeasibility there should be at least one.)

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumCols() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.22.4.49 virtual void OsiMskSolverInterface::setObjCoeff (int *elementIndex,* double *elementValue*) [virtual]

Set an objective function coefficient.

Implements OsiSolverInterface.

8.22.4.50 virtual void OsiMskSolverInterface::setObjCoeffSet (const int ∗ *indexFirst,* const int ∗ *indexLast,* const double ∗ *coeffList*) [virtual]

Set a a set of objective function coefficients.

Reimplemented from OsiSolverInterface.

8.22.4.51 virtual void OsiMskSolverInterface::setColLower (int *elementIndex,* double *elementValue*) [virtual]

Set a single column lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.22.4.52 virtual void OsiMskSolverInterface::setColUpper (int *elementIndex,* double *elementValue*) [virtual]

Set a single column upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.22.4.53 virtual void OsiMskSolverInterface::setColBounds (int *elementIndex,* double *lower,* double *upper*) [virtual]

Set a single column lower and upper bound

The default implementation just invokes `setColLower()` and `setColUpper()`

Reimplemented from OsiSolverInterface.

8.22.4.54 virtual void OsiMskSolverInterface::setColSetBounds (const int ∗ *indexFirst,* const int ∗ *indexLast,* const double ∗ *boundList*) [virtual]

Set the bounds on a number of columns simultaneously

The default implementation just invokes `setCollower()` and `setColupper()` over and over again.

Parameters

<code>[indexfirst,indexLast]</code>	contains the indices of the constraints whose either bound changes
boundList	the new lower/upper bound pairs for the variables

Reimplemented from OsiSolverInterface.

8.22.4.55 virtual void OsiMskSolverInterface::setRowLower (int *elementIndex,* double *elementValue*) [virtual]

Set a single row lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.22.4.56 virtual void OsiMskSolverInterface::setRowUpper (int *elementIndex,* double *elementValue*) [virtual]

Set a single row upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.22.4.57 virtual void OsiMskSolverInterface::setRowBounds (int *elementIndex,* double *lower,* double *upper*) [virtual]

Set a single row lower and upper bound

The default implementation just invokes `setRowLower()` and `setRowUpper()`

Reimplemented from OsiSolverInterface.

8.22.4.58 virtual void OsiMskSolverInterface::setRowType (int *index,* char *sense,* double *rightHandSide,* double *range*) [virtual]

Set the type of a single row

Implements OsiSolverInterface.

8.22.4.59 virtual void OsiMskSolverInterface::setRowSetBounds (const int ∗ *indexFirst,* const int ∗ *indexLast,* const double ∗ *boundList*) [virtual]

Set the bounds on a number of rows simultaneously

The default implementation just invokes `setRowLower()` and `setRowUpper()` over and over again.

Parameters

<code>[indexfirst,indexLast]</code>	contains the indices of the constraints whose either bound changes
boundList	the new lower/upper bound pairs for the constraints

Reimplemented from OsiSolverInterface.

8.22.4.60 virtual void OsiMskSolverInterface::setRowSetTypes (const int ∗ *indexFirst,* const int ∗ *indexLast,* const char ∗ *senseList,* const double ∗ *rhsList,* const double ∗ *rangeList*) [virtual]

Set the type of a number of rows simultaneously

The default implementation just invokes `setRowType()` and over and over again.

Parameters

<code>[indexfirst,index-Last]</code>	contains the indices of the constraints whose type changes
senseList	the new senses
rhsList	the new right hand sides
rangeList	the new ranges

Reimplemented from OsiSolverInterface.

8.22.4.61 virtual void OsiMskSolverInterface::setContinuous (int *index*) [virtual]

Set the index-th variable to be a continuous variable.

Implements OsiSolverInterface.

8.22.4.62 virtual void OsiMskSolverInterface::setInteger (int *index*) [virtual]

Set the index-th variable to be an integer variable.

Implements OsiSolverInterface.

8.22.4.63 virtual void OsiMskSolverInterface::setContinuous (const int ∗ *indices,* int *len*) [virtual]

Set the variables listed in indices (which is of length len) to be continuous variables.

Reimplemented from OsiSolverInterface.

8.22.4.64 virtual void OsiMskSolverInterface::setInteger (const int ∗ *indices,* int *len*) [virtual]

Set the variables listed in indices (which is of length len) to be integer variables.

Reimplemented from OsiSolverInterface.

8.22.4.65 virtual void OsiMskSolverInterface::setObjSense (double *s*) [virtual]

Set objective function sense (1 for min (default), -1 for max,)

Implements OsiSolverInterface.

8.22.4.66 virtual void OsiMskSolverInterface::setColSolution (const double ∗ *colsol*) [virtual]

Set the primal solution column values.

colsol[numcols()] is an array of values of the problem column variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of colsol() until changed by another call to setColsol() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.22.4.67 virtual void OsiMskSolverInterface::setRowPrice (const double ∗ *rowprice*) [virtual]

Set dual solution vector.

rowprice[numrows()] is an array of values of the problem row dual variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of rowprice() until changed by another call to setRowprice() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.22.4.68 virtual void OsiMskSolverInterface::addCol (const CoinPackedVectorBase & *vec*, const double *collb*, const double *colub*, const double *obj*) [virtual]

Add a column (primal variable) to the problem.

Implements OsiSolverInterface.

8.22.4.69 virtual void OsiMskSolverInterface::addCols (const int *numcols*, const CoinPackedVectorBase ∗const ∗ *cols*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*) [virtual]

Add a set of columns (primal variables) to the problem.

The default implementation simply makes repeated calls to addCol().

Reimplemented from OsiSolverInterface.

8.22.4.70 virtual void OsiMskSolverInterface::deleteCols (const int *num*, const int ∗ *colIndices*) [virtual]

Remove a set of columns (primal variables) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted variables are nonbasic.

Implements OsiSolverInterface.

8.22.4.71 virtual void OsiMskSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const double *rowlb*, const double *rowub*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.22.4.72 virtual void OsiMskSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const char *rowsen*, const double *rowrhs*, const double *rowrng*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.22.4.73 virtual void OsiMskSolverInterface::addRows (const int *numrows*, const CoinPackedVectorBase ∗const ∗ *rows*, const double ∗ *rowlb*, const double ∗ *rowub*) [virtual]

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented from OsiSolverInterface.

8.22.4.74 virtual void OsiMskSolverInterface::addRows (const int *numrows*, const CoinPackedVectorBase ∗const ∗ *rows*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) [virtual]

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented from OsiSolverInterface.

8.22.4.75 virtual void OsiMskSolverInterface::deleteRows (const int *num*, const int ∗ *rowIndices*) [virtual]

Delete a set of rows (constraints) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted rows are loose.

Implements OsiSolverInterface.

8.22.4.76 virtual void OsiMskSolverInterface::loadProblem (const CoinPackedMatrix & *matrix*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const double ∗ *rowlb*, const double ∗ *rowub*) `[virtual]`

Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `rowub`: all rows have upper bound infinity
- `rowlb`: all rows have lower bound -infinity
- `obj`: all variables have 0 objective coefficient

Implements OsiSolverInterface.

8.22.4.77 virtual void OsiMskSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix*, double ∗& *collb*, double ∗& *colub*, double ∗& *obj*, double ∗& *rowlb*, double ∗& *rowub*) `[virtual]`

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.22.4.78 virtual void OsiMskSolverInterface::loadProblem (const CoinPackedMatrix & *matrix*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) `[virtual]`

Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `obj`: all variables have 0 objective coefficient
- `rowsen`: all rows are >=
- `rowrhs`: all right hand sides are 0
- `rowrng`: 0 for the ranged rows

Implements OsiSolverInterface.

8.22.4.79 virtual void OsiMskSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix*, double ∗& *collb*, double ∗& *colub*, double ∗& *obj*, char ∗& *rowsen*, double ∗& *rowrhs*, double ∗& *rowrng*) `[virtual]`

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.22.4.80 virtual void OsiMskSolverInterface::loadProblem (const int *numcols,* const int *numrows,* const int ∗ *start,* const int ∗ *index,* const double ∗ *value,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj,* const double ∗ *rowlb,* const double ∗ *rowub*) [virtual]

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.22.4.81 virtual void OsiMskSolverInterface::loadProblem (const int *numcols,* const int *numrows,* const int ∗ *start,* const int ∗ *index,* const double ∗ *value,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj,* const char ∗ *rowsen,* const double ∗ *rowrhs,* const double ∗ *rowrng*) [virtual]

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.22.4.82 virtual int OsiMskSolverInterface::readMps (const char ∗ *filename,* const char ∗ *extension* = "mps") [virtual]

Read an mps file from the given filename.

Reimplemented from OsiSolverInterface.

8.22.4.83 virtual void OsiMskSolverInterface::writeMps (const char ∗ *filename,* const char ∗ *extension* = "mps", double *objSense* = 0.0) const [virtual]

Write the problem into an mps file of the given filename.

If objSense is non zero then -1.0 forces the code to write a maximization objective and +1.0 to write a minimization one. If 0.0 then solver can do what it wants

Implements OsiSolverInterface.

8.22.4.84 void OsiMskSolverInterface::passInMessageHandler (CoinMessageHandler ∗ *handler*) [virtual]

Pass in a message handler It is the client's responsibility to destroy a message handler installed by this routine; it will not be destroyed when the solver interface is destroyed.

Reimplemented from OsiSolverInterface.

8.22.4.85 MSKtask_t OsiMskSolverInterface::getLpPtr (int *keepCached* = KEEPCACHED_NONE)

8.22.4.86 MSKenv_t OsiMskSolverInterface::getEnvironmentPtr ( )

Method to access MOSEK environment pointer.

8.22.4.87 const char∗ OsiMskSolverInterface::getCtype ( ) const

return a vector of variable types (continous, binary, integer)

8.22.4.88 static void OsiMskSolverInterface::incrementInstanceCounter ( ) [static]

MOSEK has a context which must be created prior to all other MOSEK calls.

This method:

- Increments by 1 the number of uses of the MOSEK environment.
- Creates the MOSEK context when the number of uses is change to 1 from 0.

8.22.4.89 static void OsiMskSolverInterface::decrementInstanceCounter ( ) [static]

MOSEK has a context which should be deleted after MOSEK calls.

This method:

- Decrements by 1 the number of uses of the MOSEK environment.
- Deletes the MOSEK context when the number of uses is change to 0 from 1.

8.22.4.90 static unsigned int OsiMskSolverInterface::getNumInstances ( ) [static]

Return the number of instances of instantiated objects using MOSEK services.

8.22.4.91 virtual OsiSolverInterface∗ OsiMskSolverInterface::clone (bool *copyData* = true) const [virtual]

Clone.

Implements OsiSolverInterface.

8.22.4.92 OsiMskSolverInterface& OsiMskSolverInterface::operator= (const OsiMskSolverInterface & *rhs*)

Assignment operator.

8.22.4.93 virtual void OsiMskSolverInterface::applyRowCut (const OsiRowCut & *rc*) [protected], [virtual]

Apply a row cut. Return true if cut was applied.

Implements OsiSolverInterface.

8.22.4.94 virtual void OsiMskSolverInterface::applyColCut (const OsiColCut & *cc*) [protected], [virtual]

Apply a column cut (bound adjustment).

Return true if cut was applied.

Implements OsiSolverInterface.

8.22.4.95 void OsiMskSolverInterface::switchToLP ( ) [private]

switches MOSEK to prob type LP

8.22.4.96 void OsiMskSolverInterface::switchToMIP ( ) [private]

switches MOSEK to prob type MIP

8.22.4.97 void OsiMskSolverInterface::resizeColType (int *minsize*) [private]

resizes coltype_ vector to be able to store at least minsize elements

8.22.4.98 void OsiMskSolverInterface::freeColType ( ) [private]

frees colsize_ vector

8.22.4.99 bool OsiMskSolverInterface::definedSolution (int *solution*) const [private]

8.22.4.100 int OsiMskSolverInterface::solverUsed ( ) const [private]

8.22.4.101 MSKtask_t OsiMskSolverInterface::getMutableLpPtr ( ) const

Get task Pointer for const methods.

8.22.4.102 void OsiMskSolverInterface::gutsOfCopy (const OsiMskSolverInterface & *source*)

The real work of a copy constructor (used by copy and assignment)

8.22.4.103 void OsiMskSolverInterface::gutsOfConstructor ( )

The real work of the constructor.

8.22.4.104 void OsiMskSolverInterface::gutsOfDestructor ( )

The real work of the destructor.

8.22.4.105 void OsiMskSolverInterface::freeCachedColRim ( )

free cached column rim vectors

8.22.4.106 void OsiMskSolverInterface::freeCachedRowRim ( )

free cached row rim vectors

8.22.4.107 void OsiMskSolverInterface::freeCachedResults ( )

free cached result vectors

8.22.4.108 void OsiMskSolverInterface::freeCachedMatrix ( )

free cached matrices

8.22.4.109 void OsiMskSolverInterface::freeCachedData (int *keepCached* = KEEPCACHED_NONE)

free all cached data (except specified entries, see getLpPtr())

8.22.4.110 void OsiMskSolverInterface::freeAllMemory ( )

free all allocated memory

8.22.5 Friends And Related Function Documentation

8.22.5.1 void OsiMskSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*) [friend]

A function that tests the methods in the OsiMskSolverInterface class.

8.22.6 Member Data Documentation

8.22.6.1 MSKenv_t OsiMskSolverInterface::env_ [static], [private]

MOSEK environment pointer.

Definition at line 717 of file OsiMskSolverInterface.hpp.

8.22.6.2 unsigned int OsiMskSolverInterface::numInstances_ [static], [private]

Number of live problem instances.

Definition at line 722 of file OsiMskSolverInterface.hpp.

8.22.6.3 int OsiMskSolverInterface::Mskerr [private]

Definition at line 727 of file OsiMskSolverInterface.hpp.

8.22.6.4 int OsiMskSolverInterface::MSKsolverused_ [private]

Definition at line 728 of file OsiMskSolverInterface.hpp.

8.22.6.5 double OsiMskSolverInterface::ObjOffset_ [private]

Definition at line 729 of file OsiMskSolverInterface.hpp.

8.22.6.6 int OsiMskSolverInterface::InitialSolver [private]

Definition at line 731 of file OsiMskSolverInterface.hpp.

8.22.6.7 MSKtask_t OsiMskSolverInterface::task_ [mutable]

MOSEK model represented by this class instance.

Definition at line 766 of file OsiMskSolverInterface.hpp.

8.22.6.8 int∗ OsiMskSolverInterface::hotStartCStat_

Hotstart information.

Definition at line 769 of file OsiMskSolverInterface.hpp.

8.22.6.9 int OsiMskSolverInterface::hotStartCStatSize_

Definition at line 770 of file OsiMskSolverInterface.hpp.

8.22.6.10 int∗ OsiMskSolverInterface::hotStartRStat_

Definition at line 771 of file OsiMskSolverInterface.hpp.

8.22.6.11 int OsiMskSolverInterface::hotStartRStatSize_

Definition at line 772 of file OsiMskSolverInterface.hpp.

8.22.6.12 int OsiMskSolverInterface::hotStartMaxIteration_

Definition at line 773 of file OsiMskSolverInterface.hpp.

8.22.6.13 double∗ OsiMskSolverInterface::obj_ [mutable]

Pointer to objective vector.

Definition at line 778 of file OsiMskSolverInterface.hpp.

8.22.6.14 double∗ OsiMskSolverInterface::collower_ [mutable]

Pointer to dense vector of variable lower bounds.

Definition at line 781 of file OsiMskSolverInterface.hpp.

8.22.6.15 double∗ OsiMskSolverInterface::colupper_ [mutable]

Pointer to dense vector of variable lower bounds.

Definition at line 784 of file OsiMskSolverInterface.hpp.

8.22.6.16 char∗ OsiMskSolverInterface::rowsense_ [mutable]

Pointer to dense vector of row sense indicators.

Definition at line 787 of file OsiMskSolverInterface.hpp.

8.22.6.17 double∗ OsiMskSolverInterface::rhs_ [mutable]

Pointer to dense vector of row right-hand side values.

Definition at line 790 of file OsiMskSolverInterface.hpp.

8.22.6.18 double∗ OsiMskSolverInterface::rowrange_ [mutable]

Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)

Definition at line 793 of file OsiMskSolverInterface.hpp.

8.22.6.19 double∗ OsiMskSolverInterface::rowlower_ [mutable]

Pointer to dense vector of row lower bounds.

Definition at line 796 of file OsiMskSolverInterface.hpp.

8.22.6.20 double∗ OsiMskSolverInterface::rowupper_ [mutable]

Pointer to dense vector of row upper bounds.

Definition at line 799 of file OsiMskSolverInterface.hpp.

8.22.6.21 double∗ OsiMskSolverInterface::colsol_ [mutable]

Pointer to primal solution vector.

Definition at line 802 of file OsiMskSolverInterface.hpp.

8.22.6.22 double∗ OsiMskSolverInterface::rowsol_ [mutable]

Pointer to dual solution vector.

Definition at line 805 of file OsiMskSolverInterface.hpp.

8.22.6.23 double∗ OsiMskSolverInterface::redcost_ [mutable]

Pointer to reduced cost vector.

Definition at line 808 of file OsiMskSolverInterface.hpp.

8.22.6.24 double∗ OsiMskSolverInterface::rowact_ [mutable]

Pointer to row activity (slack) vector.

Definition at line 811 of file OsiMskSolverInterface.hpp.

8.22.6.25 CoinPackedMatrix* OsiMskSolverInterface::matrixByRow_ [mutable]

Pointer to row-wise copy of problem matrix coefficients.

Definition at line 814 of file OsiMskSolverInterface.hpp.

8.22.6.26 CoinPackedMatrix* OsiMskSolverInterface::matrixByCol_ [mutable]

Pointer to row-wise copy of problem matrix coefficients.

Definition at line 817 of file OsiMskSolverInterface.hpp.

8.22.6.27 char* OsiMskSolverInterface::coltype_

Pointer to dense vector of variable types (continous, binary, integer)

Definition at line 823 of file OsiMskSolverInterface.hpp.

8.22.6.28 int OsiMskSolverInterface::coltypesize_

Size of allocated memory for coltype_.

Definition at line 826 of file OsiMskSolverInterface.hpp.

8.22.6.29 bool OsiMskSolverInterface::probtypemip_ [mutable]

Stores whether MOSEK' prob type is currently set to MIP.

Definition at line 829 of file OsiMskSolverInterface.hpp.

The documentation for this class was generated from the following file:

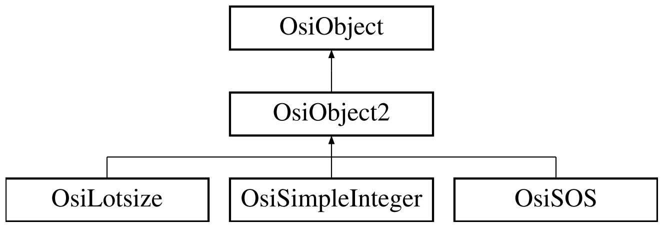
- /home/ted/COIN/trunk/Osi/src/OsiMsk/OsiMskSolverInterface.hpp

8.23 OsiObject Class Reference

Abstract base class for 'objects'.

`#include <OsiBranchingObject.hpp>`

Inheritance diagram for OsiObject:



Public Member Functions

- OsiObject ()

  Default Constructor.
- OsiObject (const OsiObject &)

  Copy constructor.

- OsiObject & operator= (const OsiObject &rhs)

    Assignment operator.
- virtual OsiObject ∗ clone () const =0

    Clone.
- virtual ∼OsiObject ()

    Destructor.
- double infeasibility (const OsiSolverInterface ∗solver, int &whichWay) const

    Infeasibility of the object.
- virtual double infeasibility (const OsiBranchingInformation ∗info, int &whichWay) const =0
- virtual double checkInfeasibility (const OsiBranchingInformation ∗info) const
- virtual double feasibleRegion (OsiSolverInterface ∗solver) const

    For the variable(s) referenced by the object, look at the current solution and set bounds to match the solution.
- virtual double feasibleRegion (OsiSolverInterface ∗solver, const OsiBranchingInformation ∗info) const =0

    For the variable(s) referenced by the object, look at the current solution and set bounds to match the solution.
- virtual OsiBranchingObject ∗ createBranch (OsiSolverInterface ∗, const OsiBranchingInformation ∗, int) const

    Create a branching object and indicate which way to branch first.
- virtual bool canDoHeuristics () const

    Return true if object can take part in normal heuristics.
- virtual bool canMoveToNearest () const

    Return true if object can take part in move to nearest heuristic.
- virtual int columnNumber () const

    Column number if single column object -1 otherwise, Used by heuristics.
- int priority () const

    Return Priority - note 1 is highest priority.
- void setPriority (int priority)

    Set priority.
- virtual bool boundBranch () const

    Return true if branch should only bound variables.
- virtual bool canHandleShadowPrices () const

    Return true if knows how to deal with Pseudo Shadow Prices.
- int numberWays () const

    Return maximum number of ways branch may have.
- void setNumberWays (int numberWays)

    Set maximum number of ways branch may have.
- void setWhichWay (int way)

    Return preferred way to branch.
- int whichWay () const

    Return current preferred way to branch.
- virtual int preferredWay () const

    Get pre-emptive preferred way of branching - -1 off, 0 down, 1 up (for 2-way)
- double infeasibility () const

    Return infeasibility.
- virtual double upEstimate () const

    Return "up" estimate (default 1.0e-5)
- virtual double downEstimate () const

    Return "down" estimate (default 1.0e-5)
- virtual void resetBounds (const OsiSolverInterface ∗)

Reset variable bounds to their original values.
- virtual void resetSequenceEtc (int, const int ∗)

  Change column numbers after preprocessing.
- virtual void updateBefore (const OsiObject ∗)

  Updates stuff like pseudocosts before threads.
- virtual void updateAfter (const OsiObject ∗, const OsiObject ∗)

  Updates stuff like pseudocosts after threads finished.

Protected Attributes

- double infeasibility_

  data
- short whichWay_

  Computed preferred way to branch.
- short numberWays_

  Maximum number of ways on branch.
- int priority_

  Priority.

8.23.1 Detailed Description

Abstract base class for 'objects'.

The branching model used in Osi is based on the idea of an *object*. In the abstract, an object is something that has a feasible region, can be evaluated for infeasibility, can be branched on (*i.e.*, there's some constructive action to be taken to move toward feasibility), and allows comparison of the effect of branching.

This class (OsiObject) is the base class for an object. To round out the branching model, the class OsiBranchingObject describes how to perform a branch, and the class OsiBranchDecision describes how to compare two OsiBranching-Objects.

To create a new type of object you need to provide three methods: infeasibility(), feasibleRegion(), and createBranch(), described below.

This base class is primarily virtual to allow for any form of structure. Any form of discontinuity is allowed.

As there is an overhead in getting information from solvers and because other useful information is available there is also an OsiBranchingInformation class which can contain pointers to information. If used it must at minimum contain pointers to current value of objective, maximum allowed objective and pointers to arrays for bounds and solution and direction of optimization. Also integer and primal tolerance.

Classes which inherit might have other information such as depth, number of solutions, pseudo-shadow prices etc etc. May be easier just to throw in here - as I keep doing

Definition at line 56 of file OsiBranchingObject.hpp.

8.23.2 Constructor & Destructor Documentation

8.23.2.1 OsiObject::OsiObject ( )

Default Constructor.

8.23.2.2 OsiObject::OsiObject (const OsiObject &)

Copy constructor.

8.23.2.3 virtual OsiObject::∼OsiObject ( ) [virtual]

Destructor.

8.23.3 Member Function Documentation

8.23.3.1 OsiObject& OsiObject::operator= (const OsiObject & *rhs*)

Assignment operator.

8.23.3.2 virtual OsiObject∗ OsiObject::clone ( ) const [pure virtual]

Clone.

Implemented in OsiLotsize, OsiSOS, and OsiSimpleInteger.

8.23.3.3 double OsiObject::infeasibility (const OsiSolverInterface ∗ *solver,* int & *whichWay*) const

Infeasibility of the object.

This is some measure of the infeasibility of the object. 0.0 indicates that the object is satisfied.

The preferred branching direction is returned in whichWay, where for normal two-way branching 0 is down, 1 is up

This is used to prepare for strong branching but should also think of case when no strong branching

The object may also compute an estimate of cost of going "up" or "down". This will probably be based on pseudo-cost ideas

This should also set mutable infeasibility_ and whichWay_ This is for instant re-use for speed

Default for this just calls infeasibility with OsiBranchingInformation NOTE - Convention says that an infeasibility of COI-N_DBL_MAX means object has worked out it can't be satisfied!

8.23.3.4 virtual double OsiObject::infeasibility (const OsiBranchingInformation ∗ *info,* int & *whichWay*) const [pure virtual]

Implemented in OsiLotsize, OsiSOS, and OsiSimpleInteger.

8.23.3.5 virtual double OsiObject::checkInfeasibility (const OsiBranchingInformation ∗ *info*) const [virtual]

8.23.3.6 virtual double OsiObject::feasibleRegion (OsiSolverInterface ∗ *solver*) const [virtual]

For the variable(s) referenced by the object, look at the current solution and set bounds to match the solution.

Returns measure of how much it had to move solution to make feasible

8.23.3.7 virtual double OsiObject::feasibleRegion (OsiSolverInterface ∗ *solver,* const OsiBranchingInformation ∗ *info*) const [pure virtual]

For the variable(s) referenced by the object, look at the current solution and set bounds to match the solution.

Returns measure of how much it had to move solution to make feasible Faster version

Implemented in OsiLotsize, OsiSOS, and OsiSimpleInteger.

8.23.3.8 virtual OsiBranchingObject∗ OsiObject::createBranch (OsiSolverInterface ∗ , const OsiBranchingInformation ∗ , int) const [inline], [virtual]

Create a branching object and indicate which way to branch first.

The branching object has to know how to create branches (fix variables, etc.)

Reimplemented in OsiLotsize, OsiSOS, and OsiSimpleInteger.

Definition at line 119 of file OsiBranchingObject.hpp.

8.23.3.9 virtual bool OsiObject::canDoHeuristics ( ) const [inline], [virtual]

Return true if object can take part in normal heuristics.

Reimplemented in OsiLotsize, and OsiSOS.

Definition at line 125 of file OsiBranchingObject.hpp.

8.23.3.10 virtual bool OsiObject::canMoveToNearest ( ) const [inline], [virtual]

Return true if object can take part in move to nearest heuristic.

Definition at line 129 of file OsiBranchingObject.hpp.

8.23.3.11 virtual int OsiObject::columnNumber ( ) const [virtual]

Column number if single column object -1 otherwise, Used by heuristics.

Reimplemented in OsiLotsize, and OsiSimpleInteger.

8.23.3.12 int OsiObject::priority ( ) const [inline]

Return Priority - note 1 is highest priority.

Definition at line 136 of file OsiBranchingObject.hpp.

8.23.3.13 void OsiObject::setPriority (int *priority*) [inline]

Set priority.

Definition at line 139 of file OsiBranchingObject.hpp.

8.23.3.14 virtual bool OsiObject::boundBranch ( ) const [inline], [virtual]

Return true if branch should only bound variables.

Definition at line 143 of file OsiBranchingObject.hpp.

8.23.3.15 virtual bool OsiObject::canHandleShadowPrices ( ) const [inline], [virtual]

Return true if knows how to deal with Pseudo Shadow Prices.

Reimplemented in OsiLotsize, OsiSOS, and OsiSimpleInteger.

Definition at line 146 of file OsiBranchingObject.hpp.

8.23.3.16 int OsiObject::numberWays ( ) const [inline]

Return maximum number of ways branch may have.

Definition at line 149 of file OsiBranchingObject.hpp.

8.23.3.17 void OsiObject::setNumberWays (int *numberWays*) [inline]

Set maximum number of ways branch may have.

Definition at line 152 of file OsiBranchingObject.hpp.

8.23.3.18 void OsiObject::setWhichWay (int *way*) [inline]

Return preferred way to branch.

If two then way=0 means down and 1 means up, otherwise way points to preferred branch

Definition at line 158 of file OsiBranchingObject.hpp.

8.23.3.19 int OsiObject::whichWay ( ) const [inline]

Return current preferred way to branch.

If two then way=0 means down and 1 means up, otherwise way points to preferred branch

Definition at line 164 of file OsiBranchingObject.hpp.

8.23.3.20 virtual int OsiObject::preferredWay ( ) const [inline], [virtual]

Get pre-emptive preferred way of branching - -1 off, 0 down, 1 up (for 2-way)

Reimplemented in OsiObject2.

Definition at line 167 of file OsiBranchingObject.hpp.

8.23.3.21 double OsiObject::infeasibility ( ) const [inline]

Return infeasibility.

Definition at line 170 of file OsiBranchingObject.hpp.

8.23.3.22 virtual double OsiObject::upEstimate ( ) const [virtual]

Return "up" estimate (default 1.0e-5)

Reimplemented in OsiLotsize, OsiSOS, and OsiSimpleInteger.

8.23.3.23 virtual double OsiObject::downEstimate ( ) const [virtual]

Return "down" estimate (default 1.0e-5)

Reimplemented in OsiLotsize, OsiSOS, and OsiSimpleInteger.

8.23.3.24 virtual void OsiObject::resetBounds (const **OsiSolverInterface** *) [inline], [virtual]

Reset variable bounds to their original values.

Bounds may be tightened, so it may be good to be able to reset them to their original values.

Reimplemented in OsiLotsize, and OsiSimpleInteger.

Definition at line 180 of file OsiBranchingObject.hpp.

8.23.3.25 virtual void OsiObject::resetSequenceEtc (int , const int *) [inline], [virtual]

Change column numbers after preprocessing.

Reimplemented in OsiLotsize, OsiSOS, and OsiSimpleInteger.

Definition at line 183 of file OsiBranchingObject.hpp.

8.23.3.26 virtual void OsiObject::updateBefore (const **OsiObject** *) [inline], [virtual]

Updates stuff like pseudocosts before threads.

Definition at line 185 of file OsiBranchingObject.hpp.

8.23.3.27 virtual void OsiObject::updateAfter (const OsiObject ∗ , const OsiObject ∗) [inline], [virtual]

Updates stuff like pseudocosts after threads finished.

Definition at line 187 of file OsiBranchingObject.hpp.

8.23.4 Member Data Documentation

8.23.4.1 double OsiObject::infeasibility_ [mutable], [protected]

data

Computed infeasibility

Definition at line 193 of file OsiBranchingObject.hpp.

8.23.4.2 short OsiObject::whichWay_ [mutable], [protected]

Computed preferred way to branch.

Definition at line 195 of file OsiBranchingObject.hpp.

8.23.4.3 short OsiObject::numberWays_ [protected]

Maximum number of ways on branch.

Definition at line 197 of file OsiBranchingObject.hpp.

8.23.4.4 int OsiObject::priority_ [protected]

Priority.

Definition at line 199 of file OsiBranchingObject.hpp.

The documentation for this class was generated from the following file:

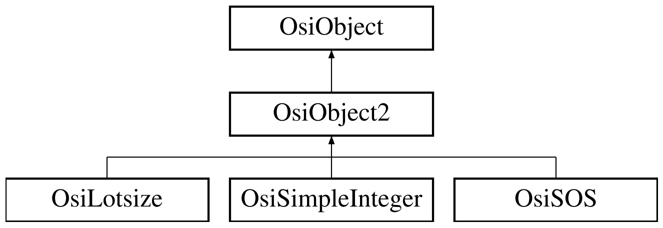
- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.24 OsiObject2 Class Reference

Define a class to add a bit of complexity to OsiObject This assumes 2 way branching.

`#include <OsiBranchingObject.hpp>`

Inheritance diagram for OsiObject2:



Public Member Functions

- OsiObject2 ()

  Default Constructor.
- OsiObject2 (const OsiObject2 &)

  Copy constructor.
- OsiObject2 & operator= (const OsiObject2 &rhs)

  Assignment operator.
- virtual ∼OsiObject2 ()

  Destructor.
- void setPreferredWay (int value)

  Set preferred way of branching - -1 off, 0 down, 1 up (for 2-way)
- virtual int preferredWay () const

  Get preferred way of branching - -1 off, 0 down, 1 up (for 2-way)

Protected Attributes

- int preferredWay_

  Preferred way of branching - -1 off, 0 down, 1 up (for 2-way)
- double otherInfeasibility_

  "Infeasibility" on other way

8.24.1 Detailed Description

Define a class to add a bit of complexity to OsiObject This assumes 2 way branching.

Definition at line 206 of file OsiBranchingObject.hpp.

8.24.2 Constructor & Destructor Documentation

8.24.2.1 OsiObject2::OsiObject2 ( )

Default Constructor.

8.24.2.2 OsiObject2::OsiObject2 (const **OsiObject2** &)

Copy constructor.

8.24.2.3 virtual OsiObject2::∼OsiObject2 ( ) `[virtual]`

Destructor.

8.24.3 Member Function Documentation

8.24.3.1 **OsiObject2**& OsiObject2::operator= (const **OsiObject2** & *rhs*)

Assignment operator.

8.24.3.2 void OsiObject2::setPreferredWay (int *value*) [inline]

Set preferred way of branching - -1 off, 0 down, 1 up (for 2-way)

Definition at line 223 of file OsiBranchingObject.hpp.

8.24.3.3 virtual int OsiObject2::preferredWay ( ) const [inline], [virtual]

Get preferred way of branching - -1 off, 0 down, 1 up (for 2-way)

Reimplemented from OsiObject.

Definition at line 227 of file OsiBranchingObject.hpp.

8.24.4 Member Data Documentation

8.24.4.1 int OsiObject2::preferredWay_ [protected]

Preferred way of branching - -1 off, 0 down, 1 up (for 2-way)

Definition at line 231 of file OsiBranchingObject.hpp.

8.24.4.2 double OsiObject2::otherInfeasibility_ [mutable], [protected]

"Infeasibility" on other way

Definition at line 233 of file OsiBranchingObject.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.25 OsiPresolve Class Reference

OSI interface to COIN problem simplification capabilities.

```
#include <OsiPresolve.hpp>
```

Public Member Functions

- OsiPresolve ()

  Default constructor (empty object)
- virtual ∼OsiPresolve ()

  Virtual destructor.
- virtual OsiSolverInterface ∗ presolvedModel (OsiSolverInterface &origModel, double feasibilityTolerance=0.0, bool keepIntegers=true, int numberPasses=5, const char ∗prohibited=NULL, bool doStatus=true, const char ∗rowProhibited=NULL)

  Create a new OsiSolverInterface loaded with the presolved problem.
- virtual void postsolve (bool updateStatus=true)

  Restate the solution to the presolved problem in terms of the original problem and load it into the original model.
- OsiSolverInterface ∗ model () const

  Return a pointer to the presolved model.
- OsiSolverInterface ∗ originalModel () const

  Return a pointer to the original model.

- void setOriginalModel (OsiSolverInterface ∗model)

  Set the pointer to the original model.
- const int ∗ originalColumns () const

  Return a pointer to the original columns.
- const int ∗ originalRows () const

  Return a pointer to the original rows.
- int getNumRows () const

  Return number of rows in original model.
- int getNumCols () const

  Return number of columns in original model.
- void setNonLinearValue (double value)

  "Magic" number.
- double nonLinearValue () const
- void setPresolveActions (int action)

  Fine control over presolve actions.

Protected Member Functions

- virtual const CoinPresolveAction ∗ presolve (CoinPresolveMatrix ∗prob)

  Apply presolve transformations to the problem.
- virtual void postsolve (CoinPostsolveMatrix &prob)

  Reverse presolve transformations to recover the solution to the original problem.
- void gutsOfDestroy ()

  Destroys queued postsolve actions.

Private Attributes

- OsiSolverInterface ∗ originalModel_

  Original model (solver interface loaded with the original problem).
- OsiSolverInterface ∗ presolvedModel_

  Presolved model (solver interface loaded with the presolved problem)
- double nonLinearValue_

  "Magic" number.
- int ∗ originalColumn_

  Original column numbers.
- int ∗ originalRow_

  Original row numbers.
- const CoinPresolveAction ∗ paction_

  The list of transformations applied.
- int ncols_

  Number of columns in original model.
- int nrows_

  Number of rows in original model.
- CoinBigIndex nelems_

  Number of nonzero matrix coefficients in the original model.
- int presolveActions_

  Whether we want to skip dual part of presolve etc.
- int numberPasses_

  Number of major passes.

8.25.1 Detailed Description

OSI interface to COIN problem simplification capabilities.

COIN provides a number of classes which implement problem simplification algorithms (CoinPresolveAction, CoinPrePostsolveMatrix, and derived classes). The model of operation is as follows:

- Create a copy of the original problem.
- Subject the copy to a series of transformations (the *presolve* methods) to produce a presolved model. Each transformation is also expected to provide a method to reverse the transformation (the *postsolve* method). The postsolve methods are collected in a linked list; the postsolve method for the final presolve transformation is at the head of the list.
- Hand the presolved problem to the solver for optimization.
- Apply the collected postsolve methods to the presolved problem and solution, restating the solution in terms of the original problem.

The COIN presolve algorithms are unaware of OSI. The OsiPresolve class takes care of the interface. Given an OsiSolverInterface `origModel`, it will take care of creating a clone properly loaded with the presolved problem and ready for optimization. After optimization, it will apply postsolve transformations and load the result back into `origModel`.

Assuming a problem has been loaded into an `OsiSolverInterface` `origModel`, a bare-bones application looks like this:

```
OsiPresolve pinfo ;
OsiSolverInterface *presolvedModel ;
// Return an OsiSolverInterface loaded with the presolved problem.
presolvedModel = pinfo.presolvedModel(*origModel,1.0e-8,false,numberPasses) ;
presolvedModel->initialSolve() ;
// Restate the solution and load it back into origModel.
pinfo.postsolve(true) ;
delete presolvedModel ;
```

Definition at line 62 of file OsiPresolve.hpp.

8.25.2 Constructor & Destructor Documentation

8.25.2.1 OsiPresolve::OsiPresolve ( )

Default constructor (empty object)

8.25.2.2 virtual OsiPresolve::∼OsiPresolve ( ) `[virtual]`

Virtual destructor.

8.25.3 Member Function Documentation

8.25.3.1 virtual OsiSolverInterface∗ OsiPresolve::presolvedModel (OsiSolverInterface & *origModel*, double *feasibilityTolerance* = `0.0`, bool *keepIntegers* = `true`, int *numberPasses* = `5`, const char ∗ *prohibited* = `NULL`, bool *doStatus* = `true`, const char ∗ *rowProhibited* = `NULL`) `[virtual]`

Create a new OsiSolverInterface loaded with the presolved problem.

This method implements the first two steps described in the class documentation. It clones `origModel` and applies presolve transformations, storing the resulting list of postsolve transformations. It returns a pointer to a new OsiSolverInterface loaded with the presolved problem, or NULL if the problem is infeasible or unbounded. If `keepIntegers` is true then bounds may be tightened in the original. Bounds will be moved by up to `feasibilityTolerance` to try and stay feasible. When `doStatus` is true, the current solution will be transformed to match the presolved model.

This should be paired with postsolve(). It is up to the client to destroy the returned OsiSolverInterface, *after* calling postsolve().

This method is virtual. Override this method if you need to customize the steps of creating a model to apply presolve transformations.

In some sense, a wrapper for presolve(CoinPresolveMatrix∗).

8.25.3.2 virtual void OsiPresolve::postsolve (bool *updateStatus* = `true`) `[virtual]`

Restate the solution to the presolved problem in terms of the original problem and load it into the original model.

postsolve() restates the solution in terms of the original problem and updates the original OsiSolverInterface supplied to presolvedModel(). If the problem has not been solved to optimality, there are no guarantees. If you are using an algorithm like simplex that has a concept of a basic solution, then set updateStatus

The advantage of going back to the original problem is that it will be exactly as it was, *i.e.*, 0.0 will not become 1.0e-19.

Note that if you modified the original problem after presolving, then you must “undo” these modifications before calling postsolve().

In some sense, a wrapper for postsolve(CoinPostsolveMatrix&).

8.25.3.3 OsiSolverInterface∗ OsiPresolve::model ( ) const

Return a pointer to the presolved model.

8.25.3.4 OsiSolverInterface∗ OsiPresolve::originalModel ( ) const

Return a pointer to the original model.

8.25.3.5 void OsiPresolve::setOriginalModel (OsiSolverInterface ∗ *model*)

Set the pointer to the original model.

8.25.3.6 const int∗ OsiPresolve::originalColumns ( ) const

Return a pointer to the original columns.

8.25.3.7 const int∗ OsiPresolve::originalRows ( ) const

Return a pointer to the original rows.

8.25.3.8 int OsiPresolve::getNumRows ( ) const `[inline]`

Return number of rows in original model.

Definition at line 133 of file OsiPresolve.hpp.

8.25.3.9 int OsiPresolve::getNumCols ( ) const `[inline]`

Return number of columns in original model.

Definition at line 137 of file OsiPresolve.hpp.

8.25.3.10 void OsiPresolve::setNonLinearValue (double *value*) `[inline]`

"Magic" number.

If this is non-zero then any elements with this value may change and so presolve is very limited in what can be done to the row and column. This is for non-linear problems.

Definition at line 144 of file OsiPresolve.hpp.

8.25.3.11 double OsiPresolve::nonLinearValue ( ) const [inline]

Definition at line 146 of file OsiPresolve.hpp.

8.25.3.12 void OsiPresolve::setPresolveActions (int *action*) [inline]

Fine control over presolve actions.

Set/clear the following bits to allow or suppress actions:

- 0x01 allow duplicate column processing on integer columns and dual stuff on integers
- 0x02 switch off actions which can change +1 to something else (doubleton, tripleton, implied free)
- 0x04 allow transfer of costs from singletons and between integer variables (when advantageous)
- 0x08 do not allow x+y+z=1 transform
- 0x10 allow actions that don't easily unroll
- 0x20 allow dubious gub element reduction

GUB element reduction is only partially implemented in CoinPresolve (see gubrow_action) and willl cause an abort at postsolve. It's not clear what's meant by 'dual stuff on integers'. – lh, 110605 –

Definition at line 166 of file OsiPresolve.hpp.

8.25.3.13 virtual const CoinPresolveAction* OsiPresolve::presolve (CoinPresolveMatrix * *prob*) [protected], [virtual]

Apply presolve transformations to the problem.

Handles the core activity of applying presolve transformations.

If you want to apply the individual presolve routines differently, or perhaps add your own to the mix, define a derived class and override this method

8.25.3.14 virtual void OsiPresolve::postsolve (CoinPostsolveMatrix & *prob*) [protected], [virtual]

Reverse presolve transformations to recover the solution to the original problem.

Handles the core activity of applying postsolve transformations.

Postsolving is pretty generic; just apply the transformations in reverse order. You will probably only be interested in overriding this method if you want to add code to test for consistency while debugging new presolve techniques.

8.25.3.15 void OsiPresolve::gutsOfDestroy ( ) [protected]

Destroys queued postsolve actions.

E.g., when presolve() determines the problem is infeasible, so that it will not be necessary to actually solve the presolved problem and convert the result back to the original problem.

8.25.4 Member Data Documentation

8.25.4.1 OsiSolverInterface∗ OsiPresolve::originalModel_ [private]

Original model (solver interface loaded with the original problem).

Must not be destroyed until after postsolve().

Definition at line 174 of file OsiPresolve.hpp.

8.25.4.2 OsiSolverInterface∗ OsiPresolve::presolvedModel_ [private]

Presolved model (solver interface loaded with the presolved problem)

Must be destroyed by the client (using delete) after postsolve().

Definition at line 180 of file OsiPresolve.hpp.

8.25.4.3 double OsiPresolve::nonLinearValue_ [private]

"Magic" number.

If this is non-zero then any elements with this value may change and so presolve is very limited in what can be done to the row and column. This is for non-linear problems. One could also allow for cases where sign of coefficient is known.

Definition at line 187 of file OsiPresolve.hpp.

8.25.4.4 int∗ OsiPresolve::originalColumn_ [private]

Original column numbers.

Definition at line 190 of file OsiPresolve.hpp.

8.25.4.5 int∗ OsiPresolve::originalRow_ [private]

Original row numbers.

Definition at line 193 of file OsiPresolve.hpp.

8.25.4.6 const CoinPresolveAction∗ OsiPresolve::paction_ [private]

The list of transformations applied.

Definition at line 196 of file OsiPresolve.hpp.

8.25.4.7 int OsiPresolve::ncols_ [private]

Number of columns in original model.

The problem will expand back to its former size as postsolve transformations are applied. It is efficient to allocate data structures for the final size of the problem rather than expand them as needed.

Definition at line 204 of file OsiPresolve.hpp.

8.25.4.8 int OsiPresolve::nrows_ [private]

Number of rows in original model.

Definition at line 207 of file OsiPresolve.hpp.

8.25.4.9 CoinBigIndex OsiPresolve::nelems_ [private]

Number of nonzero matrix coefficients in the original model.

Definition at line 210 of file OsiPresolve.hpp.

8.25.4.10 int OsiPresolve::presolveActions_ [private]

Whether we want to skip dual part of presolve etc.

1 bit allows duplicate column processing on integer columns and dual stuff on integers 4 transfers costs to integer variables

Definition at line 217 of file OsiPresolve.hpp.

8.25.4.11 int OsiPresolve::numberPasses_ [private]

Number of major passes.

Definition at line 219 of file OsiPresolve.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiPresolve.hpp

8.26 OsiPseudoCosts Class Reference

This class is the placeholder for the pseudocosts used by OsiChooseStrong.

`#include <OsiChooseVariable.hpp>`

Public Member Functions

- OsiPseudoCosts ()
- virtual ∼OsiPseudoCosts ()
- OsiPseudoCosts (const OsiPseudoCosts &rhs)
- OsiPseudoCosts & operator= (const OsiPseudoCosts &rhs)
- int numberBeforeTrusted () const

  Number of times before trusted.
- void setNumberBeforeTrusted (int value)

  Set number of times before trusted.
- void initialize (int n)

  Initialize the pseudocosts with n entries.
- int numberObjects () const

  Give the number of objects for which pseudo costs are stored.
- virtual void updateInformation (const OsiBranchingInformation ∗info, int branch, OsiHotInfo ∗hotInfo)

  Given a candidate fill in useful information e.g. estimates.
- virtual void updateInformation (int whichObject, int branch, double changeInObjective, double changeInValue, int status)

  Given a branch fill in useful information e.g. estimates.

Accessor methods to pseudo costs data

- double ∗ upTotalChange ()
- const double ∗ upTotalChange () const
- double ∗ downTotalChange ()
- const double ∗ downTotalChange () const
- int ∗ upNumber ()
- const int ∗ upNumber () const
- int ∗ downNumber ()
- const int ∗ downNumber () const

Protected Attributes

- double $*$ upTotalChange_

  Total of all changes up.
- double $*$ downTotalChange_

  Total of all changes down.
- int $*$ upNumber_

  Number of times up.
- int $*$ downNumber_

  Number of times down.
- int numberObjects_

  Number of objects (could be found from solver)
- int numberBeforeTrusted_

  Number before we trust.

Private Member Functions

- void gutsOfDelete ()
- void gutsOfCopy (const OsiPseudoCosts &rhs)

8.26.1 Detailed Description

This class is the placeholder for the pseudocosts used by OsiChooseStrong.

It can also be used by any other pseudocost based strong branching algorithm.

Definition at line 240 of file OsiChooseVariable.hpp.

8.26.2 Constructor & Destructor Documentation

8.26.2.1 OsiPseudoCosts::OsiPseudoCosts ( )

8.26.2.2 virtual OsiPseudoCosts::∼OsiPseudoCosts ( ) [virtual]

8.26.2.3 OsiPseudoCosts::OsiPseudoCosts (const OsiPseudoCosts & *rhs*)

8.26.3 Member Function Documentation

8.26.3.1 void OsiPseudoCosts::gutsOfDelete ( ) [private]

8.26.3.2 void OsiPseudoCosts::gutsOfCopy (const OsiPseudoCosts & *rhs*) [private]

8.26.3.3 OsiPseudoCosts& OsiPseudoCosts::operator= (const OsiPseudoCosts & *rhs*)

8.26.3.4 int OsiPseudoCosts::numberBeforeTrusted ( ) const [inline]

Number of times before trusted.

Definition at line 267 of file OsiChooseVariable.hpp.

8.26.3.5 void OsiPseudoCosts::setNumberBeforeTrusted (int *value*) [inline]

Set number of times before trusted.

Definition at line 270 of file OsiChooseVariable.hpp.

8.26.3.6 void OsiPseudoCosts::initialize (int *n*)

Initialize the pseudocosts with n entries.

8.26.3.7 int OsiPseudoCosts::numberObjects ( ) const [inline]

Give the number of objects for which pseudo costs are stored.

Definition at line 275 of file OsiChooseVariable.hpp.

8.26.3.8 double* OsiPseudoCosts::upTotalChange ( ) [inline]

Definition at line 280 of file OsiChooseVariable.hpp.

8.26.3.9 const double* OsiPseudoCosts::upTotalChange ( ) const [inline]

Definition at line 281 of file OsiChooseVariable.hpp.

8.26.3.10 double* OsiPseudoCosts::downTotalChange ( ) [inline]

Definition at line 283 of file OsiChooseVariable.hpp.

8.26.3.11 const double* OsiPseudoCosts::downTotalChange ( ) const [inline]

Definition at line 284 of file OsiChooseVariable.hpp.

8.26.3.12 int* OsiPseudoCosts::upNumber ( ) [inline]

Definition at line 286 of file OsiChooseVariable.hpp.

8.26.3.13 const int* OsiPseudoCosts::upNumber ( ) const [inline]

Definition at line 287 of file OsiChooseVariable.hpp.

8.26.3.14 int* OsiPseudoCosts::downNumber ( ) [inline]

Definition at line 289 of file OsiChooseVariable.hpp.

8.26.3.15 const int* OsiPseudoCosts::downNumber ( ) const [inline]

Definition at line 290 of file OsiChooseVariable.hpp.

8.26.3.16 virtual void OsiPseudoCosts::updateInformation (const OsiBranchingInformation * *info,* int *branch,* OsiHotInfo * *hotInfo*) [virtual]

Given a candidate fill in useful information e.g. estimates.

8.26.3.17 virtual void OsiPseudoCosts::updateInformation (int *whichObject,* int *branch,* double *changeInObjective,* double *changeInValue,* int *status*) [virtual]

Given a branch fill in useful information e.g. estimates.

8.26.4 Member Data Documentation

8.26.4.1 double∗ OsiPseudoCosts::upTotalChange_ [protected]

Total of all changes up.

Definition at line 244 of file OsiChooseVariable.hpp.

8.26.4.2 double∗ OsiPseudoCosts::downTotalChange_ [protected]

Total of all changes down.

Definition at line 246 of file OsiChooseVariable.hpp.

8.26.4.3 int∗ OsiPseudoCosts::upNumber_ [protected]

Number of times up.

Definition at line 248 of file OsiChooseVariable.hpp.

8.26.4.4 int∗ OsiPseudoCosts::downNumber_ [protected]

Number of times down.

Definition at line 250 of file OsiChooseVariable.hpp.

8.26.4.5 int OsiPseudoCosts::numberObjects_ [protected]

Number of objects (could be found from solver)

Definition at line 252 of file OsiChooseVariable.hpp.

8.26.4.6 int OsiPseudoCosts::numberBeforeTrusted_ [protected]

Number before we trust.

Definition at line 254 of file OsiChooseVariable.hpp.

The documentation for this class was generated from the following file:

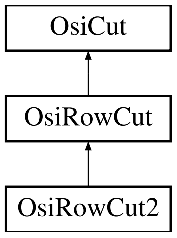
- /home/ted/COIN/trunk/Osi/src/Osi/OsiChooseVariable.hpp

8.27 OsiRowCut Class Reference

Row Cut Class.

`#include <OsiRowCut.hpp>`

Inheritance diagram for OsiRowCut:



Public Member Functions

- void sortIncrIndex ()

  Allow access row sorting function.

Row bounds

- OsiRowCut_inline double lb () const

  Get lower bound.
- OsiRowCut_inline void setLb (double lb)

  Set lower bound.
- OsiRowCut_inline double ub () const

  Get upper bound.
- OsiRowCut_inline void setUb (double ub)

  Set upper bound.

Row rhs, sense, range

- char sense () const

  Get sense ('E', 'G', 'L', 'N', 'R')
- double rhs () const

  Get right-hand side.
- double range () const

  Get range (ub - lb for 'R' rows, 0 otherwise)

Row elements

- OsiRowCut_inline void setRow (int size, const int ∗colIndices, const double ∗elements, bool testForDuplicateIndex=COIN_DEFAULT_VALUE_FOR_DUPLICATE)

  Set row elements.
- OsiRowCut_inline void setRow (const CoinPackedVector &v)

  Set row elements from a packed vector.
- OsiRowCut_inline const CoinPackedVector & row () const

  Get row elements.
- OsiRowCut_inline CoinPackedVector & mutableRow ()

  Get row elements for changing.

Comparison operators

- OsiRowCut_inline bool operator== (const OsiRowCut &rhs) const

  equal - true if lower bound, upper bound, row elements, and OsiCut are equal.
- OsiRowCut_inline bool operator!= (const OsiRowCut &rhs) const

  not equal

Sanity checks on cut

- OsiRowCut_inline bool consistent () const

  Returns true if the cut is consistent.
- OsiRowCut_inline bool consistent (const OsiSolverInterface &im) const

  Returns true if cut is consistent with respect to the solver interface's model.
- OsiRowCut_inline bool infeasible (const OsiSolverInterface &im) const

  Returns true if the row cut itself is infeasible and cannot be satisfied.
- virtual double violated (const double ∗solution) const

Returns infeasibility of the cut with respect to solution passed in i.e.

Arithmetic operators. Apply CoinPackedVector methods to the vector

- void operator+= (double value)

  add `value` to every vector entry
- void operator-= (double value)

  subtract `value` from every vector entry
- void operator∗= (double value)

  multiply every vector entry by `value`
- void operator/= (double value)

  divide every vector entry by `value`

Constructors and destructors

- OsiRowCut & operator= (const OsiRowCut &rhs)

  Assignment operator.
- OsiRowCut (const OsiRowCut &)

  Copy constructor.
- virtual OsiRowCut ∗ clone () const

  Clone.
- OsiRowCut ()

  Default Constructor.
- OsiRowCut (double cutlb, double cutub, int capacity, int size, int ∗&colIndices, double ∗&elements)

  Ownership Constructor.
- virtual ∼OsiRowCut ()

  Destructor.

Debug stuff

- virtual void print () const

  Print cuts in collection.

Private Attributes

Private member data

- CoinPackedVector row_

  Row elements.
- double lb_

  Row lower bound.
- double ub_

  Row upper bound.

Friends

- void OsiRowCutUnitTest (const OsiSolverInterface ∗baseSiP, const std::string &mpsDir)

  A function that tests the methods in the OsiRowCut class.

Additional Inherited Members

8.27.1 Detailed Description

Row Cut Class.

A row cut has:

- a lower bound
- an upper bound
- a vector of row elements

Definition at line 29 of file OsiRowCut.hpp.

8.27.2 Constructor & Destructor Documentation

8.27.2.1 OsiRowCut::OsiRowCut (const OsiRowCut &)

Copy constructor.

8.27.2.2 OsiRowCut::OsiRowCut ( )

Default Constructor.

8.27.2.3 OsiRowCut::OsiRowCut (double *cutlb,* double *cutub,* int *capacity,* int *size,* int ∗& *colIndices,* double ∗& *elements*)

Ownership Constructor.

This constructor assumes ownership of the vectors passed as parameters for indices and elements. `colIndices` and `elements` will be NULL on return.

8.27.2.4 virtual OsiRowCut::∼OsiRowCut ( ) `[virtual]`

Destructor.

8.27.3 Member Function Documentation

8.27.3.1 OsiRowCut_inline double OsiRowCut::lb ( ) const

Get lower bound.

8.27.3.2 OsiRowCut_inline void OsiRowCut::setLb (double *lb*)

Set lower bound.

8.27.3.3 OsiRowCut_inline double OsiRowCut::ub ( ) const

Get upper bound.

8.27.3.4 OsiRowCut_inline void OsiRowCut::setUb (double *ub*)

Set upper bound.

8.27.3.5 char OsiRowCut::sense ( ) const

Get sense ('E', 'G', 'L', 'N', 'R')

8.27.3.6 double OsiRowCut::rhs ( ) const

Get right-hand side.

8.27.3.7 double OsiRowCut::range ( ) const

Get range (ub - lb for 'R' rows, 0 otherwise)

8.27.3.8 OsiRowCut_inline void OsiRowCut::setRow (int *size*, const int ∗ *colIndices*, const double ∗ *elements*, bool *testForDuplicateIndex* = COIN_DEFAULT_VALUE_FOR_DUPLICATE)

Set row elements.

8.27.3.9 OsiRowCut_inline void OsiRowCut::setRow (const CoinPackedVector & *v*)

Set row elements from a packed vector.

8.27.3.10 OsiRowCut_inline const CoinPackedVector& OsiRowCut::row ( ) const

Get row elements.

8.27.3.11 OsiRowCut_inline CoinPackedVector& OsiRowCut::mutableRow ( )

Get row elements for changing.

8.27.3.12 OsiRowCut_inline bool OsiRowCut::operator== (const OsiRowCut & *rhs*) const

equal - true if lower bound, upper bound, row elements, and OsiCut are equal.

8.27.3.13 OsiRowCut_inline bool OsiRowCut::operator!= (const OsiRowCut & *rhs*) const

not equal

8.27.3.14 OsiRowCut_inline bool OsiRowCut::consistent ( ) const `[virtual]`

Returns true if the cut is consistent.

This checks to ensure that:

- The row element vector does not have duplicate indices
- The row element vector indices are >= 0

Implements OsiCut.

8.27.3.15 OsiRowCut_inline bool OsiRowCut::consistent (const OsiSolverInterface & *im*) const `[virtual]`

Returns true if cut is consistent with respect to the solver interface's model.

This checks to ensure that

- The row element vector indices are < the number of columns in the model

Implements OsiCut.

8.27.3.16 OsiRowCut_inline bool OsiRowCut::infeasible (const OsiSolverInterface & *im*) const [virtual]

Returns true if the row cut itself is infeasible and cannot be satisfied.

This checks whether

- the lower bound is strictly greater than the upper bound.

Implements OsiCut.

8.27.3.17 virtual double OsiRowCut::violated (const double ∗ *solution*) const [virtual]

Returns infeasibility of the cut with respect to solution passed in i.e.

is positive if cuts off that solution. solution is getNumCols() long..

Implements OsiCut.

8.27.3.18 void OsiRowCut::operator+= (double *value*) [inline]

add `value` to every vector entry

Definition at line 132 of file OsiRowCut.hpp.

8.27.3.19 void OsiRowCut::operator-= (double *value*) [inline]

subtract `value` from every vector entry

Definition at line 136 of file OsiRowCut.hpp.

8.27.3.20 void OsiRowCut::operator∗= (double *value*) [inline]

multiply every vector entry by `value`

Definition at line 140 of file OsiRowCut.hpp.

8.27.3.21 void OsiRowCut::operator/= (double *value*) [inline]

divide every vector entry by `value`

Definition at line 144 of file OsiRowCut.hpp.

8.27.3.22 void OsiRowCut::sortIncrIndex ( ) [inline]

Allow access row sorting function.

Definition at line 149 of file OsiRowCut.hpp.

8.27.3.23 OsiRowCut& OsiRowCut::operator= (const OsiRowCut & *rhs*)

Assignment operator.

8.27.3.24 virtual OsiRowCut∗ OsiRowCut::clone ( ) const [virtual]

Clone.

Reimplemented in OsiRowCut2.

8.27.3.25 virtual void OsiRowCut::print ( ) const [virtual]

Print cuts in collection.

Reimplemented from OsiCut.

8.27.4 Friends And Related Function Documentation

8.27.4.1 void OsiRowCutUnitTest (const OsiSolverInterface ∗ *baseSiP*, const std::string & *mpsDir*) `[friend]`

A function that tests the methods in the OsiRowCut class.

8.27.5 Member Data Documentation

8.27.5.1 CoinPackedVector OsiRowCut::row_ `[private]`

Row elements.

Definition at line 192 of file OsiRowCut.hpp.

8.27.5.2 double OsiRowCut::lb_ `[private]`

Row lower bound.

Definition at line 194 of file OsiRowCut.hpp.

8.27.5.3 double OsiRowCut::ub_ `[private]`

Row upper bound.

Definition at line 196 of file OsiRowCut.hpp.

The documentation for this class was generated from the following file:

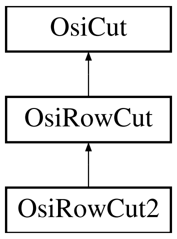
- /home/ted/COIN/trunk/Osi/src/Osi/OsiRowCut.hpp

8.28 OsiRowCut2 Class Reference

Row Cut Class which refers back to row which created it.

`#include <OsiRowCut.hpp>`

Inheritance diagram for OsiRowCut2:



Public Member Functions

Which row

- int whichRow () const
  Get row.

- void setWhichRow (int row)
  Set row.

Constructors and destructors

- OsiRowCut2 & operator= (const OsiRowCut2 &rhs)
  Assignment operator.
- OsiRowCut2 (const OsiRowCut2 &)
  Copy constructor.
- virtual OsiRowCut ∗ clone () const
  Clone.
- OsiRowCut2 (int row=-1)
  Default Constructor.
- virtual ∼OsiRowCut2 ()
  Destructor.

Private Attributes

Private member data

- int whichRow_
  Which row.

Additional Inherited Members

8.28.1 Detailed Description

Row Cut Class which refers back to row which created it.

It may be useful to strengthen a row rather than add a cut. To do this we need to know which row is strengthened. This trivial extension to OsiRowCut does that.

Definition at line 290 of file OsiRowCut.hpp.

8.28.2 Constructor & Destructor Documentation

8.28.2.1 OsiRowCut2::OsiRowCut2 (const OsiRowCut2 &)

Copy constructor.

8.28.2.2 OsiRowCut2::OsiRowCut2 (int *row* = `-1`)

Default Constructor.

8.28.2.3 virtual OsiRowCut2::∼OsiRowCut2 ( ) `[virtual]`

Destructor.

8.28.3 Member Function Documentation

8.28.3.1 int OsiRowCut2::whichRow ( ) const `[inline]`

Get row.

Definition at line 297 of file OsiRowCut.hpp.

8.28.3.2 void OsiRowCut2::setWhichRow (int *row*) [inline]

Set row.

Definition at line 300 of file OsiRowCut.hpp.

8.28.3.3 OsiRowCut2& OsiRowCut2::operator= (const OsiRowCut2 & *rhs*)

Assignment operator.

8.28.3.4 virtual OsiRowCut∗ OsiRowCut2::clone ( ) const [virtual]

Clone.

Reimplemented from OsiRowCut.

8.28.4 Member Data Documentation

8.28.4.1 int OsiRowCut2::whichRow_ [private]

Which row.

Definition at line 328 of file OsiRowCut.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiRowCut.hpp

8.29 OsiRowCutDebugger Class Reference

Validate cuts against a known solution.

`#include <OsiRowCutDebugger.hpp>`

Public Member Functions

Validate Row Cuts

Check that the specified cuts do not cut off the known solution.

- virtual int validateCuts (const OsiCuts &cs, int first, int last) const
  Check that the set of cuts does not cut off the solution known to the debugger.
- virtual bool invalidCut (const OsiRowCut &rowcut) const
  Check that the cut does not cut off the solution known to the debugger.
- bool onOptimalPath (const OsiSolverInterface &si) const
  Returns true if the solution held in the solver is compatible with the known solution.

Activate the Debugger

The debugger is considered to be active when it holds a known solution.

- bool activate (const OsiSolverInterface &si, const char ∗model)
  Activate a debugger using the name of a problem.
- bool activate (const OsiSolverInterface &si, const double ∗solution, bool keepContinuous=false)
  Activate a debugger using a full solution array.
- bool active () const
  Returns true if the debugger is active.

Query or Manipulate the Known Solution

- const double ∗ optimalSolution () const

  Return the known solution.
- int numberColumns () const

  Return the number of columns in the known solution.
- double optimalValue () const

  Return the value of the objective for the known solution.
- void redoSolution (int numberColumns, const int ∗originalColumns)

  Edit the known solution to reflect column changes.
- int printOptimalSolution (const OsiSolverInterface &si) const

  Print optimal solution (returns -1 bad debug, 0 on optimal, 1 not)

Constructors and Destructors

- OsiRowCutDebugger ()

  Default constructor - no checking.
- OsiRowCutDebugger (const OsiSolverInterface &si, const char ∗model)

  Constructor with name of model.
- OsiRowCutDebugger (const OsiSolverInterface &si, const double ∗solution, bool enforceOptimality=false)

  Constructor with full solution.
- OsiRowCutDebugger (const OsiRowCutDebugger &)

  Copy constructor.
- OsiRowCutDebugger & operator= (const OsiRowCutDebugger &rhs)

  Assignment operator.
- virtual ∼OsiRowCutDebugger ()

  Destructor.

Private Attributes

Private member data

- double knownValue_

  Value of known solution.
- int numberColumns_

  Number of columns in known solution.
- bool ∗ integerVariable_

  array specifying integer variables
- double ∗ knownSolution_

  array specifying known solution

Friends

- void OsiRowCutDebuggerUnitTest (const OsiSolverInterface ∗siP, const std::string &mpsDir)

  A function that tests the methods in the OsiRowCutDebugger class.

8.29.1 Detailed Description

Validate cuts against a known solution.

OsiRowCutDebugger provides a facility for validating cuts against a known solution for a problem. The debugger knows an optimal solution for many of the miplib3 problems. Check the source for activate(const OsiSolverInterface&,const char∗) in OsiRowCutDebugger.cpp for the full set of known problems.

A full solution vector can be supplied as a parameter with (activate(const OsiSolverInterface&,const double∗,bool)). Only the integer values need to be valid. The default behaviour is to solve an lp relaxation with the integer variables fixed to the specified values and use the optimal solution to fill in the continuous variables in the solution. The debugger can be instructed to preserve the continuous variables (useful when debugging solvers where the linear relaxation doesn't capture all the constraints).

Note that the solution must match the problem held in the solver interface. If you want to use the row cut debugger on a problem after applying presolve transformations, your solution must match the presolved problem. (But see redoSolution().)

Definition at line 42 of file OsiRowCutDebugger.hpp.

8.29.2 Constructor & Destructor Documentation

8.29.2.1 OsiRowCutDebugger::OsiRowCutDebugger ( )

Default constructor - no checking.

8.29.2.2 OsiRowCutDebugger::OsiRowCutDebugger (const **OsiSolverInterface** & *si*, const char ∗ *model*)

Constructor with name of model.

See activate(const OsiSolverInterface&,const char∗).

8.29.2.3 OsiRowCutDebugger::OsiRowCutDebugger (const **OsiSolverInterface** & *si*, const double ∗ *solution*, bool *enforceOptimality* = `false`)

Constructor with full solution.

See activate(const OsiSolverInterface&,const double∗,bool).

8.29.2.4 OsiRowCutDebugger::OsiRowCutDebugger (const **OsiRowCutDebugger** &)

Copy constructor.

8.29.2.5 virtual OsiRowCutDebugger::∼OsiRowCutDebugger ( ) `[virtual]`

Destructor.

8.29.3 Member Function Documentation

8.29.3.1 virtual int OsiRowCutDebugger::validateCuts (const **OsiCuts** & *cs*, int *first*, int *last*) const `[virtual]`

Check that the set of cuts does not cut off the solution known to the debugger.

Check if any generated cuts cut off the solution known to the debugger! If so then print offending cuts. Return the number of invalid cuts.

8.29.3.2 virtual bool OsiRowCutDebugger::invalidCut (const **OsiRowCut** & *rowcut*) const `[virtual]`

Check that the cut does not cut off the solution known to the debugger.

Return true if cut is invalid

8.29.3.3 bool OsiRowCutDebugger::onOptimalPath (const **OsiSolverInterface** & *si*) const

Returns true if the solution held in the solver is compatible with the known solution.

More specifically, returns true if the known solution satisfies the column bounds held in the solver.

8.29.3.4 bool OsiRowCutDebugger::activate (const OsiSolverInterface & *si*, const char ∗ *model*)

Activate a debugger using the name of a problem.

The debugger knows an optimal solution for most of miplib3. Check the source code for the full list. Returns true if the debugger is successfully activated.

8.29.3.5 bool OsiRowCutDebugger::activate (const OsiSolverInterface & *si*, const double ∗ *solution*, bool *keepContinuous* = `false`)

Activate a debugger using a full solution array.

The solution must have one entry for every variable, but only the entries for integer values are used. By default the debugger will solve an lp relaxation with the integer variables fixed and fill in values for the continuous variables from this solution. If the debugger should preserve the given values for the continuous variables, set `keepContinuous` to `true`.

Returns true if debugger activates successfully.

8.29.3.6 bool OsiRowCutDebugger::active ( ) const

Returns true if the debugger is active.

8.29.3.7 const double∗ OsiRowCutDebugger::optimalSolution ( ) const `[inline]`

Return the known solution.

Definition at line 111 of file OsiRowCutDebugger.hpp.

8.29.3.8 int OsiRowCutDebugger::numberColumns ( ) const `[inline]`

Return the number of columns in the known solution.

Definition at line 115 of file OsiRowCutDebugger.hpp.

8.29.3.9 double OsiRowCutDebugger::optimalValue ( ) const `[inline]`

Return the value of the objective for the known solution.

Definition at line 118 of file OsiRowCutDebugger.hpp.

8.29.3.10 void OsiRowCutDebugger::redoSolution (int *numberColumns*, const int ∗ *originalColumns*)

Edit the known solution to reflect column changes.

Given a translation array `originalColumns`[numberColumns] which can translate current column indices to original column indices, this method will edit the solution held in the debugger so that it matches the current set of columns.

Useful when the original problem is preprocessed prior to cut generation. The debugger does keep a record of the changes.

8.29.3.11 int OsiRowCutDebugger::printOptimalSolution (const OsiSolverInterface & *si*) const

Print optimal solution (returns -1 bad debug, 0 on optimal, 1 not)

8.29.3.12 OsiRowCutDebugger& OsiRowCutDebugger::operator= (const OsiRowCutDebugger & *rhs*)

Assignment operator.

8.29.4 Friends And Related Function Documentation

8.29.4.1 void OsiRowCutDebuggerUnitTest (const OsiSolverInterface ∗ *siP*, const std::string & *mpsDir*) `[friend]`

A function that tests the methods in the OsiRowCutDebugger class.

8.29.5 Member Data Documentation

8.29.5.1 double OsiRowCutDebugger::knownValue_ `[private]`

Value of known solution.

Definition at line 171 of file OsiRowCutDebugger.hpp.

8.29.5.2 int OsiRowCutDebugger::numberColumns_ `[private]`

Number of columns in known solution.

This must match the number of columns reported by the solver.

Definition at line 177 of file OsiRowCutDebugger.hpp.

8.29.5.3 bool∗ OsiRowCutDebugger::integerVariable_ `[private]`

array specifying integer variables

Definition at line 180 of file OsiRowCutDebugger.hpp.

8.29.5.4 double∗ OsiRowCutDebugger::knownSolution_ `[private]`

array specifying known solution

Definition at line 183 of file OsiRowCutDebugger.hpp.

The documentation for this class was generated from the following file:

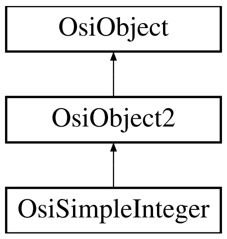
- /home/ted/COIN/trunk/Osi/src/Osi/OsiRowCutDebugger.hpp

8.30 OsiSimpleInteger Class Reference

Define a single integer class.

`#include <OsiBranchingObject.hpp>`

Inheritance diagram for OsiSimpleInteger:



Public Member Functions

- OsiSimpleInteger ()

  Default Constructor.
- OsiSimpleInteger (const OsiSolverInterface ∗solver, int iColumn)

  Useful constructor - passed solver index.
- OsiSimpleInteger (int iColumn, double lower, double upper)

  Useful constructor - passed solver index and original bounds.
- OsiSimpleInteger (const OsiSimpleInteger &)

  Copy constructor.
- virtual OsiObject ∗ clone () const

  Clone.
- OsiSimpleInteger & operator= (const OsiSimpleInteger &rhs)

  Assignment operator.
- virtual ∼OsiSimpleInteger ()

  Destructor.
- virtual double infeasibility (const OsiBranchingInformation ∗info, int &whichWay) const

  Infeasibility - large is 0.5.
- virtual double feasibleRegion (OsiSolverInterface ∗solver, const OsiBranchingInformation ∗info) const

  Set bounds to fix the variable at the current (integer) value.
- virtual OsiBranchingObject ∗ createBranch (OsiSolverInterface ∗solver, const OsiBranchingInformation ∗info, int way) const

  Creates a branching object.
- void setColumnNumber (int value)

  Set solver column number.
- virtual int columnNumber () const

  Column number if single column object -1 otherwise, so returns >= 0 Used by heuristics.
- double originalLowerBound () const

  Original bounds.
- void setOriginalLowerBound (double value)
- double originalUpperBound () const
- void setOriginalUpperBound (double value)
- virtual void resetBounds (const OsiSolverInterface ∗solver)

  Reset variable bounds to their original values.
- virtual void resetSequenceEtc (int numberColumns, const int ∗originalColumns)

  Change column numbers after preprocessing.
- virtual double upEstimate () const

  Return "up" estimate (default 1.0e-5)
- virtual double downEstimate () const

  Return "down" estimate (default 1.0e-5)
- virtual bool canHandleShadowPrices () const

  Return true if knows how to deal with Pseudo Shadow Prices.

Protected Attributes

- double originalLower_
  data Original lower bound
- double originalUpper_
  Original upper bound.
- int columnNumber_
  Column number in solver.

8.30.1 Detailed Description

Define a single integer class.

Definition at line 511 of file OsiBranchingObject.hpp.

8.30.2 Constructor & Destructor Documentation

8.30.2.1 OsiSimpleInteger::OsiSimpleInteger ( )

Default Constructor.

8.30.2.2 OsiSimpleInteger::OsiSimpleInteger (const **OsiSolverInterface** ∗ *solver,* int *iColumn*)

Useful constructor - passed solver index.

8.30.2.3 OsiSimpleInteger::OsiSimpleInteger (int *iColumn,* double *lower,* double *upper*)

Useful constructor - passed solver index and original bounds.

8.30.2.4 OsiSimpleInteger::OsiSimpleInteger (const **OsiSimpleInteger** &)

Copy constructor.

8.30.2.5 virtual OsiSimpleInteger::∼OsiSimpleInteger ( ) `[virtual]`

Destructor.

8.30.3 Member Function Documentation

8.30.3.1 virtual **OsiObject**∗ OsiSimpleInteger::clone ( ) const `[virtual]`

Clone.

Implements OsiObject.

8.30.3.2 **OsiSimpleInteger**& OsiSimpleInteger::operator= (const **OsiSimpleInteger** & *rhs*)

Assignment operator.

8.30.3.3 virtual double OsiSimpleInteger::infeasibility (const **OsiBranchingInformation** ∗ *info,* int & *whichWay*) const `[virtual]`

Infeasibility - large is 0.5.

Implements OsiObject.

8.30.3.4 virtual double OsiSimpleInteger::feasibleRegion (OsiSolverInterface ∗ *solver,* const OsiBranchingInformation ∗ *info*) const [virtual]

Set bounds to fix the variable at the current (integer) value.

Given an integer value, set the lower and upper bounds to fix the variable. Returns amount it had to move variable.

Implements OsiObject.

8.30.3.5 virtual OsiBranchingObject∗ OsiSimpleInteger::createBranch (OsiSolverInterface ∗ *solver,* const OsiBranchingInformation ∗ *info,* int *way*) const [virtual]

Creates a branching object.

The preferred direction is set by `way`, 0 for down, 1 for up.

Reimplemented from OsiObject.

8.30.3.6 void OsiSimpleInteger::setColumnNumber (int *value*) [inline]

Set solver column number.

Definition at line 556 of file OsiBranchingObject.hpp.

8.30.3.7 virtual int OsiSimpleInteger::columnNumber ( ) const [virtual]

Column number if single column object -1 otherwise, so returns >= 0 Used by heuristics.

Reimplemented from OsiObject.

8.30.3.8 double OsiSimpleInteger::originalLowerBound ( ) const [inline]

Original bounds.

Definition at line 566 of file OsiBranchingObject.hpp.

8.30.3.9 void OsiSimpleInteger::setOriginalLowerBound (double *value*) [inline]

Definition at line 568 of file OsiBranchingObject.hpp.

8.30.3.10 double OsiSimpleInteger::originalUpperBound ( ) const [inline]

Definition at line 570 of file OsiBranchingObject.hpp.

8.30.3.11 void OsiSimpleInteger::setOriginalUpperBound (double *value*) [inline]

Definition at line 572 of file OsiBranchingObject.hpp.

8.30.3.12 virtual void OsiSimpleInteger::resetBounds (const OsiSolverInterface ∗ *solver*) [virtual]

Reset variable bounds to their original values.

Bounds may be tightened, so it may be good to be able to reset them to their original values.

Reimplemented from OsiObject.

8.30.3.13 virtual void OsiSimpleInteger::resetSequenceEtc (int *numberColumns,* const int ∗ *originalColumns*) [virtual]

Change column numbers after preprocessing.

Reimplemented from OsiObject.

8.30.3.14 virtual double OsiSimpleInteger::upEstimate ( ) const [virtual]

Return "up" estimate (default 1.0e-5)

Reimplemented from OsiObject.

8.30.3.15 virtual double OsiSimpleInteger::downEstimate ( ) const [virtual]

Return "down" estimate (default 1.0e-5)

Reimplemented from OsiObject.

8.30.3.16 virtual bool OsiSimpleInteger::canHandleShadowPrices ( ) const [inline], [virtual]

Return true if knows how to deal with Pseudo Shadow Prices.

Reimplemented from OsiObject.

Definition at line 588 of file OsiBranchingObject.hpp.

8.30.4 Member Data Documentation

8.30.4.1 double OsiSimpleInteger::originalLower_ [protected]

data Original lower bound

Definition at line 593 of file OsiBranchingObject.hpp.

8.30.4.2 double OsiSimpleInteger::originalUpper_ [protected]

Original upper bound.

Definition at line 595 of file OsiBranchingObject.hpp.

8.30.4.3 int OsiSimpleInteger::columnNumber_ [protected]

Column number in solver.

Definition at line 597 of file OsiBranchingObject.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.31 OsiSolverBranch Class Reference

Solver Branch Class.

`#include <OsiSolverBranch.hpp>`

Public Member Functions

Add and Get methods

- void addBranch (int iColumn, double value)
  Add a simple branch (i.e. first sets ub of floor(value), second lb of ceil(value))
- void addBranch (int way, int numberTighterLower, const int ∗whichLower, const double ∗newLower, int numberTighterUpper, const int ∗whichUpper, const double ∗newUpper)

Add bounds - way =-1 is first , +1 is second.

- void addBranch (int way, int numberColumns, const double ∗oldLower, const double ∗newLower, const double ∗oldUpper, const double ∗newUpper)

  Add bounds - way =-1 is first , +1 is second.
- void applyBounds (OsiSolverInterface &solver, int way) const

  Apply bounds.
- bool feasibleOneWay (const OsiSolverInterface &solver) const

  Returns true if current solution satsifies one side of branch.
- const int ∗ starts () const

  Starts.
- const int ∗ which () const

  Which variables.
- const double ∗ bounds () const

  Bounds.

Constructors and destructors

- OsiSolverBranch ()

  Default Constructor.
- OsiSolverBranch (const OsiSolverBranch &rhs)

  Copy constructor.
- OsiSolverBranch & operator= (const OsiSolverBranch &rhs)

  Assignment operator.
- ∼OsiSolverBranch ()

  Destructor.

Private Attributes

Private member data

- int start_ [5]

  Start of lower first, upper first, lower second, upper second.
- int ∗ indices_

  Column numbers (if >= numberColumns treat as rows)
- double ∗ bound_

  New bounds.

8.31.1 Detailed Description

Solver Branch Class.

This provides information on a branch as a set of tighter bounds on both ways

Definition at line 18 of file OsiSolverBranch.hpp.

8.31.2 Constructor & Destructor Documentation

8.31.2.1 OsiSolverBranch::OsiSolverBranch ( )

Default Constructor.

8.31.2.2 OsiSolverBranch::OsiSolverBranch (const **OsiSolverBranch** & *rhs*)

Copy constructor.

8.31.2.3 OsiSolverBranch::∼OsiSolverBranch ( )

Destructor.

8.31.3 Member Function Documentation

8.31.3.1 void OsiSolverBranch::addBranch (int *iColumn,* double *value*)

Add a simple branch (i.e. first sets ub of floor(value), second lb of ceil(value))

8.31.3.2 void OsiSolverBranch::addBranch (int *way,* int *numberTighterLower,* const int ∗ *whichLower,* const double ∗ *newLower,* int *numberTighterUpper,* const int ∗ *whichUpper,* const double ∗ *newUpper*)

Add bounds - way =-1 is first , +1 is second.

8.31.3.3 void OsiSolverBranch::addBranch (int *way,* int *numberColumns,* const double ∗ *oldLower,* const double ∗ *newLower,* const double ∗ *oldUpper,* const double ∗ *newUpper*)

Add bounds - way =-1 is first , +1 is second.

8.31.3.4 void OsiSolverBranch::applyBounds (OsiSolverInterface & *solver,* int *way*) const

Apply bounds.

8.31.3.5 bool OsiSolverBranch::feasibleOneWay (const OsiSolverInterface & *solver*) const

Returns true if current solution satsifies one side of branch.

8.31.3.6 const int∗ OsiSolverBranch::starts ( ) const [inline]

Starts.

Definition at line 38 of file OsiSolverBranch.hpp.

8.31.3.7 const int∗ OsiSolverBranch::which ( ) const [inline]

Which variables.

Definition at line 41 of file OsiSolverBranch.hpp.

8.31.3.8 const double∗ OsiSolverBranch::bounds ( ) const [inline]

Bounds.

Definition at line 44 of file OsiSolverBranch.hpp.

8.31.3.9 OsiSolverBranch& OsiSolverBranch::operator= (const OsiSolverBranch & *rhs*)

Assignment operator.

8.31.4 Member Data Documentation

8.31.4.1 int OsiSolverBranch::start_[5] [private]

Start of lower first, upper first, lower second, upper second.

Definition at line 69 of file OsiSolverBranch.hpp.

8.31.4.2 int∗ OsiSolverBranch::indices_ [private]

Column numbers (if >= numberColumns treat as rows)

Definition at line 71 of file OsiSolverBranch.hpp.

8.31.4.3 double∗ OsiSolverBranch::bound_ [private]

New bounds.

Definition at line 73 of file OsiSolverBranch.hpp.

The documentation for this class was generated from the following file:

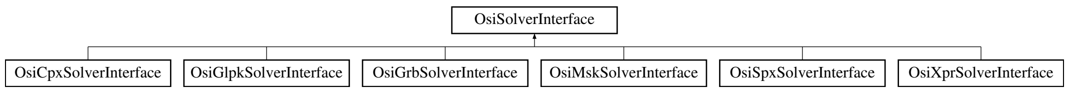
- /home/ted/COIN/trunk/Osi/src/Osi/OsiSolverBranch.hpp

8.32 OsiSolverInterface Class Reference

Abstract Base Class for describing an interface to a solver.

`#include <OsiSolverInterface.hpp>`

Inheritance diagram for OsiSolverInterface:



Classes

- class ApplyCutsReturnCode

  Internal class for obtaining status from the applyCuts method.

Public Types

- typedef std::vector< std::string > OsiNameVec

  Data type for name vectors.

Public Member Functions

Solve methods

- virtual void initialSolve ()=0

  Solve initial LP relaxation.
- virtual void resolve ()=0

  Resolve an LP relaxation after problem modification.
- virtual void branchAndBound ()=0

  Invoke solver's built-in enumeration algorithm.

Parameter set/get methods

The set methods return true if the parameter was set to the given value, false otherwise.

When a set method returns false, the original value (if any) should be unchanged. There can be various reasons for failure: the given parameter is not applicable for the solver (e.g., refactorization frequency for the volume algorithm), the parameter is not yet implemented for the solver or simply the value of the parameter is out of the range the solver accepts. If a parameter setting call returns false check the details of your solver.

The get methods return true if the given parameter is applicable for the solver and is implemented. In this case the value of the parameter is returned in the second argument. Otherwise they return false.

Note

There is a default implementation of the set/get methods, namely to store/retrieve the given value using an array in the base class. A specific solver implementation can use this feature, for example, to store parameters that should be used later on. Implementors of a solver interface should overload these functions to provide the proper interface to and accurately reflect the capabilities of a specific solver.

The format for hints is slightly different in that a boolean specifies the sense of the hint and an enum specifies the strength of the hint. Hints should be initialised when a solver is instantiated. (See OsiSolverParameters.hpp for defined hint parameters and strength.) When specifying the sense of the hint, a value of true means to work with the hint, false to work against it. For example,

- `setHintParam(OsiDoScale,true,OsiHintTry)`

  is a mild suggestion to the solver to scale the constraint system.
- `setHintParam(OsiDoScale,false,OsiForceDo)`

  tells the solver to disable scaling, or throw an exception if it cannot comply.

As another example, a solver interface could use the value and strength of the `OsiDoReducePrint` hint to adjust the amount of information printed by the interface and/or solver. The extent to which a solver obeys hints is left to the solver. The value and strength returned by `getHintParam` will match the most recent call to `setHintParam`, and will not necessarily reflect the solver's ability to comply with the hint. If the hint strength is `OsiForceDo`, the solver is required to throw an exception if it cannot perform the specified action.

Note

As with the other set/get methods, there is a default implementation which maintains arrays in the base class for hint sense and strength. The default implementation does not store the `otherInformation` pointer, and always throws an exception for strength `OsiForceDo`. Implementors of a solver interface should override these functions to provide the proper interface to and accurately reflect the capabilities of a specific solver.

- virtual bool setIntParam (OsiIntParam key, int value)

  Set an integer parameter.
- virtual bool setDblParam (OsiDblParam key, double value)

  Set a double parameter.
- virtual bool setStrParam (OsiStrParam key, const std::string &value)

  Set a string parameter.
- virtual bool setHintParam (OsiHintParam key, bool yesNo=true, OsiHintStrength strength=OsiHintTry, void ∗=N-ULL)

  Set a hint parameter.
- virtual bool getIntParam (OsiIntParam key, int &value) const

  Get an integer parameter.
- virtual bool getDblParam (OsiDblParam key, double &value) const

  Get a double parameter.
- virtual bool getStrParam (OsiStrParam key, std::string &value) const

  Get a string parameter.
- virtual bool getHintParam (OsiHintParam key, bool &yesNo, OsiHintStrength &strength, void ∗&other-Information) const

  Get a hint parameter (all information)
- virtual bool getHintParam (OsiHintParam key, bool &yesNo, OsiHintStrength &strength) const

  Get a hint parameter (sense and strength only)

- virtual bool getHintParam (OsiHintParam key, bool &yesNo) const

  Get a hint parameter (sense only)
- void copyParameters (OsiSolverInterface &rhs)

  Copy all parameters in this section from one solver to another.
- double getIntegerTolerance () const

  Return the integrality tolerance of the underlying solver.

Methods returning info on how the solution process terminated

- virtual bool isAbandoned () const =0

  Are there numerical difficulties?
- virtual bool isProvenOptimal () const =0

  Is optimality proven?
- virtual bool isProvenPrimalInfeasible () const =0

  Is primal infeasibility proven?
- virtual bool isProvenDualInfeasible () const =0

  Is dual infeasibility proven?
- virtual bool isPrimalObjectiveLimitReached () const

  Is the given primal objective limit reached?
- virtual bool isDualObjectiveLimitReached () const

  Is the given dual objective limit reached?
- virtual bool isIterationLimitReached () const =0

  Iteration limit reached?

Warm start methods

Note that the warm start methods return a generic CoinWarmStart object.

The precise characteristics of this object are solver-dependent. Clients who wish to maintain a maximum degree of solver independence should take care to avoid unnecessary assumptions about the properties of a warm start object.

- virtual CoinWarmStart ∗ getEmptyWarmStart () const =0

  Get an empty warm start object.
- virtual CoinWarmStart ∗ getWarmStart () const =0

  Get warm start information.
- virtual CoinWarmStart ∗ getPointerToWarmStart (bool &mustDelete)

  Get warm start information.
- virtual bool setWarmStart (const CoinWarmStart ∗warmstart)=0

  Set warm start information.

Hot start methods

Primarily used in strong branching.

The user can create a hot start object — a snapshot of the optimization process — then reoptimize over and over again, starting from the same point.

Note

- *Between hot started optimizations only bound changes are allowed.*
- *The copy constructor and assignment operator should NOT copy any hot start information.*
- *The default implementation simply extracts a warm start object in `markHotStart`, resets to the warm start object in `solveFromHotStart`, and deletes the warm start object in `unmarkHotStart`. Actual solver implementations are encouraged to do better.*

- virtual void markHotStart ()

  Create a hot start snapshot of the optimization process.

- virtual void solveFromHotStart ()
  Optimize starting from the hot start snapshot.
- virtual void unmarkHotStart ()
  Delete the hot start snapshot.

Problem query methods

Querying a problem that has no data associated with it will result in zeros for the number of rows and columns, and NULL pointers from the methods that return vectors.

Const pointers returned from any data-query method are valid as long as the data is unchanged and the solver is not called.

- virtual int getNumCols () const =0
  Get the number of columns.
- virtual int getNumRows () const =0
  Get the number of rows.
- virtual int getNumElements () const =0
  Get the number of nonzero elements.
- virtual int getNumIntegers () const
  Get the number of integer variables.
- virtual const double ∗ getColLower () const =0
  Get a pointer to an array[getNumCols()] of column lower bounds.
- virtual const double ∗ getColUpper () const =0
  Get a pointer to an array[getNumCols()] of column upper bounds.
- virtual const char ∗ getRowSense () const =0
  Get a pointer to an array[getNumRows()] of row constraint senses.
- virtual const double ∗ getRightHandSide () const =0
  Get a pointer to an array[getNumRows()] of row right-hand sides.
- virtual const double ∗ getRowRange () const =0
  Get a pointer to an array[getNumRows()] of row ranges.
- virtual const double ∗ getRowLower () const =0
  Get a pointer to an array[getNumRows()] of row lower bounds.
- virtual const double ∗ getRowUpper () const =0
  Get a pointer to an array[getNumRows()] of row upper bounds.
- virtual const double ∗ getObjCoefficients () const =0
  Get a pointer to an array[getNumCols()] of objective function coefficients.
- virtual double getObjSense () const =0
  Get the objective function sense.
- virtual bool isContinuous (int colIndex) const =0
  Return true if the variable is continuous.
- virtual bool isBinary (int colIndex) const
  Return true if the variable is binary.
- virtual bool isInteger (int colIndex) const
  Return true if the variable is integer.
- virtual bool isIntegerNonBinary (int colIndex) const
  Return true if the variable is general integer.
- virtual bool isFreeBinary (int colIndex) const
  Return true if the variable is binary and not fixed.
- const char ∗ columnType (bool refresh=false) const
  Return an array[getNumCols()] of column types.
- virtual const char ∗ getColType (bool refresh=false) const
  Return an array[getNumCols()] of column types.
- virtual const CoinPackedMatrix ∗ getMatrixByRow () const =0
  Get a pointer to a row-wise copy of the matrix.
- virtual const CoinPackedMatrix ∗ getMatrixByCol () const =0

Get a pointer to a column-wise copy of the matrix.
- virtual CoinPackedMatrix ∗ getMutableMatrixByRow () const

    Get a pointer to a mutable row-wise copy of the matrix.
- virtual CoinPackedMatrix ∗ getMutableMatrixByCol () const

    Get a pointer to a mutable column-wise copy of the matrix.
- virtual double getInfinity () const =0

    Get the solver's value for infinity.

Solution query methods

- virtual const double ∗ getColSolution () const =0

    Get a pointer to an array[getNumCols()] of primal variable values.
- virtual const double ∗ getStrictColSolution ()

    Get a pointer to an array[getNumCols()] of primal variable values guaranteed to be between the column lower and upper bounds.
- virtual const double ∗ getRowPrice () const =0

    Get pointer to array[getNumRows()] of dual variable values.
- virtual const double ∗ getReducedCost () const =0

    Get a pointer to an array[getNumCols()] of reduced costs.
- virtual const double ∗ getRowActivity () const =0

    Get a pointer to array[getNumRows()] of row activity levels.
- virtual double getObjValue () const =0

    Get the objective function value.
- virtual int getIterationCount () const =0

    Get the number of iterations it took to solve the problem (whatever 'iteration' means to the solver).
- virtual std::vector< double ∗ > getDualRays (int maxNumRays, bool fullRay=false) const =0

    Get as many dual rays as the solver can provide.
- virtual std::vector< double ∗ > getPrimalRays (int maxNumRays) const =0

    Get as many primal rays as the solver can provide.
- virtual OsiVectorInt getFractionalIndices (const double etol=1.e-05) const

    Get vector of indices of primal variables which are integer variables but have fractional values in the current solution.

Methods to modify the objective, bounds, and solution

For functions which take a set of indices as parameters (`setObjCoeffSet()`, `setColSetBounds()`, `setRowSetBounds()`, `setRowSetTypes()`), the parameters follow the C++ STL iterator convention: `indexFirst` points to the first index in the set, and `indexLast` points to a position one past the last index in the set.

- virtual void setObjCoeff (int elementIndex, double elementValue)=0

    Set an objective function coefficient.
- virtual void setObjCoeffSet (const int ∗indexFirst, const int ∗indexLast, const double ∗coeffList)

    Set a set of objective function coefficients.
- virtual void setObjective (const double ∗array)

    Set the objective coefficients for all columns.
- virtual void setObjSense (double s)=0

    Set the objective function sense.
- virtual void setColLower (int elementIndex, double elementValue)=0

    Set a single column lower bound.
- virtual void setColLower (const double ∗array)

    Set the lower bounds for all columns.
- virtual void setColUpper (int elementIndex, double elementValue)=0

    Set a single column upper bound.
- virtual void setColUpper (const double ∗array)

    Set the upper bounds for all columns.

- virtual void setColBounds (int elementIndex, double lower, double upper)
  Set a single column lower and upper bound.
- virtual void setColSetBounds (const int ∗indexFirst, const int ∗indexLast, const double ∗boundList)
  Set the upper and lower bounds of a set of columns.
- virtual void setRowLower (int elementIndex, double elementValue)=0
  Set a single row lower bound.
- virtual void setRowUpper (int elementIndex, double elementValue)=0
  Set a single row upper bound.
- virtual void setRowBounds (int elementIndex, double lower, double upper)
  Set a single row lower and upper bound.
- virtual void setRowSetBounds (const int ∗indexFirst, const int ∗indexLast, const double ∗boundList)
  Set the bounds on a set of rows.
- virtual void setRowType (int index, char sense, double rightHandSide, double range)=0
  Set the type of a single row.
- virtual void setRowSetTypes (const int ∗indexFirst, const int ∗indexLast, const char ∗senseList, const double ∗rhsList, const double ∗rangeList)
  Set the type of a set of rows.
- virtual void setColSolution (const double ∗colsol)=0
  Set the primal solution variable values.
- virtual void setRowPrice (const double ∗rowprice)=0
  Set dual solution variable values.
- virtual int reducedCostFix (double gap, bool justInteger=true)
  Fix variables at bound based on reduced cost.

Methods to set variable type

- virtual void setContinuous (int index)=0
  Set the index-th variable to be a continuous variable.
- virtual void setInteger (int index)=0
  Set the index-th variable to be an integer variable.
- virtual void setContinuous (const int ∗indices, int len)
  Set the variables listed in indices (which is of length len) to be continuous variables.
- virtual void setInteger (const int ∗indices, int len)
  Set the variables listed in indices (which is of length len) to be integer variables.

Methods for row and column names

Osi defines three name management disciplines: 'auto names' (0), 'lazy names' (1), and 'full names' (2).

See the description of OsiNameDiscipline for details. Changing the name discipline (via setIntParam()) will not automatically add or remove name information, but setting the discipline to auto will make existing information inaccessible until the discipline is reset to lazy or full.

By definition, a row index of getNumRows() (i.e., one larger than the largest valid row index) refers to the objective function.

OSI users and implementors: While the OSI base class can define an interface and provide rudimentary support, use of names really depends on support by the OsiXXX class to ensure that names are managed correctly. If an OsiXXX class does not support names, it should return false for calls to getIntParam() or setIntParam() that reference OsiNameDiscipline.

- virtual std::string dfltRowColName (char rc, int ndx, unsigned digits=7) const
  Generate a standard name of the form Rnnnnnnn or Cnnnnnnn.
- virtual std::string getObjName (unsigned maxLen=static_cast< unsigned >(std::string::npos)) const
  Return the name of the objective function.
- virtual void setObjName (std::string name)
  Set the name of the objective function.

- virtual std::string getRowName (int rowIndex, unsigned maxLen=static_cast< unsigned >(std::string::npos)) const

  Return the name of the row.
- virtual const OsiNameVec & getRowNames ()

  Return a pointer to a vector of row names.
- virtual void setRowName (int ndx, std::string name)

  Set a row name.
- virtual void setRowNames (OsiNameVec &srcNames, int srcStart, int len, int tgtStart)

  Set multiple row names.
- virtual void deleteRowNames (int tgtStart, int len)

  Delete len row names starting at index tgtStart.
- virtual std::string getColName (int colIndex, unsigned maxLen=static_cast< unsigned >(std::string::npos)) const

  Return the name of the column.
- virtual const OsiNameVec & getColNames ()

  Return a pointer to a vector of column names.
- virtual void setColName (int ndx, std::string name)

  Set a column name.
- virtual void setColNames (OsiNameVec &srcNames, int srcStart, int len, int tgtStart)

  Set multiple column names.
- virtual void deleteColNames (int tgtStart, int len)

  Delete len column names starting at index tgtStart.
- void setRowColNames (const CoinMpsIO &mps)

  Set row and column names from a CoinMpsIO object.
- void setRowColNames (CoinModel &mod)

  Set row and column names from a CoinModel object.
- void setRowColNames (CoinLpIO &mod)

  Set row and column names from a CoinLpIO object.

Methods to modify the constraint system.

Note that new columns are added as continuous variables.

- virtual void addCol (const CoinPackedVectorBase &vec, const double collb, const double colub, const double obj)=0

  Add a column (primal variable) to the problem.
- virtual void addCol (const CoinPackedVectorBase &vec, const double collb, const double colub, const double obj, std::string name)

  Add a named column (primal variable) to the problem.
- virtual void addCol (int numberElements, const int ∗rows, const double ∗elements, const double collb, const double colub, const double obj)

  Add a column (primal variable) to the problem.
- virtual void addCol (int numberElements, const int ∗rows, const double ∗elements, const double collb, const double colub, const double obj, std::string name)

  Add a named column (primal variable) to the problem.
- virtual void addCols (const int numcols, const CoinPackedVectorBase ∗const ∗cols, const double ∗collb, const double ∗colub, const double ∗obj)

  Add a set of columns (primal variables) to the problem.
- virtual void addCols (const int numcols, const int ∗columnStarts, const int ∗rows, const double ∗elements, const double ∗collb, const double ∗colub, const double ∗obj)

  Add a set of columns (primal variables) to the problem.
- void addCols (const CoinBuild &buildObject)

  Add columns using a CoinBuild object.
- int addCols (CoinModel &modelObject)

  Add columns from a model object.

- virtual void deleteCols (const int num, const int ∗colIndices)=0
  Remove a set of columns (primal variables) from the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const double rowlb, const double rowub)=0
  Add a row (constraint) to the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const double rowlb, const double rowub, std::string name)
  Add a named row (constraint) to the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const char rowsen, const double rowrhs, const double rowrng)=0
  Add a row (constraint) to the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const char rowsen, const double rowrhs, const double rowrng, std::string name)
  Add a named row (constraint) to the problem.
- virtual void addRow (int numberElements, const int ∗columns, const double ∗element, const double rowlb, const double rowub)
  Add a row (constraint) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const double ∗rowlb, const double ∗rowub)
  Add a set of rows (constraints) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)
  Add a set of rows (constraints) to the problem.
- virtual void addRows (const int numrows, const int ∗rowStarts, const int ∗columns, const double ∗element, const double ∗rowlb, const double ∗rowub)
  Add a set of rows (constraints) to the problem.
- void addRows (const CoinBuild &buildObject)
  Add rows using a CoinBuild object.
- int addRows (CoinModel &modelObject)
  Add rows from a CoinModel object.
- virtual void deleteRows (const int num, const int ∗rowIndices)=0
  Delete a set of rows (constraints) from the problem.
- virtual void replaceMatrixOptional (const CoinPackedMatrix &)
  Replace the constraint matrix.
- virtual void replaceMatrix (const CoinPackedMatrix &)
  Replace the constraint matrix.
- virtual void saveBaseModel ()
  Save a copy of the base model.
- virtual void restoreBaseModel (int numberRows)
  Reduce the constraint system to the specified number of constraints.
- virtual ApplyCutsReturnCode applyCuts (const OsiCuts &cs, double effectivenessLb=0.0)
  Apply a collection of cuts.
- virtual void applyRowCuts (int numberCuts, const OsiRowCut ∗cuts)
  Apply a collection of row cuts which are all effective.
- virtual void applyRowCuts (int numberCuts, const OsiRowCut ∗∗cuts)
  Apply a collection of row cuts which are all effective.
- void deleteBranchingInfo (int numberDeleted, const int ∗which)
  Deletes branching information before columns deleted.

Methods for problem input and output

- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)=0
  Load in a problem by copying the arguments.
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, double ∗&rowlb, double ∗&rowub)=0

Load in a problem by assuming ownership of the arguments.
- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)=0

  Load in a problem by copying the arguments.
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, char ∗&rowsen, double ∗&rowrhs, double ∗&rowrng)=0

  Load in a problem by assuming ownership of the arguments.
- virtual void loadProblem (const int numcols, const int numrows, const CoinBigIndex ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)=0

  Load in a problem by copying the arguments.
- virtual void loadProblem (const int numcols, const int numrows, const CoinBigIndex ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)=0

  Load in a problem by copying the arguments.
- virtual int loadFromCoinModel (CoinModel &modelObject, bool keepSolution=false)

  Load a model from a CoinModel object.
- virtual int readMps (const char ∗filename, const char ∗extension="mps")

  Read a problem in MPS format from the given filename.
- virtual int readMps (const char ∗filename, const char ∗extension, int &numberSets, CoinSet ∗∗&sets)

  Read a problem in MPS format from the given full filename.
- virtual int readGMPL (const char ∗filename, const char ∗dataname=NULL)

  Read a problem in GMPL format from the given filenames.
- virtual void writeMps (const char ∗filename, const char ∗extension="mps", double objSense=0.0) const =0

  Write the problem in MPS format to the specified file.
- int writeMpsNative (const char ∗filename, const char ∗∗rowNames, const char ∗∗columnNames, int formatType=0, int numberAcross=2, double objSense=0.0, int numberSOS=0, const CoinSet ∗setInfo=NULL) const

  Write the problem in MPS format to the specified file with more control over the output.
- virtual void writeLp (const char ∗filename, const char ∗extension="lp", double epsilon=1e-5, int numberAcross=10, int decimals=5, double objSense=0.0, bool useRowNames=true) const

  Write the problem into an Lp file of the given filename with the specified extension.
- virtual void writeLp (FILE ∗fp, double epsilon=1e-5, int numberAcross=10, int decimals=5, double objSense=0.0, bool useRowNames=true) const

  Write the problem into the file pointed to by the parameter fp.
- int writeLpNative (const char ∗filename, char const ∗const ∗const rowNames, char const ∗const ∗const columnNames, const double epsilon=1.0e-5, const int numberAcross=10, const int decimals=5, const double objSense=0.0, const bool useRowNames=true) const

  Write the problem into an Lp file.
- int writeLpNative (FILE ∗fp, char const ∗const ∗const rowNames, char const ∗const ∗const columnNames, const double epsilon=1.0e-5, const int numberAcross=10, const int decimals=5, const double objSense=0.0, const bool useRowNames=true) const

  Write the problem into the file pointed to by the parameter fp.
- virtual int readLp (const char ∗filename, const double epsilon=1e-5)

  Read file in LP format from file with name filename.
- int readLp (FILE ∗fp, const double epsilon=1e-5)

  Read file in LP format from the file pointed to by fp.

Setting/Accessing application data

- void setApplicationData (void ∗appData)

  Set application data.
- void setAuxiliaryInfo (OsiAuxInfo ∗auxiliaryInfo)

  Create a clone of an Auxiliary Information object.
- void ∗ getApplicationData () const

Get application data.
- OsiAuxInfo ∗ getAuxiliaryInfo () const

  Get pointer to auxiliary info object.

Message handling

See the COIN library documentation for additional information about COIN message facilities.

- virtual void passInMessageHandler (CoinMessageHandler ∗handler)

  Pass in a message handler.
- void newLanguage (CoinMessages::Language language)

  Set language.
- void setLanguage (CoinMessages::Language language)
- CoinMessageHandler ∗ messageHandler () const

  Return a pointer to the current message handler.
- CoinMessages messages ()

  Return the current set of messages.
- CoinMessages ∗ messagesPointer ()

  Return a pointer to the current set of messages.
- bool defaultHandler () const

  Return true if default handler.

Methods for dealing with discontinuities other than integers.

Osi should be able to know about SOS and other types.

This is an optional section where such information can be stored.

- void findIntegers (bool justCount)

  Identify integer variables and create corresponding objects.
- virtual int findIntegersAndSOS (bool justCount)

  Identify integer variables and SOS and create corresponding objects.
- int numberObjects () const

  Get the number of objects.
- void setNumberObjects (int number)

  Set the number of objects.
- OsiObject ∗∗ objects () const

  Get the array of objects.
- const OsiObject ∗ object (int which) const

  Get the specified object.
- OsiObject ∗ modifiableObject (int which) const

  Get the specified object.
- void deleteObjects ()

  Delete all object information.
- void addObjects (int numberObjects, OsiObject ∗∗objects)

  Add in object information.
- double forceFeasible ()

  Use current solution to set bounds so current integer feasible solution will stay feasible.

Methods related to testing generated cuts

See the documentation for OsiRowCutDebugger for additional details.

- virtual void activateRowCutDebugger (const char ∗modelName)

  Activate the row cut debugger.
- virtual void activateRowCutDebugger (const double ∗solution, bool enforceOptimality=true)

  Activate the row cut debugger using a full solution array.
- const OsiRowCutDebugger ∗ getRowCutDebugger () const

Get the row cut debugger provided the solution known to the debugger is within the feasible region held in the solver.
- OsiRowCutDebugger ∗ getRowCutDebuggerAlways () const

  Get the row cut debugger object.

OsiSimplexInterface

Simplex Interface

Methods for an advanced interface to a simplex solver. The interface comprises two groups of methods. Group 1 contains methods for tableau access. Group 2 contains methods for dictating individual simplex pivots.

- virtual int canDoSimplexInterface () const

  Return the simplex implementation level.

OsiSimplex Group 1

Tableau access methods.

This group of methods provides access to rows and columns of the basis inverse and to rows and columns of the tableau.

- virtual void enableFactorization () const

  Prepare the solver for the use of tableau access methods.
- virtual void disableFactorization () const

  Undo the effects of enableFactorization.
- virtual bool basisIsAvailable () const

  Check if an optimal basis is available.
- bool optimalBasisIsAvailable () const

  Synonym for basisIsAvailable.
- virtual void getBasisStatus (int ∗cstat, int ∗rstat) const

  Retrieve status information for column and row variables.
- virtual int setBasisStatus (const int ∗cstat, const int ∗rstat)

  Set the status of column and row variables and update the basis factorization and solution.
- virtual void getReducedGradient (double ∗columnReducedCosts, double ∗duals, const double ∗c) const

  Calculate duals and reduced costs for the given objective coefficients.
- virtual void getBInvARow (int row, double ∗z, double ∗slack=NULL) const

  Get a row of the tableau.
- virtual void getBInvRow (int row, double ∗z) const

  Get a row of the basis inverse.
- virtual void getBInvACol (int col, double ∗vec) const

  Get a column of the tableau.
- virtual void getBInvCol (int col, double ∗vec) const

  Get a column of the basis inverse.
- virtual void getBasics (int ∗index) const

  Get indices of basic variables.

OsiSimplex Group 2

Pivoting methods

This group of methods provides for control of individual pivots by a simplex solver.

- virtual void enableSimplexInterface (bool doingPrimal)

  Enables normal operation of subsequent functions.
- virtual void disableSimplexInterface ()

  Undo whatever setting changes the above method had to make.
- virtual int pivot (int colIn, int colOut, int outStatus)

  Perform a pivot by substituting a colIn for colOut in the basis.
- virtual int primalPivotResult (int colIn, int sign, int &colOut, int &outStatus, double &t, CoinPackedVector ∗dx)

Obtain a result of the primal pivot Outputs: colOut – leaving column, outStatus – its status, t – step size, and, if dx!=NULL, ∗dx – primal ray direction.
- virtual int dualPivotResult (int &colIn, int &sign, int colOut, int outStatus, double &t, CoinPackedVector ∗dx)

  Obtain a result of the dual pivot (similar to the previous method) Differences: entering variable and a sign of its change are now the outputs, the leaving variable and its statuts – the inputs If dx!=NULL, then ∗dx contains dual ray Return code: same.

Constructors and destructors

- OsiSolverInterface ()

  Default Constructor.
- virtual OsiSolverInterface ∗ clone (bool copyData=true) const =0

  Clone.
- OsiSolverInterface (const OsiSolverInterface &)

  Copy constructor.
- OsiSolverInterface & operator= (const OsiSolverInterface &rhs)

  Assignment operator.
- virtual ∼OsiSolverInterface ()

  Destructor.
- virtual void reset ()

  Reset the solver interface.

Protected Member Functions

Protected methods

- virtual void applyRowCut (const OsiRowCut &rc)=0

  Apply a row cut (append to the constraint matrix).
- virtual void applyColCut (const OsiColCut &cc)=0

  Apply a column cut (adjust the bounds of one or more variables).
- void convertBoundToSense (const double lower, const double upper, char &sense, double &right, double &range) const

  A quick inlined function to convert from the lb/ub style of constraint definition to the sense/rhs/range style.
- void convertSenseToBound (const char sense, const double right, const double range, double &lower, double &upper) const

  A quick inlined function to convert from the sense/rhs/range style of constraint definition to the lb/ub style.
- template<class T >
  T forceIntoRange (const T value, const T lower, const T upper) const

  A quick inlined function to force a value to be between a minimum and a maximum value.
- void setInitialData ()

  Set OsiSolverInterface object state for default constructor.

Protected Attributes

Protected member data

- OsiRowCutDebugger ∗ rowCutDebugger_

  Pointer to row cut debugger object.
- CoinMessageHandler ∗ handler_

  Message handler.
- bool defaultHandler_

  Flag to say if the currrent handler is the default handler.
- CoinMessages messages_

  Messages.

- int numberIntegers_

  Number of integers.
- int numberObjects_

  Total number of objects.
- OsiObject ∗∗ object_

  Integer and ... information (integer info normally at beginning)
- char ∗ columnType_

  Column type 0 - continuous 1 - binary (may get fixed later) 2 - general integer (may get fixed later)

Private Attributes

Private member data

- OsiAuxInfo ∗ appDataEtc_

  Pointer to user-defined data structure - and more if user wants.
- int intParam_ [OsiLastIntParam]

  Array of integer parameters.
- double dblParam_ [OsiLastDblParam]

  Array of double parameters.
- std::string strParam_ [OsiLastStrParam]

  Array of string parameters.
- bool hintParam_ [OsiLastHintParam]

  Array of hint parameters.
- OsiHintStrength hintStrength_ [OsiLastHintParam]

  Array of hint strengths.
- CoinWarmStart ∗ ws_

  Warm start information used for hot starts when the default hot start implementation is used.
- std::vector< double > strictColSolution_

  Column solution satisfying lower and upper column bounds.
- OsiNameVec rowNames_

  Row names.
- OsiNameVec colNames_

  Column names.
- std::string objName_

  Objective name.

Friends

- void OsiSolverInterfaceCommonUnitTest (const OsiSolverInterface ∗emptySi, const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiSolverInterface class.
- void OsiSolverInterfaceMpsUnitTest (const std::vector< OsiSolverInterface ∗ > &vecSiP, const std::string &mps-Dir)

  A function that tests that a lot of problems given in MPS files (mostly the NETLIB problems) solve properly with all the specified solvers.

8.32.1 Detailed Description

Abstract Base Class for describing an interface to a solver.

Many OsiSolverInterface query methods return a const pointer to the requested read-only data. If the model data is changed or the solver is called, these pointers may no longer be valid and should be refreshed by invoking the member function to obtain an updated copy of the pointer. For example:

```
OsiSolverInterface solverInterfacePtr ;
const double * ruBnds = solverInterfacePtr->getRowUpper();
solverInterfacePtr->applyCuts(someSetOfCuts);
// ruBnds is no longer a valid pointer and must be refreshed
ruBnds = solverInterfacePtr->getRowUpper();
```

Querying a problem that has no data associated with it will result in zeros for the number of rows and columns, and NULL pointers from the methods that return vectors.

Definition at line 62 of file OsiSolverInterface.hpp.

8.32.2 Member Typedef Documentation

8.32.2.1 typedef std::vector<std::string> OsiSolverInterface::OsiNameVec

Data type for name vectors.

Definition at line 888 of file OsiSolverInterface.hpp.

8.32.3 Constructor & Destructor Documentation

8.32.3.1 OsiSolverInterface::OsiSolverInterface ( )

Default Constructor.

8.32.3.2 OsiSolverInterface::OsiSolverInterface (const OsiSolverInterface &)

Copy constructor.

8.32.3.3 virtual OsiSolverInterface::~OsiSolverInterface ( ) [virtual]

Destructor.

8.32.4 Member Function Documentation

8.32.4.1 virtual void OsiSolverInterface::initialSolve ( ) [pure virtual]

Solve initial LP relaxation.

Implemented in OsiGlpkSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiGrbSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.2 virtual void OsiSolverInterface::resolve ( ) [pure virtual]

Resolve an LP relaxation after problem modification.

Note the 're-' in 'resolve'. initialSolve() should be used to solve the problem for the first time.

Implemented in OsiGlpkSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiGrbSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.3 virtual void OsiSolverInterface::branchAndBound ( ) [pure virtual]

Invoke solver's built-in enumeration algorithm.

Implemented in OsiGlpkSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiGrbSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.4 virtual bool OsiSolverInterface::setIntParam (**OsiIntParam** *key,* int *value*) `[inline]`, `[virtual]`

Set an integer parameter.

Reimplemented in OsiGlpkSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiGrbSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

Definition at line 266 of file OsiSolverInterface.hpp.

8.32.4.5 virtual bool OsiSolverInterface::setDblParam (**OsiDblParam** *key,* double *value*) `[inline]`, `[virtual]`

Set a double parameter.

Reimplemented in OsiGlpkSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiGrbSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

Definition at line 272 of file OsiSolverInterface.hpp.

8.32.4.6 virtual bool OsiSolverInterface::setStrParam (**OsiStrParam** *key,* const std::string & *value*) `[inline]`, `[virtual]`

Set a string parameter.

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiGrbSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

Definition at line 278 of file OsiSolverInterface.hpp.

8.32.4.7 virtual bool OsiSolverInterface::setHintParam (**OsiHintParam** *key,* bool *yesNo* = `true`, **OsiHintStrength** *strength* = **OsiHintTry**, void * = `NULL`) `[inline]`, `[virtual]`

Set a hint parameter.

The `otherInformation` parameter can be used to pass in an arbitrary block of information which is interpreted by the OSI and the underlying solver. Users are cautioned that this hook is solver-specific.

Implementors: The default implementation completely ignores `otherInformation` and always throws an exception for OsiForceDo. This is almost certainly not the behaviour you want; you really should override this method.

Reimplemented in OsiGlpkSolverInterface, and OsiGrbSolverInterface.

Definition at line 294 of file OsiSolverInterface.hpp.

8.32.4.8 virtual bool OsiSolverInterface::getIntParam (**OsiIntParam** *key,* int & *value*) const `[inline]`, `[virtual]`

Get an integer parameter.

Reimplemented in OsiGlpkSolverInterface, OsiGrbSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

Definition at line 307 of file OsiSolverInterface.hpp.

8.32.4.9 virtual bool OsiSolverInterface::getDblParam (**OsiDblParam** *key,* double & *value*) const `[inline]`, `[virtual]`

Get a double parameter.

Reimplemented in OsiGlpkSolverInterface, OsiGrbSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

Definition at line 313 of file OsiSolverInterface.hpp.

8.32.4.10 virtual bool OsiSolverInterface::getStrParam (OsiStrParam *key*, std::string & *value*) const [inline], [virtual]

Get a string parameter.

Reimplemented in OsiGlpkSolverInterface, OsiGrbSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

Definition at line 319 of file OsiSolverInterface.hpp.

8.32.4.11 virtual bool OsiSolverInterface::getHintParam (OsiHintParam *key*, bool & *yesNo*, OsiHintStrength & *strength*, void ∗& *otherInformation*) const [inline], [virtual]

Get a hint parameter (all information)

Return all available information for the hint: sense, strength, and any extra information associated with the hint.

Implementors: The default implementation will always set `otherInformation` to NULL. This is almost certainly not the behaviour you want; you really should override this method.

Reimplemented in OsiGrbSolverInterface.

Definition at line 333 of file OsiSolverInterface.hpp.

8.32.4.12 virtual bool OsiSolverInterface::getHintParam (OsiHintParam *key*, bool & *yesNo*, OsiHintStrength & *strength*) const [inline], [virtual]

Get a hint parameter (sense and strength only)

Return only the sense and strength of the hint.

Reimplemented in OsiGrbSolverInterface.

Definition at line 347 of file OsiSolverInterface.hpp.

8.32.4.13 virtual bool OsiSolverInterface::getHintParam (OsiHintParam *key*, bool & *yesNo*) const [inline], [virtual]

Get a hint parameter (sense only)

Return only the sense (true/false) of the hint.

Reimplemented in OsiGrbSolverInterface.

Definition at line 359 of file OsiSolverInterface.hpp.

8.32.4.14 void OsiSolverInterface::copyParameters (OsiSolverInterface & *rhs*)

Copy all parameters in this section from one solver to another.

Note that the current implementation also copies the appData block, message handler, and rowCutDebugger. Arguably these should have independent copy methods.

8.32.4.15 double OsiSolverInterface::getIntegerTolerance ( ) const [inline]

Return the integrality tolerance of the underlying solver.

We should be able to get an integrality tolerance, but until that time just use the primal tolerance

Todo This method should be replaced; it's architecturally wrong. This should be an honest dblParam with a keyword. Underlying solvers that do not support integer variables should return false for set and get on this parameter. Underlying solvers that support integrality should add this to the parameters they support, using whatever tolerance is appropriate. -lh, 091021-

Definition at line 386 of file OsiSolverInterface.hpp.

8.32.4.16 virtual bool OsiSolverInterface::isAbandoned ( ) const [pure virtual]

Are there numerical difficulties?

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.17 virtual bool OsiSolverInterface::isProvenOptimal ( ) const [pure virtual]

Is optimality proven?

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.18 virtual bool OsiSolverInterface::isProvenPrimalInfeasible ( ) const [pure virtual]

Is primal infeasibility proven?

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.19 virtual bool OsiSolverInterface::isProvenDualInfeasible ( ) const [pure virtual]

Is dual infeasibility proven?

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiSpxSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.20 virtual bool OsiSolverInterface::isPrimalObjectiveLimitReached ( ) const [virtual]

Is the given primal objective limit reached?

Reimplemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.21 virtual bool OsiSolverInterface::isDualObjectiveLimitReached ( ) const [virtual]

Is the given dual objective limit reached?

Reimplemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.22 virtual bool OsiSolverInterface::isIterationLimitReached ( ) const [pure virtual]

Iteration limit reached?

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.23 virtual CoinWarmStart∗ OsiSolverInterface::getEmptyWarmStart ( ) const [pure virtual]

Get an empty warm start object.

This routine returns an empty warm start object. Its purpose is to provide a way for a client to acquire a warm start object of the appropriate type for the solver, which can then be resized and modified as desired.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.24 virtual CoinWarmStart∗ OsiSolverInterface::getWarmStart ( ) const [pure virtual]

Get warm start information.

Return warm start information for the current state of the solver interface. If there is no valid warm start information, an empty warm start object wil be returned.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.25 virtual CoinWarmStart∗ OsiSolverInterface::getPointerToWarmStart (bool & *mustDelete*) [virtual]

Get warm start information.

Return warm start information for the current state of the solver interface. If there is no valid warm start information, an empty warm start object wil be returned. This does not necessarily create an object - may just point to one. must Delete set true if user should delete returned object.

8.32.4.26 virtual bool OsiSolverInterface::setWarmStart (const CoinWarmStart ∗ *warmstart*) [pure virtual]

Set warm start information.

Return true or false depending on whether the warm start information was accepted or not. By definition, a call to setWarmStart with a null parameter should cause the solver interface to refresh its warm start information from the underlying solver.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.27 virtual void OsiSolverInterface::markHotStart ( ) [virtual]

Create a hot start snapshot of the optimization process.

Reimplemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.28 virtual void OsiSolverInterface::solveFromHotStart ( ) [virtual]

Optimize starting from the hot start snapshot.

Reimplemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.29 virtual void OsiSolverInterface::unmarkHotStart ( ) [virtual]

Delete the hot start snapshot.

Reimplemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.30 virtual int OsiSolverInterface::getNumCols ( ) const [pure virtual]

Get the number of columns.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.31 virtual int OsiSolverInterface::getNumRows ( ) const [pure virtual]

Get the number of rows.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.32 virtual int OsiSolverInterface::getNumElements ( ) const [pure virtual]

Get the number of nonzero elements.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.33 virtual int OsiSolverInterface::getNumIntegers ( ) const [virtual]

Get the number of integer variables.

8.32.4.34 virtual const double∗ OsiSolverInterface::getColLower ( ) const [pure virtual]

Get a pointer to an array[getNumCols()] of column lower bounds.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.35 virtual const double∗ OsiSolverInterface::getColUpper ( ) const [pure virtual]

Get a pointer to an array[getNumCols()] of column upper bounds.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.36 virtual const char∗ OsiSolverInterface::getRowSense ( ) const [pure virtual]

Get a pointer to an array[getNumRows()] of row constraint senses.

- ’L’: <= constraint
- ’E’: = constraint
- ’G’: >= constraint
- ’R’: ranged constraint
- ’N’: free constraint

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.37 virtual const double∗ OsiSolverInterface::getRightHandSide ( ) const [pure virtual]

Get a pointer to an array[getNumRows()] of row right-hand sides.

- if getRowSense()[i] == ’L’ then getRightHandSide()[i] == getRowUpper()[i]
- if getRowSense()[i] == ’G’ then getRightHandSide()[i] == getRowLower()[i]
- if getRowSense()[i] == ’R’ then getRightHandSide()[i] == getRowUpper()[i]
- if getRowSense()[i] == ’N’ then getRightHandSide()[i] == 0.0

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.38 virtual const double∗ OsiSolverInterface::getRowRange ( ) const [pure virtual]

Get a pointer to an array[getNumRows()] of row ranges.

- if getRowSense()[i] == 'R' then getRowRange()[i] == getRowUpper()[i] - getRowLower()[i]
- if getRowSense()[i] != 'R' then getRowRange()[i] is 0.0

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.39 virtual const double∗ OsiSolverInterface::getRowLower ( ) const [pure virtual]

Get a pointer to an array[getNumRows()] of row lower bounds.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.40 virtual const double∗ OsiSolverInterface::getRowUpper ( ) const [pure virtual]

Get a pointer to an array[getNumRows()] of row upper bounds.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.41 virtual const double∗ OsiSolverInterface::getObjCoefficients ( ) const [pure virtual]

Get a pointer to an array[getNumCols()] of objective function coefficients.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.42 virtual double OsiSolverInterface::getObjSense ( ) const [pure virtual]

Get the objective function sense.

- 1 for minimisation (default)
- -1 for maximisation

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.43 virtual bool OsiSolverInterface::isContinuous (int *colIndex*) const [pure virtual]

Return true if the variable is continuous.

Implemented in OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.44 virtual bool OsiSolverInterface::isBinary (int *colIndex*) const [virtual]

Return true if the variable is binary.

8.32.4.45 virtual bool OsiSolverInterface::isInteger (int *colIndex*) const [virtual]

Return true if the variable is integer.

This method returns true if the variable is binary or general integer.

8.32.4.46 virtual bool OsiSolverInterface::isIntegerNonBinary (int *colIndex*) const [virtual]

Return true if the variable is general integer.

8.32.4.47 virtual bool OsiSolverInterface::isFreeBinary (int *colIndex*) const [virtual]

Return true if the variable is binary and not fixed.

8.32.4.48 const char∗ OsiSolverInterface::columnType (bool *refresh* = false) const [inline]

Return an array[getNumCols()] of column types.

Deprecated See getColType

Definition at line 593 of file OsiSolverInterface.hpp.

8.32.4.49 virtual const char∗ OsiSolverInterface::getColType (bool *refresh* = false) const [virtual]

Return an array[getNumCols()] of column types.

- 0 - continuous
- 1 - binary
- 2 - general integer

If `refresh` is true, the classification of integer variables as binary or general integer will be reevaluated. If the current bounds are [0,1], or if the variable is fixed at 0 or 1, it will be classified as binary, otherwise it will be classified as general integer.

8.32.4.50 virtual const CoinPackedMatrix∗ OsiSolverInterface::getMatrixByRow ( ) const [pure virtual]

Get a pointer to a row-wise copy of the matrix.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.51 virtual const CoinPackedMatrix∗ OsiSolverInterface::getMatrixByCol ( ) const [pure virtual]

Get a pointer to a column-wise copy of the matrix.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.52 virtual CoinPackedMatrix∗ OsiSolverInterface::getMutableMatrixByRow ( ) const [inline], [virtual]

Get a pointer to a mutable row-wise copy of the matrix.

Returns NULL if the request is not meaningful (i.e., the OSI will not recognise any modifications to the matrix).

Definition at line 620 of file OsiSolverInterface.hpp.

8.32.4.53 virtual CoinPackedMatrix∗ OsiSolverInterface::getMutableMatrixByCol ( ) const [inline], [virtual]

Get a pointer to a mutable column-wise copy of the matrix.

Returns NULL if the request is not meaningful (i.e., the OSI will not recognise any modifications to the matrix).

Definition at line 627 of file OsiSolverInterface.hpp.

8.32.4.54 virtual double OsiSolverInterface::getInfinity ( ) const [pure virtual]

Get the solver's value for infinity.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.55 virtual const double∗ OsiSolverInterface::getColSolution ( ) const [pure virtual]

Get a pointer to an array[getNumCols()] of primal variable values.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.56 virtual const double∗ OsiSolverInterface::getStrictColSolution ( ) [virtual]

Get a pointer to an array[getNumCols()] of primal variable values guaranteed to be between the column lower and upper bounds.

8.32.4.57 virtual const double∗ OsiSolverInterface::getRowPrice ( ) const [pure virtual]

Get pointer to array[getNumRows()] of dual variable values.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.58 virtual const double∗ OsiSolverInterface::getReducedCost ( ) const [pure virtual]

Get a pointer to an array[getNumCols()] of reduced costs.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.59 virtual const double∗ OsiSolverInterface::getRowActivity ( ) const [pure virtual]

Get a pointer to array[getNumRows()] of row activity levels.

The row activity for a row is the left-hand side evaluated at the current solution.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.60 virtual double OsiSolverInterface::getObjValue ( ) const [pure virtual]

Get the objective function value.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.61 virtual int OsiSolverInterface::getIterationCount ( ) const [pure virtual]

Get the number of iterations it took to solve the problem (whatever 'iteration' means to the solver).

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.62 virtual std::vector<double∗> OsiSolverInterface::getDualRays (int *maxNumRays*, bool *fullRay* = false) const [pure virtual]

Get as many dual rays as the solver can provide.

In case of proven primal infeasibility there should (with high probability) be at least one.

The first getNumRows() ray components will always be associated with the row duals (as returned by getRowPrice()). If `fullRay` is true, the final getNumCols() entries will correspond to the ray components associated with the nonbasic variables. If the full ray is requested and the method cannot provide it, it will throw an exception.

Note

Implementors of solver interfaces note that the double pointers in the vector should point to arrays of length getNumRows() (fullRay = false) or (getNumRows()+getNumCols()) (fullRay = true) and they should be allocated with new[].
Clients of solver interfaces note that it is the client's responsibility to free the double pointers in the vector using delete[]. Clients are reminded that a problem can be dual and primal infeasible.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.63 virtual std::vector<double∗> OsiSolverInterface::getPrimalRays (int *maxNumRays*) const `[pure virtual]`

Get as many primal rays as the solver can provide.

In case of proven dual infeasibility there should (with high probability) be at least one.

Note

Implementors of solver interfaces note that the double pointers in the vector should point to arrays of length getNumCols() and they should be allocated with new[].
Clients of solver interfaces note that it is the client's responsibility to free the double pointers in the vector using delete[]. Clients are reminded that a problem can be dual and primal infeasible.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.64 virtual OsiVectorInt OsiSolverInterface::getFractionalIndices (const double *etol* = `1.e-05`) const `[virtual]`

Get vector of indices of primal variables which are integer variables but have fractional values in the current solution.

8.32.4.65 virtual void OsiSolverInterface::setObjCoeff (int *elementIndex*, double *elementValue*) `[pure virtual]`

Set an objective function coefficient.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.66 virtual void OsiSolverInterface::setObjCoeffSet (const int ∗ *indexFirst*, const int ∗ *indexLast*, const double ∗ *coeffList*) `[virtual]`

Set a set of objective function coefficients.

Reimplemented in OsiCpxSolverInterface, OsiMskSolverInterface, and OsiGrbSolverInterface.

8.32.4.67 virtual void OsiSolverInterface::setObjective (const double ∗ *array*) `[virtual]`

Set the objective coefficients for all columns.

array [getNumCols()] is an array of values for the objective. This defaults to a series of set operations and is here for speed.

8.32.4.68 virtual void OsiSolverInterface::setObjSense (double *s*) [pure virtual]

Set the objective function sense.

Use 1 for minimisation (default), -1 for maximisation.

Note

> Implementors note that objective function sense is a parameter of the OSI, not a property of the problem. Objective sense can be set prior to problem load and should not be affected by loading a new problem.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.69 virtual void OsiSolverInterface::setColLower (int *elementIndex,* double *elementValue*) [pure virtual]

Set a single column lower bound.

Use -getInfinity() for -infinity.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiSpxSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.70 virtual void OsiSolverInterface::setColLower (const double ∗ *array*) [virtual]

Set the lower bounds for all columns.

array [getNumCols()] is an array of values for the lower bounds. This defaults to a series of set operations and is here for speed.

8.32.4.71 virtual void OsiSolverInterface::setColUpper (int *elementIndex,* double *elementValue*) [pure virtual]

Set a single column upper bound.

Use getInfinity() for infinity.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiSpxSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.72 virtual void OsiSolverInterface::setColUpper (const double ∗ *array*) [virtual]

Set the upper bounds for all columns.

array [getNumCols()] is an array of values for the upper bounds. This defaults to a series of set operations and is here for speed.

8.32.4.73 virtual void OsiSolverInterface::setColBounds (int *elementIndex,* double *lower,* double *upper*) [inline], [virtual]

Set a single column lower and upper bound.

The default implementation just invokes setColLower() and setColUpper()

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiSpxSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

Definition at line 778 of file OsiSolverInterface.hpp.

8.32.4.74 virtual void OsiSolverInterface::setColSetBounds (const int ∗ *indexFirst,* const int ∗ *indexLast,* const double ∗ *boundList*) [virtual]

Set the upper and lower bounds of a set of columns.

The default implementation just invokes setColBounds() over and over again. For each column, boundList must contain both a lower and upper bound, in that order.

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.75 virtual void OsiSolverInterface::setRowLower (int *elementIndex,* double *elementValue*) [pure virtual]

Set a single row lower bound.

Use -getInfinity() for -infinity.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiSpxSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.76 virtual void OsiSolverInterface::setRowUpper (int *elementIndex,* double *elementValue*) [pure virtual]

Set a single row upper bound.

Use getInfinity() for infinity.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiSpxSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.77 virtual void OsiSolverInterface::setRowBounds (int *elementIndex,* double *lower,* double *upper*) [inline], [virtual]

Set a single row lower and upper bound.

The default implementation just invokes setRowLower() and setRowUpper()

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiSpxSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

Definition at line 805 of file OsiSolverInterface.hpp.

8.32.4.78 virtual void OsiSolverInterface::setRowSetBounds (const int ∗ *indexFirst,* const int ∗ *indexLast,* const double ∗ *boundList*) [virtual]

Set the bounds on a set of rows.

The default implementation just invokes setRowBounds() over and over again. For each row, boundList must contain both a lower and upper bound, in that order.

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.79 virtual void OsiSolverInterface::setRowType (int *index,* char *sense,* double *rightHandSide,* double *range*) [pure virtual]

Set the type of a single row.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiSpxSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.80 virtual void OsiSolverInterface::setRowSetTypes (const int ∗ *indexFirst,* const int ∗ *indexLast,* const char ∗ *senseList,* const double ∗ *rhsList,* const double ∗ *rangeList*) [virtual]

Set the type of a set of rows.

The default implementation just invokes setRowType() over and over again.

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.81 virtual void OsiSolverInterface::setColSolution (const double ∗ *colsol*) `[pure virtual]`

Set the primal solution variable values.

colsol[getNumCols()] is an array of values for the primal variables. These values are copied to memory owned by the solver interface object or the solver. They will be returned as the result of getColSolution() until changed by another call to setColSolution() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.82 virtual void OsiSolverInterface::setRowPrice (const double ∗ *rowprice*) `[pure virtual]`

Set dual solution variable values.

rowprice[getNumRows()] is an array of values for the dual variables. These values are copied to memory owned by the solver interface object or the solver. They will be returned as the result of getRowPrice() until changed by another call to setRowPrice() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.83 virtual int OsiSolverInterface::reducedCostFix (double *gap*, bool *justInteger* = `true`) `[virtual]`

Fix variables at bound based on reduced cost.

For variables currently at bound, fix the variable at bound if the reduced cost exceeds the gap. Return the number of variables fixed.

If justInteger is set to false, the routine will also fix continuous variables, but the test still assumes a delta of 1.0.

8.32.4.84 virtual void OsiSolverInterface::setContinuous (int *index*) `[pure virtual]`

Set the index-th variable to be a continuous variable.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.85 virtual void OsiSolverInterface::setInteger (int *index*) `[pure virtual]`

Set the index-th variable to be an integer variable.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.86 virtual void OsiSolverInterface::setContinuous (const int ∗ *indices*, int *len*) `[virtual]`

Set the variables listed in indices (which is of length len) to be continuous variables.

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.87 virtual void OsiSolverInterface::setInteger (const int ∗ *indices*, int *len*) `[virtual]`

Set the variables listed in indices (which is of length len) to be integer variables.

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.88 virtual std::string OsiSolverInterface::dfltRowColName (char *rc*, int *ndx*, unsigned *digits* = `7`) const `[virtual]`

Generate a standard name of the form Rnnnnnnn or Cnnnnnnn.

Set `rc` to 'r' for a row name, 'c' for a column name. The 'nnnnnnn' part is generated from ndx and will contain 7 digits by default, padded with zeros if necessary. As a special case, ndx = getNumRows() is interpreted as a request for the name of the objective function. OBJECTIVE is returned, truncated to digits+1 characters to match the row and column names.

8.32.4.89 virtual std::string OsiSolverInterface::getObjName (unsigned *maxLen* = `static_cast< unsigned >(std::string::npos)`) const `[virtual]`

Return the name of the objective function.

8.32.4.90 virtual void OsiSolverInterface::setObjName (std::string *name*) `[inline]`, `[virtual]`

Set the name of the objective function.

Reimplemented in OsiGlpkSolverInterface.

Definition at line 929 of file OsiSolverInterface.hpp.

8.32.4.91 virtual std::string OsiSolverInterface::getRowName (int *rowIndex*, unsigned *maxLen* = `static_cast< unsigned >(std::string::npos)`) const `[virtual]`

Return the name of the row.

The routine will *always* return some name, regardless of the name discipline or the level of support by an OsiXXX derived class. Use maxLen to limit the length.

8.32.4.92 virtual const OsiNameVec& OsiSolverInterface::getRowNames ( ) `[virtual]`

Return a pointer to a vector of row names.

If the name discipline (OsiNameDiscipline) is auto, the return value will be a vector of length zero. If the name discipline is lazy, the vector will contain only names supplied by the client and will be no larger than needed to hold those names; entries not supplied will be null strings. In particular, the objective name is *not* included in the vector for lazy names. If the name discipline is full, the vector will have getNumRows() names, either supplied or generated, plus one additional entry for the objective name.

8.32.4.93 virtual void OsiSolverInterface::setRowName (int *ndx*, std::string *name*) `[virtual]`

Set a row name.

Quietly does nothing if the name discipline (OsiNameDiscipline) is auto. Quietly fails if the row index is invalid.

Reimplemented in OsiGlpkSolverInterface, and OsiGrbSolverInterface.

8.32.4.94 virtual void OsiSolverInterface::setRowNames (OsiNameVec & *srcNames*, int *srcStart*, int *len*, int *tgtStart*) `[virtual]`

Set multiple row names.

The run of len entries starting at srcNames[srcStart] are installed as row names starting at row index tgtStart. The base class implementation makes repeated calls to setRowName.

8.32.4.95 virtual void OsiSolverInterface::deleteRowNames (int *tgtStart,* int *len*) [virtual]

Delete len row names starting at index tgtStart.

The specified row names are removed and the remaining row names are copied down to close the gap.

8.32.4.96 virtual std::string OsiSolverInterface::getColName (int *colIndex,* unsigned *maxLen* = static_cast< unsigned >(std::string::npos)) const [virtual]

Return the name of the column.

The routine will *always* return some name, regardless of the name discipline or the level of support by an OsiXXX derived class. Use maxLen to limit the length.

8.32.4.97 virtual const OsiNameVec& OsiSolverInterface::getColNames ( ) [virtual]

Return a pointer to a vector of column names.

If the name discipline (OsiNameDiscipline) is auto, the return value will be a vector of length zero. If the name discipline is lazy, the vector will contain only names supplied by the client and will be no larger than needed to hold those names; entries not supplied will be null strings. If the name discipline is full, the vector will have getNumCols() names, either supplied or generated.

8.32.4.98 virtual void OsiSolverInterface::setColName (int *ndx,* std::string *name*) [virtual]

Set a column name.

Quietly does nothing if the name discipline (OsiNameDiscipline) is auto. Quietly fails if the column index is invalid.

Reimplemented in OsiGlpkSolverInterface, and OsiGrbSolverInterface.

8.32.4.99 virtual void OsiSolverInterface::setColNames (OsiNameVec & *srcNames,* int *srcStart,* int *len,* int *tgtStart*) [virtual]

Set multiple column names.

The run of len entries starting at srcNames[srcStart] are installed as column names starting at column index tgtStart. The base class implementation makes repeated calls to setColName.

8.32.4.100 virtual void OsiSolverInterface::deleteColNames (int *tgtStart,* int *len*) [virtual]

Delete len column names starting at index tgtStart.

The specified column names are removed and the remaining column names are copied down to close the gap.

8.32.4.101 void OsiSolverInterface::setRowColNames (const CoinMpsIO & *mps*)

Set row and column names from a CoinMpsIO object.

Also sets the name of the objective function. If the name discipline is auto, you get what you asked for. This routine does not use setRowName or setColName.

8.32.4.102 void OsiSolverInterface::setRowColNames (CoinModel & *mod*)

Set row and column names from a CoinModel object.

If the name discipline is auto, you get what you asked for. This routine does not use setRowName or setColName.

8.32.4.103 void OsiSolverInterface::setRowColNames (CoinLpIO & *mod*)

Set row and column names from a CoinLpIO object.

Also sets the name of the objective function. If the name discipline is auto, you get what you asked for. This routine does not use setRowName or setColName.

8.32.4.104 virtual void OsiSolverInterface::addCol (const CoinPackedVectorBase & *vec,* const double *collb,* const double *colub,* const double *obj*) [pure virtual]

Add a column (primal variable) to the problem.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.105 virtual void OsiSolverInterface::addCol (const CoinPackedVectorBase & *vec,* const double *collb,* const double *colub,* const double *obj,* std::string *name*) [virtual]

Add a named column (primal variable) to the problem.

The default implementation adds the column, then changes the name. This can surely be made more efficient within an OsiXXX class.

8.32.4.106 virtual void OsiSolverInterface::addCol (int *numberElements,* const int ∗ *rows,* const double ∗ *elements,* const double *collb,* const double *colub,* const double *obj*) [virtual]

Add a column (primal variable) to the problem.

8.32.4.107 virtual void OsiSolverInterface::addCol (int *numberElements,* const int ∗ *rows,* const double ∗ *elements,* const double *collb,* const double *colub,* const double *obj,* std::string *name*) [virtual]

Add a named column (primal variable) to the problem.

The default implementation adds the column, then changes the name. This can surely be made more efficient within an OsiXXX class.

8.32.4.108 virtual void OsiSolverInterface::addCols (const int *numcols,* const CoinPackedVectorBase ∗const ∗ *cols,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj*) [virtual]

Add a set of columns (primal variables) to the problem.

The default implementation simply makes repeated calls to addCol().

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.109 virtual void OsiSolverInterface::addCols (const int *numcols,* const int ∗ *columnStarts,* const int ∗ *rows,* const double ∗ *elements,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj*) [virtual]

Add a set of columns (primal variables) to the problem.

The default implementation simply makes repeated calls to addCol().

8.32.4.110 void OsiSolverInterface::addCols (const CoinBuild & *buildObject*)

Add columns using a CoinBuild object.

8.32.4.111 int OsiSolverInterface::addCols (CoinModel & *modelObject*)

Add columns from a model object.

returns -1 if object in bad state (i.e. has row information) otherwise number of errors modelObject non const as can be regularized as part of build

8.32.4.112 virtual void OsiSolverInterface::deleteCols (const int *num*, const int ∗ *colIndices*) [pure virtual]

Remove a set of columns (primal variables) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted variables are nonbasic.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.113 virtual void OsiSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const double *rowlb*, const double *rowub*) [pure virtual]

Add a row (constraint) to the problem.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.114 virtual void OsiSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const double *rowlb*, const double *rowub*, std::string *name*) [virtual]

Add a named row (constraint) to the problem.

The default implementation adds the row, then changes the name. This can surely be made more efficient within an OsiXXX class.

8.32.4.115 virtual void OsiSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const char *rowsen*, const double *rowrhs*, const double *rowrng*) [pure virtual]

Add a row (constraint) to the problem.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.116 virtual void OsiSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const char *rowsen*, const double *rowrhs*, const double *rowrng*, std::string *name*) [virtual]

Add a named row (constraint) to the problem.

The default implementation adds the row, then changes the name. This can surely be made more efficient within an OsiXXX class.

8.32.4.117 virtual void OsiSolverInterface::addRow (int *numberElements*, const int ∗ *columns*, const double ∗ *element*, const double *rowlb*, const double *rowub*) [virtual]

Add a row (constraint) to the problem.

Converts to addRow(CoinPackedVectorBase&,const double,const double).

8.32.4.118 virtual void OsiSolverInterface::addRows (const int *numrows*, const CoinPackedVectorBase ∗const ∗ *rows*, const double ∗ *rowlb*, const double ∗ *rowub*) [virtual]

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.119 virtual void OsiSolverInterface::addRows (const int *numrows*, const CoinPackedVectorBase ∗const ∗ *rows*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) [virtual]

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.120 virtual void OsiSolverInterface::addRows (const int *numrows*, const int ∗ *rowStarts*, const int ∗ *columns*, const double ∗ *element*, const double ∗ *rowlb*, const double ∗ *rowub*) [virtual]

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

8.32.4.121 void OsiSolverInterface::addRows (const CoinBuild & *buildObject*)

Add rows using a CoinBuild object.

8.32.4.122 int OsiSolverInterface::addRows (CoinModel & *modelObject*)

Add rows from a CoinModel object.

Returns -1 if the object is in the wrong state (*i.e.*, has column-major information), otherwise the number of errors.

The modelObject is not const as it can be regularized as part of the build.

8.32.4.123 virtual void OsiSolverInterface::deleteRows (const int *num*, const int ∗ *rowIndices*) [pure virtual]

Delete a set of rows (constraints) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted rows are loose.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiGrbSolverInterface, and OsiXprSolverInterface.

8.32.4.124 virtual void OsiSolverInterface::replaceMatrixOptional (const CoinPackedMatrix &) [inline], [virtual]

Replace the constraint matrix.

I (JJF) am getting annoyed because I can't just replace a matrix. The default behavior of this is do nothing so only use where that would not matter, e.g. strengthening a matrix for MIP.

Definition at line 1228 of file OsiSolverInterface.hpp.

8.32.4.125 virtual void OsiSolverInterface::replaceMatrix (const CoinPackedMatrix &) [inline], [virtual]

Replace the constraint matrix.

And if it does matter (not used at present)

Definition at line 1234 of file OsiSolverInterface.hpp.

8.32.4.126 virtual void OsiSolverInterface::saveBaseModel ( ) [inline], [virtual]

Save a copy of the base model.

If solver wants it can save a copy of "base" (continuous) model here.

Definition at line 1240 of file OsiSolverInterface.hpp.

8.32.4.127 virtual void OsiSolverInterface::restoreBaseModel (int *numberRows*) `[virtual]`

Reduce the constraint system to the specified number of constraints.

If solver wants it can restore a copy of "base" (continuous) model here.

Note

The name is somewhat misleading. Implementors should consider the opportunity to optimise behaviour in the common case where `numberRows` is exactly the number of original constraints. Do not, however, neglect the possibility that `numberRows` does not equal the number of original constraints.

8.32.4.128 virtual ApplyCutsReturnCode OsiSolverInterface::applyCuts (const OsiCuts & *cs*, double *effectivenessLb* = `0.0`) `[virtual]`

Apply a collection of cuts.

Only cuts which have an `effectiveness >= effectivenessLb` are applied.

- ReturnCode.getNumineffective() – number of cuts which were not applied because they had an `effectiveness < effectivenessLb`
- ReturnCode.getNuminconsistent() – number of invalid cuts
- ReturnCode.getNuminconsistentWrtIntegerModel() – number of cuts that are invalid with respect to this integer model
- ReturnCode.getNuminfeasible() – number of cuts that would make this integer model infeasible
- ReturnCode.getNumApplied() – number of integer cuts which were applied to the integer model
- cs.size() == getNumineffective() + getNuminconsistent() + getNuminconsistentWrtIntegerModel() + getNuminfeasible() + getNumApplied()

Reimplemented in OsiGrbSolverInterface.

8.32.4.129 virtual void OsiSolverInterface::applyRowCuts (int *numberCuts*, const OsiRowCut ∗ *cuts*) `[virtual]`

Apply a collection of row cuts which are all effective.

applyCuts seems to do one at a time which seems inefficient. Would be even more efficient to pass an array of pointers.

8.32.4.130 virtual void OsiSolverInterface::applyRowCuts (int *numberCuts*, const OsiRowCut ∗∗ *cuts*) `[virtual]`

Apply a collection of row cuts which are all effective.

This is passed in as an array of pointers.

8.32.4.131 void OsiSolverInterface::deleteBranchingInfo (int *numberDeleted*, const int ∗ *which*)

Deletes branching information before columns deleted.

8.32.4.132 virtual void OsiSolverInterface::loadProblem (const CoinPackedMatrix & *matrix*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const double ∗ *rowlb*, const double ∗ *rowub*) `[pure virtual]`

Load in a problem by copying the arguments.

The constraints on the rows are given by lower and upper bounds.

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `rowub`: all rows have upper bound infinity
- `rowlb`: all rows have lower bound -infinity
- `obj`: all variables have 0 objective coefficient

Note that the default values for rowub and rowlb produce the constraint -infty <= ax <= infty. This is probably not what you want.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiXprSolverInterface, and OsiGrbSolverInterface.

8.32.4.133 virtual void OsiSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix,* double ∗& *collb,* double ∗& *colub,* double ∗& *obj,* double ∗& *rowlb,* double ∗& *rowub*) `[pure virtual]`

Load in a problem by assuming ownership of the arguments.

```
The constraints on the rows are given by lower and upper bounds.
```

For default argument values see the matching loadProblem method.

Warning

The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiXprSolverInterface, and OsiGrbSolverInterface.

8.32.4.134 virtual void OsiSolverInterface::loadProblem (const CoinPackedMatrix & *matrix,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj,* const char ∗ *rowsen,* const double ∗ *rowrhs,* const double ∗ *rowrng*) `[pure virtual]`

Load in a problem by copying the arguments.

```
The constraints on the rows are given by sense/rhs/range triplets.
```

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `obj`: all variables have 0 objective coefficient
- `rowsen`: all rows are >=
- `rowrhs`: all right hand sides are 0
- `rowrng`: 0 for the ranged rows

Note that the default values for rowsen, rowrhs, and rowrng produce the constraint ax >= 0.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiXprSolverInterface, and OsiGrbSolverInterface.

8.32.4.135 virtual void OsiSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix*, double ∗& *collb*, double ∗& *colub*, double ∗& *obj*, char ∗& *rowsen*, double ∗& *rowrhs*, double ∗& *rowrng*) `[pure virtual]`

Load in a problem by assuming ownership of the arguments.

```
The constraints on the rows are given by sense/rhs/range triplets.
```

For default argument values see the matching loadProblem method.

Warning

The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiXprSolverInterface, and OsiGrbSolverInterface.

8.32.4.136 virtual void OsiSolverInterface::loadProblem (const int *numcols*, const int *numrows*, const CoinBigIndex ∗ *start*, const int ∗ *index*, const double ∗ *value*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const double ∗ *rowlb*, const double ∗ *rowub*) `[pure virtual]`

Load in a problem by copying the arguments.

The constraint matrix is is specified with standard column-major column starts / row indices / coefficients vectors. The constraints on the rows are given by lower and upper bounds.

The matrix vectors must be gap-free. Note that `start` must have `numcols+1` entries so that the length of the last column can be calculated as `start[numcols]-start[numcols-1]`.

See the previous loadProblem method using rowlb and rowub for default argument values.

8.32.4.137 virtual void OsiSolverInterface::loadProblem (const int *numcols*, const int *numrows*, const CoinBigIndex ∗ *start*, const int ∗ *index*, const double ∗ *value*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) `[pure virtual]`

Load in a problem by copying the arguments.

The constraint matrix is is specified with standard column-major column starts / row indices / coefficients vectors. The constraints on the rows are given by sense/rhs/range triplets.

The matrix vectors must be gap-free. Note that `start` must have `numcols+1` entries so that the length of the last column can be calculated as `start[numcols]-start[numcols-1]`.

See the previous loadProblem method using sense/rhs/range for default argument values.

8.32.4.138 virtual int OsiSolverInterface::loadFromCoinModel (CoinModel & *modelObject*, bool *keepSolution* = `false`) `[virtual]`

Load a model from a CoinModel object.

Return the number of errors encountered.

The modelObject parameter cannot be const as it may be changed as part of process. If keepSolution is true will try and keep warmStart.

8.32.4.139 virtual int OsiSolverInterface::readMps (const char ∗ *filename*, const char ∗ *extension* = `"mps"`) `[virtual]`

Read a problem in MPS format from the given filename.

The default implementation uses CoinMpsIO::readMps() to read the MPS file and returns the number of errors encountered.

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiXprSolverInterface, and OsiGrbSolverInterface.

8.32.4.140 virtual int OsiSolverInterface::readMps (const char $*$ *filename*, const char $*$ *extension*, int & *numberSets*, CoinSet $**$& *sets*) `[virtual]`

Read a problem in MPS format from the given full filename.

This uses CoinMpsIO::readMps() to read the MPS file and returns the number of errors encountered. It also may return an array of set information

8.32.4.141 virtual int OsiSolverInterface::readGMPL (const char $*$ *filename*, const char $*$ *dataname* = `NULL`) `[virtual]`

Read a problem in GMPL format from the given filenames.

The default implementation uses CoinMpsIO::readGMPL(). This capability is available only if the third-party package Glpk is installed.

8.32.4.142 virtual void OsiSolverInterface::writeMps (const char $*$ *filename*, const char $*$ *extension* = `"mps"`, double *objSense* = `0.0`) const `[pure virtual]`

Write the problem in MPS format to the specified file.

If objSense is non-zero, a value of -1.0 causes the problem to be written with a maximization objective; +1.0 forces a minimization objective. If objSense is zero, the choice is left to the implementation.

Implemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, OsiSpxSolverInterface, OsiMskSolverInterface, OsiXprSolverInterface, and OsiGrbSolverInterface.

8.32.4.143 int OsiSolverInterface::writeMpsNative (const char $*$ *filename*, const char $**$ *rowNames*, const char $**$ *columnNames*, int *formatType* = `0`, int *numberAcross* = `2`, double *objSense* = `0.0`, int *numberSOS* = `0`, const CoinSet $*$ *setInfo* = `NULL`) const

Write the problem in MPS format to the specified file with more control over the output.

Row and column names may be null. formatType is

- 0 - normal
- 1 - extra accuracy
- 2 - IEEE hex

Returns non-zero on I/O error

8.32.4.144 virtual void OsiSolverInterface::writeLp (const char $*$ *filename*, const char $*$ *extension* = `"lp"`, double *epsilon* = `1e-5`, int *numberAcross* = `10`, int *decimals* = `5`, double *objSense* = `0.0`, bool *useRowNames* = `true`) const `[virtual]`

Write the problem into an Lp file of the given filename with the specified extension.

Coefficients with value less than epsilon away from an integer value are written as integers. Write at most numberAcross monomials on a line. Write non integer numbers with decimals digits after the decimal point.

The written problem is always a minimization problem. If the current problem is a maximization problem, the intended objective function for the written problem is the current objective function multiplied by -1. If the current problem is a minimization problem, the intended objective function for the written problem is the current objective function. If objSense $<$ 0, the intended objective function is multiplied by -1 before writing the problem. It is left unchanged otherwise.

Write objective function name and constraint names if useRowNames is true. This version calls writeLpNative().

8.32.4.145 virtual void OsiSolverInterface::writeLp (FILE * *fp*, double *epsilon* = `1e-5`, int *numberAcross* = `10`, int *decimals* = `5`, double *objSense* = `0.0`, bool *useRowNames* = `true`) const [virtual]

Write the problem into the file pointed to by the parameter fp.

Other parameters are similar to those of writeLp() with first parameter filename.

8.32.4.146 int OsiSolverInterface::writeLpNative (const char * *filename*, char const *const *const *rowNames*, char const *const *const *columnNames*, const double *epsilon* = `1.0e-5`, const int *numberAcross* = `10`, const int *decimals* = `5`, const double *objSense* = `0.0`, const bool *useRowNames* = `true`) const

Write the problem into an Lp file.

Parameters are similar to those of writeLp(), but in addition row names and column names may be given.

Parameter rowNames may be NULL, in which case default row names are used. If rowNames is not NULL, it must have exactly one entry per row in the problem and one additional entry (rowNames[getNumRows()] with the objective function name. These getNumRows()+1 entries must be distinct. If this is not the case, default row names are used. In addition, format restrictions are imposed on names (see CoinLpIO::is_invalid_name() for details).

Similar remarks can be made for the parameter columnNames which must either be NULL or have exactly getNumCols() distinct entries.

Write objective function name and constraint names if useRowNames is true.

8.32.4.147 int OsiSolverInterface::writeLpNative (FILE * *fp*, char const *const *const *rowNames*, char const *const *const *columnNames*, const double *epsilon* = `1.0e-5`, const int *numberAcross* = `10`, const int *decimals* = `5`, const double *objSense* = `0.0`, const bool *useRowNames* = `true`) const

Write the problem into the file pointed to by the parameter fp.

Other parameters are similar to those of writeLpNative() with first parameter filename.

8.32.4.148 virtual int OsiSolverInterface::readLp (const char * *filename*, const double *epsilon* = `1e-5`) [virtual]

Read file in LP format from file with name filename.

See class CoinLpIO for description of this format.

8.32.4.149 int OsiSolverInterface::readLp (FILE * *fp*, const double *epsilon* = `1e-5`)

Read file in LP format from the file pointed to by fp.

See class CoinLpIO for description of this format.

8.32.4.150 void OsiSolverInterface::setApplicationData (void * *appData*)

Set application data.

This is a pointer that the application can store into and retrieve from the solver interface. This field is available for the application to optionally define and use.

8.32.4.151 void OsiSolverInterface::setAuxiliaryInfo (OsiAuxInfo * *auxiliaryInfo*)

Create a clone of an Auxiliary Information object.

The base class just stores an application data pointer but can be more general. Application data pointer is designed for one user while this can be extended to cope with more general extensions.

8.32.4.152 void∗ OsiSolverInterface::getApplicationData ( ) const

Get application data.

8.32.4.153 OsiAuxInfo∗ OsiSolverInterface::getAuxiliaryInfo ( ) const

Get pointer to auxiliary info object.

8.32.4.154 virtual void OsiSolverInterface::passInMessageHandler (CoinMessageHandler ∗ *handler*) [virtual]

Pass in a message handler.

It is the client's responsibility to destroy a message handler installed by this routine; it will not be destroyed when the solver interface is destroyed.

Reimplemented in OsiCpxSolverInterface, OsiMskSolverInterface, and OsiXprSolverInterface.

8.32.4.155 void OsiSolverInterface::newLanguage (CoinMessages::Language *language*)

Set language.

8.32.4.156 void OsiSolverInterface::setLanguage (CoinMessages::Language *language*) [inline]

Definition at line 1622 of file OsiSolverInterface.hpp.

8.32.4.157 CoinMessageHandler∗ OsiSolverInterface::messageHandler ( ) const [inline]

Return a pointer to the current message handler.

Definition at line 1625 of file OsiSolverInterface.hpp.

8.32.4.158 CoinMessages OsiSolverInterface::messages ( ) [inline]

Return the current set of messages.

Definition at line 1628 of file OsiSolverInterface.hpp.

8.32.4.159 CoinMessages∗ OsiSolverInterface::messagesPointer ( ) [inline]

Return a pointer to the current set of messages.

Definition at line 1631 of file OsiSolverInterface.hpp.

8.32.4.160 bool OsiSolverInterface::defaultHandler ( ) const [inline]

Return true if default handler.

Definition at line 1634 of file OsiSolverInterface.hpp.

8.32.4.161 void OsiSolverInterface::findIntegers (bool *justCount*)

Identify integer variables and create corresponding objects.

Record integer variables and create an OsiSimpleInteger object for each one. All existing OsiSimpleInteger objects will be destroyed. If justCount then no objects created and we just store numberIntegers_

8.32.4.162 virtual int OsiSolverInterface::findIntegersAndSOS (bool *justCount*) [virtual]

Identify integer variables and SOS and create corresponding objects.

Record integer variables and create an OsiSimpleInteger object for each one. All existing OsiSimpleInteger objects will be destroyed. If the solver supports SOS then do the same for SOS.

If justCount then no objects created and we just store numberIntegers_ Returns number of SOS

8.32.4.163 int OsiSolverInterface::numberObjects ( ) const [inline]

Get the number of objects.

Definition at line 1665 of file OsiSolverInterface.hpp.

8.32.4.164 void OsiSolverInterface::setNumberObjects (int *number*) [inline]

Set the number of objects.

Definition at line 1667 of file OsiSolverInterface.hpp.

8.32.4.165 OsiObject** OsiSolverInterface::objects ( ) const [inline]

Get the array of objects.

Definition at line 1671 of file OsiSolverInterface.hpp.

8.32.4.166 const OsiObject* OsiSolverInterface::object (int *which*) const [inline]

Get the specified object.

Definition at line 1674 of file OsiSolverInterface.hpp.

8.32.4.167 OsiObject* OsiSolverInterface::modifiableObject (int *which*) const [inline]

Get the specified object.

Definition at line 1676 of file OsiSolverInterface.hpp.

8.32.4.168 void OsiSolverInterface::deleteObjects ( )

Delete all object information.

8.32.4.169 void OsiSolverInterface::addObjects (int *numberObjects,* OsiObject ** *objects*)

Add in object information.

Objects are cloned; the owner can delete the originals.

8.32.4.170 double OsiSolverInterface::forceFeasible ( )

Use current solution to set bounds so current integer feasible solution will stay feasible.

Only feasible bounds will be used, even if current solution outside bounds. The amount of such violation will be returned (and if small can be ignored)

8.32.4.171 virtual void OsiSolverInterface::activateRowCutDebugger (const char * *modelName*) [virtual]

Activate the row cut debugger.

If `modelName` is in the set of known models then all cuts are checked to see that they do NOT cut off the optimal solution known to the debugger.

8.32.4.172 virtual void OsiSolverInterface::activateRowCutDebugger (const double * *solution*, bool *enforceOptimality* = `true`) `[virtual]`

Activate the row cut debugger using a full solution array.

Activate the debugger for a model not included in the debugger's internal database. Cuts will be checked to see that they do NOT cut off the given solution.

`solution` must be a full solution vector, but only the integer variables need to be correct. The debugger will fill in the continuous variables by solving an lp relaxation with the integer variables fixed as specified. If the given values for the continuous variables should be preserved, set `keepContinuous` to true.

8.32.4.173 const OsiRowCutDebugger* OsiSolverInterface::getRowCutDebugger ( ) const

Get the row cut debugger provided the solution known to the debugger is within the feasible region held in the solver.

If there is a row cut debugger object associated with model AND if the solution known to the debugger is within the solver's current feasible region (i.e., the column bounds held in the solver are compatible with the known solution) then a pointer to the debugger is returned which may be used to test validity of cuts.

Otherwise NULL is returned

8.32.4.174 OsiRowCutDebugger* OsiSolverInterface::getRowCutDebuggerAlways ( ) const

Get the row cut debugger object.

Return the row cut debugger object if it exists. One common usage of this method is to obtain a debugger object in order to execute OsiRowCutDebugger::redoSolution (so that the stored solution is again compatible with the problem held in the solver).

8.32.4.175 virtual int OsiSolverInterface::canDoSimplexInterface ( ) const `[virtual]`

Return the simplex implementation level.

The return codes are:

- 0: the simplex interface is not implemented.
- 1: the Group 1 (tableau access) methods are implemented.
- 2: the Group 2 (pivoting) methods are implemented

The codes are cumulative - a solver which implements Group 2 also implements Group 1.

Reimplemented in OsiCpxSolverInterface, and OsiGrbSolverInterface.

8.32.4.176 virtual void OsiSolverInterface::enableFactorization ( ) const `[virtual]`

Prepare the solver for the use of tableau access methods.

Prepares the solver for the use of the tableau access methods, if any such preparation is required.

The `const` attribute is required due to the places this method may be called (e.g., within CglCutGenerator::generateCuts()).

Reimplemented in OsiCpxSolverInterface, and OsiGrbSolverInterface.

8.32.4.177 virtual void OsiSolverInterface::disableFactorization ( ) const `[virtual]`

Undo the effects of enableFactorization.

Reimplemented in OsiCpxSolverInterface, and OsiGrbSolverInterface.

8.32.4.178 virtual bool OsiSolverInterface::basisIsAvailable ( ) const [virtual]

Check if an optimal basis is available.

Returns true if the problem has been solved to optimality and a basis is available. This should be used to see if the tableau access operations are possible and meaningful.

Note

Implementors please note that this method may be called before enableFactorization.

Reimplemented in OsiCpxSolverInterface, and OsiGrbSolverInterface.

8.32.4.179 bool OsiSolverInterface::optimalBasisIsAvailable ( ) const [inline]

Synonym for basisIsAvailable.

Definition at line 1802 of file OsiSolverInterface.hpp.

8.32.4.180 virtual void OsiSolverInterface::getBasisStatus (int * *cstat,* int * *rstat*) const [virtual]

Retrieve status information for column and row variables.

This method returns status as integer codes:

- 0: free
- 1: basic
- 2: nonbasic at upper bound
- 3: nonbasic at lower bound

The getWarmStart method provides essentially the same functionality for a simplex-oriented solver, but the implementation details are very different.

Note

Logical variables associated with rows are all assumed to have +1 coefficients, so for a <= constraint the logical will be at lower bound if the constraint is tight.
Implementors may choose to implement this method as a wrapper which converts a CoinWarmStartBasis to the requested representation.

Reimplemented in OsiCpxSolverInterface, and OsiGrbSolverInterface.

8.32.4.181 virtual int OsiSolverInterface::setBasisStatus (const int * *cstat,* const int * *rstat*) [virtual]

Set the status of column and row variables and update the basis factorization and solution.

Status information should be coded as documented for getBasisStatus. Returns 0 if all goes well, 1 if something goes wrong.

This method differs from setWarmStart in the format of the input and in its immediate effect. Think of it as setWarmStart immediately followed by resolve, but no pivots are allowed.

Note

Implementors may choose to implement this method as a wrapper that calls setWarmStart and resolve if the no pivot requirement can be satisfied.

8.32.4.182 virtual void OsiSolverInterface::getReducedGradient (double ∗ *columnReducedCosts,* double ∗ *duals,* const double ∗ *c*) const [virtual]

Calculate duals and reduced costs for the given objective coefficients.

The solver's objective coefficient vector is not changed.

8.32.4.183 virtual void OsiSolverInterface::getBInvARow (int *row,* double ∗ *z,* double ∗ *slack* = NULL) const [virtual]

Get a row of the tableau.

If `slack` is not null, it will be loaded with the coefficients for the artificial (logical) variables (i.e., the row of the basis inverse).

Reimplemented in OsiCpxSolverInterface.

8.32.4.184 virtual void OsiSolverInterface::getBInvRow (int *row,* double ∗ *z*) const [virtual]

Get a row of the basis inverse.

Reimplemented in OsiCpxSolverInterface.

8.32.4.185 virtual void OsiSolverInterface::getBInvACol (int *col,* double ∗ *vec*) const [virtual]

Get a column of the tableau.

Reimplemented in OsiCpxSolverInterface.

8.32.4.186 virtual void OsiSolverInterface::getBInvCol (int *col,* double ∗ *vec*) const [virtual]

Get a column of the basis inverse.

Reimplemented in OsiCpxSolverInterface.

8.32.4.187 virtual void OsiSolverInterface::getBasics (int ∗ *index*) const [virtual]

Get indices of basic variables.

If the logical (artificial) for row i is basic, the index should be coded as (getNumCols + i). The order of indices must match the order of elements in the vectors returned by getBInvACol and getBInvCol.

Reimplemented in OsiCpxSolverInterface.

8.32.4.188 virtual void OsiSolverInterface::enableSimplexInterface (bool *doingPrimal*) [virtual]

Enables normal operation of subsequent functions.

This method is supposed to ensure that all typical things (like reduced costs, etc.) are updated when individual pivots are executed and can be queried by other methods. says whether will be doing primal or dual

8.32.4.189 virtual void OsiSolverInterface::disableSimplexInterface ( ) [virtual]

Undo whatever setting changes the above method had to make.

Reimplemented in OsiCpxSolverInterface, and OsiGrbSolverInterface.

8.32.4.190 virtual int OsiSolverInterface::pivot (int *colIn,* int *colOut,* int *outStatus*) [virtual]

Perform a pivot by substituting a colIn for colOut in the basis.

The status of the leaving variable is given in outStatus. Where 1 is to upper bound, -1 to lower bound Return code was undefined - now for OsiClp is 0 for okay, 1 if inaccuracy forced re-factorization (should be okay) and -1 for singular factorization

8.32.4.191 virtual int OsiSolverInterface::primalPivotResult (int *colIn,* int *sign,* int & *colOut,* int & *outStatus,* double & *t,* CoinPackedVector ∗ *dx*) [virtual]

Obtain a result of the primal pivot Outputs: colOut – leaving column, outStatus – its status, t – step size, and, if dx!=NU-LL, ∗dx – primal ray direction.

Inputs: colIn – entering column, sign – direction of its change (+/-1). Both for colIn and colOut, artificial variables are index by the negative of the row index minus 1. Return code (for now): 0 – leaving variable found, -1 – everything else? Clearly, more informative set of return values is required Primal and dual solutions are updated

8.32.4.192 virtual int OsiSolverInterface::dualPivotResult (int & *colIn,* int & *sign,* int *colOut,* int *outStatus,* double & *t,* CoinPackedVector ∗ *dx*) [virtual]

Obtain a result of the dual pivot (similar to the previous method) Differences: entering variable and a sign of its change are now the outputs, the leaving variable and its statuts – the inputs If dx!=NULL, then ∗dx contains dual ray Return code: same.

8.32.4.193 virtual OsiSolverInterface∗ OsiSolverInterface::clone (bool *copyData* = true) const [pure virtual]

Clone.

The result of calling clone(false) is defined to be equivalent to calling the default constructor OsiSolverInterface().

Implemented in OsiGlpkSolverInterface, OsiMskSolverInterface, OsiCpxSolverInterface, OsiXprSolverInterface, OsiGrb-SolverInterface, and OsiSpxSolverInterface.

8.32.4.194 OsiSolverInterface& OsiSolverInterface::operator= (const OsiSolverInterface & *rhs*)

Assignment operator.

8.32.4.195 virtual void OsiSolverInterface::reset ( ) [virtual]

Reset the solver interface.

A call to reset() returns the solver interface to the same state as it would have if it had just been constructed by calling the default constructor OsiSolverInterface().

Reimplemented in OsiGlpkSolverInterface, OsiCpxSolverInterface, and OsiGrbSolverInterface.

8.32.4.196 virtual void OsiSolverInterface::applyRowCut (const OsiRowCut & *rc*) [protected], [pure virtual]

Apply a row cut (append to the constraint matrix).

Implemented in OsiCpxSolverInterface, OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiMskSolverInterface, OsiXpr-SolverInterface, and OsiSpxSolverInterface.

8.32.4.197 virtual void OsiSolverInterface::applyColCut (const OsiColCut & *cc*) [protected], [pure virtual]

Apply a column cut (adjust the bounds of one or more variables).

Implemented in OsiCpxSolverInterface, OsiGrbSolverInterface, OsiGlpkSolverInterface, OsiMskSolverInterface, OsiXpr-SolverInterface, and OsiSpxSolverInterface.

8.32.4.198 void OsiSolverInterface::convertBoundToSense (const double *lower,* const double *upper,* char & *sense,* double & *right,* double & *range*) const [inline], [protected]

A quick inlined function to convert from the lb/ub style of constraint definition to the sense/rhs/range style.

Definition at line 2074 of file OsiSolverInterface.hpp.

8.32.4.199 void OsiSolverInterface::convertSenseToBound (const char *sense,* const double *right,* const double *range,* double & *lower,* double & *upper*) const [inline], [protected]

A quick inlined function to convert from the sense/rhs/range style of constraint definition to the lb/ub style.

Definition at line 2108 of file OsiSolverInterface.hpp.

8.32.4.200 template<class T > T OsiSolverInterface::forceIntoRange (const T *value,* const T *lower,* const T *upper*) const [inline], [protected]

A quick inlined function to force a value to be between a minimum and a maximum value.

Definition at line 1990 of file OsiSolverInterface.hpp.

8.32.4.201 void OsiSolverInterface::setInitialData ( ) [protected]

Set OsiSolverInterface object state for default constructor.

This routine establishes the initial values of data fields in the OsiSolverInterface object when the object is created using the default constructor.

8.32.5 Friends And Related Function Documentation

8.32.5.1 void OsiSolverInterfaceCommonUnitTest (const OsiSolverInterface * *emptySi,* const std::string & *mpsDir,* const std::string & *netlibDir*) [friend]

A function that tests the methods in the OsiSolverInterface class.

Some time ago, if this method is compiled with optimization, the compilation took 10-15 minutes and the machine pages (has 256M core memory!)...

8.32.5.2 void OsiSolverInterfaceMpsUnitTest (const std::vector< OsiSolverInterface * > & *vecSiP,* const std::string & *mpsDir*) [friend]

A function that tests that a lot of problems given in MPS files (mostly the NETLIB problems) solve properly with all the specified solvers.

The routine creates a vector of NetLib problems (problem name, objective, various other characteristics), and a vector of solvers to be tested.

Each solver is run on each problem. The run is deemed successful if the solver reports the correct problem size after loading and returns the correct objective value after optimization.

If multiple solvers are available, the results are compared pairwise against the results reported by adjacent solvers in the solver vector. Due to limitations of the volume solver, it must be the last solver in vecEmptySiP.

8.32.6 Member Data Documentation

8.32.6.1 OsiRowCutDebugger* OsiSolverInterface::rowCutDebugger_ [mutable], [protected]

Pointer to row cut debugger object.

Mutable so that we can update the solution held in the debugger while maintaining const'ness for the Osi object.

Definition at line 2009 of file OsiSolverInterface.hpp.

8.32.6.2 CoinMessageHandler∗ OsiSolverInterface::handler_ [protected]

Message handler.

Definition at line 2012 of file OsiSolverInterface.hpp.

8.32.6.3 bool OsiSolverInterface::defaultHandler_ [protected]

Flag to say if the currrent handler is the default handler.

Indicates if the solver interface object is responsible for destruction of the handler (true) or if the client is responsible (false).

Definition at line 2018 of file OsiSolverInterface.hpp.

8.32.6.4 CoinMessages OsiSolverInterface::messages_ [protected]

Messages.

Definition at line 2020 of file OsiSolverInterface.hpp.

8.32.6.5 int OsiSolverInterface::numberIntegers_ [protected]

Number of integers.

Definition at line 2022 of file OsiSolverInterface.hpp.

8.32.6.6 int OsiSolverInterface::numberObjects_ [protected]

Total number of objects.

Definition at line 2024 of file OsiSolverInterface.hpp.

8.32.6.7 OsiObject∗∗ OsiSolverInterface::object_ [protected]

Integer and ... information (integer info normally at beginning)

Definition at line 2027 of file OsiSolverInterface.hpp.

8.32.6.8 char∗ OsiSolverInterface::columnType_ [mutable], [protected]

Column type 0 - continuous 1 - binary (may get fixed later) 2 - general integer (may get fixed later)

Definition at line 2033 of file OsiSolverInterface.hpp.

8.32.6.9 OsiAuxInfo∗ OsiSolverInterface::appDataEtc_ [private]

Pointer to user-defined data structure - and more if user wants.

Definition at line 2043 of file OsiSolverInterface.hpp.

8.32.6.10 int OsiSolverInterface::intParam_[OsiLastIntParam] [private]

Array of integer parameters.

Definition at line 2045 of file OsiSolverInterface.hpp.

8.32.6.11 double OsiSolverInterface::dblParam_[OsiLastDblParam] [private]

Array of double parameters.

Definition at line 2047 of file OsiSolverInterface.hpp.

8.32.6.12 std::string OsiSolverInterface::strParam_[OsiLastStrParam] [private]

Array of string parameters.

Definition at line 2049 of file OsiSolverInterface.hpp.

8.32.6.13 bool OsiSolverInterface::hintParam_[OsiLastHintParam] [private]

Array of hint parameters.

Definition at line 2051 of file OsiSolverInterface.hpp.

8.32.6.14 OsiHintStrength OsiSolverInterface::hintStrength_[OsiLastHintParam] [private]

Array of hint strengths.

Definition at line 2053 of file OsiSolverInterface.hpp.

8.32.6.15 CoinWarmStart* OsiSolverInterface::ws_ [private]

Warm start information used for hot starts when the default hot start implementation is used.

Definition at line 2056 of file OsiSolverInterface.hpp.

8.32.6.16 std::vector<double> OsiSolverInterface::strictColSolution_ [private]

Column solution satisfying lower and upper column bounds.

Definition at line 2058 of file OsiSolverInterface.hpp.

8.32.6.17 OsiNameVec OsiSolverInterface::rowNames_ [private]

Row names.

Definition at line 2061 of file OsiSolverInterface.hpp.

8.32.6.18 OsiNameVec OsiSolverInterface::colNames_ [private]

Column names.

Definition at line 2063 of file OsiSolverInterface.hpp.

8.32.6.19 std::string OsiSolverInterface::objName_ [private]

Objective name.

Definition at line 2065 of file OsiSolverInterface.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/Osi/OsiSolverInterface.hpp

8.33 OsiSolverResult Class Reference

Solver Result Class.

`#include <OsiSolverBranch.hpp>`

Public Member Functions

Add and Get methods

- void createResult (const OsiSolverInterface &solver, const double ∗lowerBefore, const double ∗upperBefore)
  Create result.
- void restoreResult (OsiSolverInterface &solver) const
  Restore result.
- const CoinWarmStartBasis & basis () const
  Get basis.
- double objectiveValue () const
  Objective value (as minimization)
- const double ∗ primalSolution () const
  Primal solution.
- const double ∗ dualSolution () const
  Dual solution.
- const OsiSolverBranch & fixed () const
  Extra fixed.

Constructors and destructors

- OsiSolverResult ()
  Default Constructor.
- OsiSolverResult (const OsiSolverInterface &solver, const double ∗lowerBefore, const double ∗upperBefore)
  Constructor from solver.
- OsiSolverResult (const OsiSolverResult &rhs)
  Copy constructor.
- OsiSolverResult & operator= (const OsiSolverResult &rhs)
  Assignment operator.
- ∼OsiSolverResult ()
  Destructor.

Private Attributes

Private member data

- double objectiveValue_
  Value of objective (if >= OsiSolverInterface::getInfinity() then infeasible)
- CoinWarmStartBasis basis_
  Warm start information.
- double ∗ primalSolution_
  Primal solution (numberColumns)
- double ∗ dualSolution_
  Dual solution (numberRows)
- OsiSolverBranch fixed_
  Which extra variables have been fixed (only way==-1 counts)

8.33.1 Detailed Description

Solver Result Class.

This provides information on a result as a set of tighter bounds on both ways

Definition at line 83 of file OsiSolverBranch.hpp.

8.33.2 Constructor & Destructor Documentation

8.33.2.1 OsiSolverResult::OsiSolverResult ( )

Default Constructor.

8.33.2.2 OsiSolverResult::OsiSolverResult (const OsiSolverInterface & *solver,* const double ∗ *lowerBefore,* const double ∗ *upperBefore*)

Constructor from solver.

8.33.2.3 OsiSolverResult::OsiSolverResult (const OsiSolverResult & *rhs*)

Copy constructor.

8.33.2.4 OsiSolverResult::∼OsiSolverResult ( )

Destructor.

8.33.3 Member Function Documentation

8.33.3.1 void OsiSolverResult::createResult (const OsiSolverInterface & *solver,* const double ∗ *lowerBefore,* const double ∗ *upperBefore*)

Create result.

8.33.3.2 void OsiSolverResult::restoreResult (OsiSolverInterface & *solver*) const

Restore result.

8.33.3.3 const CoinWarmStartBasis& OsiSolverResult::basis ( ) const `[inline]`

Get basis.

Definition at line 96 of file OsiSolverBranch.hpp.

8.33.3.4 double OsiSolverResult::objectiveValue ( ) const `[inline]`

Objective value (as minimization)

Definition at line 100 of file OsiSolverBranch.hpp.

8.33.3.5 const double∗ OsiSolverResult::primalSolution ( ) const `[inline]`

Primal solution.

Definition at line 104 of file OsiSolverBranch.hpp.

8.33.3.6 const double∗ OsiSolverResult::dualSolution ( ) const `[inline]`

Dual solution.

Definition at line 108 of file OsiSolverBranch.hpp.

8.33.3.7 const OsiSolverBranch& OsiSolverResult::fixed ( ) const `[inline]`

Extra fixed.

Definition at line 112 of file OsiSolverBranch.hpp.

8.33.3.8 OsiSolverResult& OsiSolverResult::operator= (const OsiSolverResult & *rhs*)

Assignment operator.

8.33.4 Member Data Documentation

8.33.4.1 double OsiSolverResult::objectiveValue_ `[private]`

Value of objective (if $>=$ OsiSolverInterface::getInfinity() then infeasible)

Definition at line 141 of file OsiSolverBranch.hpp.

8.33.4.2 CoinWarmStartBasis OsiSolverResult::basis_ `[private]`

Warm start information.

Definition at line 143 of file OsiSolverBranch.hpp.

8.33.4.3 double$*$ OsiSolverResult::primalSolution_ `[private]`

Primal solution (numberColumns)

Definition at line 145 of file OsiSolverBranch.hpp.

8.33.4.4 double$*$ OsiSolverResult::dualSolution_ `[private]`

Dual solution (numberRows)

Definition at line 147 of file OsiSolverBranch.hpp.

8.33.4.5 OsiSolverBranch OsiSolverResult::fixed_ `[private]`

Which extra variables have been fixed (only way==-1 counts)

Definition at line 149 of file OsiSolverBranch.hpp.

The documentation for this class was generated from the following file:

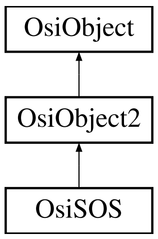
- /home/ted/COIN/trunk/Osi/src/Osi/OsiSolverBranch.hpp

8.34 OsiSOS Class Reference

Define Special Ordered Sets of type 1 and 2.

```
#include <OsiBranchingObject.hpp>
```

Inheritance diagram for OsiSOS:



Public Member Functions

- OsiSOS ()
- OsiSOS (const OsiSolverInterface ∗solver, int numberMembers, const int ∗which, const double ∗weights, int type=1)

  Useful constructor - which are indices and weights are also given.
- OsiSOS (const OsiSOS &)
- virtual OsiObject ∗ clone () const

  Clone.
- OsiSOS & operator= (const OsiSOS &rhs)
- virtual ∼OsiSOS ()
- virtual double infeasibility (const OsiBranchingInformation ∗info, int &whichWay) const

  Infeasibility - large is 0.5.
- virtual double feasibleRegion (OsiSolverInterface ∗solver, const OsiBranchingInformation ∗info) const

  Set bounds to fix the variable at the current (integer) value.
- virtual OsiBranchingObject ∗ createBranch (OsiSolverInterface ∗solver, const OsiBranchingInformation ∗info, int way) const

  Creates a branching object.
- virtual double upEstimate () const

  Return "up" estimate (default 1.0e-5)
- virtual double downEstimate () const

  Return "down" estimate (default 1.0e-5)
- virtual void resetSequenceEtc (int numberColumns, const int ∗originalColumns)

  Redoes data when sequence numbers change.
- int numberMembers () const

  Number of members.
- const int ∗ members () const

  Members (indices in range 0 ... numberColumns-1)
- int sosType () const

  SOS type.
- int setType () const

  SOS type.
- const double ∗ weights () const

  Array of weights.
- virtual bool canDoHeuristics () const

  Return true if object can take part in normal heuristics.
- void setIntegerValued (bool yesNo)

  Set whether set is integer valued or not.
- virtual bool canHandleShadowPrices () const

  Return true if knows how to deal with Pseudo Shadow Prices.
- void setNumberMembers (int value)

  Set number of members.
- int ∗ mutableMembers () const

  Members (indices in range 0 ... numberColumns-1)
- void setSosType (int value)

  Set SOS type.
- double ∗ mutableWeights () const

  Array of weights.

Protected Attributes

- int ∗ members_

  data
- double ∗ weights_

  Weights.
- int numberMembers_

  Number of members.
- int sosType_

  SOS type.
- bool integerValued_

  Whether integer valued.

8.34.1 Detailed Description

Define Special Ordered Sets of type 1 and 2.

These do not have to be integer - so do not appear in lists of integers.

which_ points columns of matrix

Definition at line 674 of file OsiBranchingObject.hpp.

8.34.2 Constructor & Destructor Documentation

8.34.2.1 OsiSOS::OsiSOS ( )

8.34.2.2 OsiSOS::OsiSOS (const **OsiSolverInterface** ∗ *solver,* int *numberMembers,* const int ∗ *which,* const double ∗ *weights,* int *type* = 1)

Useful constructor - which are indices and weights are also given.

If null then 0,1,2.. type is SOS type

8.34.2.3 OsiSOS::OsiSOS (const **OsiSOS** &)

8.34.2.4 virtual OsiSOS::∼OsiSOS ( ) [virtual]

8.34.3 Member Function Documentation

8.34.3.1 virtual **OsiObject**∗ OsiSOS::clone ( ) const [virtual]

Clone.

Implements OsiObject.

8.34.3.2 **OsiSOS**& OsiSOS::operator= (const **OsiSOS** & *rhs*)

8.34.3.3 virtual double OsiSOS::infeasibility (const **OsiBranchingInformation** ∗ *info,* int & *whichWay*) const [virtual]

Infeasibility - large is 0.5.

Implements OsiObject.

8.34.3.4 virtual double OsiSOS::feasibleRegion (**OsiSolverInterface** ∗ *solver,* const **OsiBranchingInformation** ∗ *info*) const [virtual]

Set bounds to fix the variable at the current (integer) value.

Given an integer value, set the lower and upper bounds to fix the variable. Returns amount it had to move variable.

Implements OsiObject.

8.34.3.5 virtual **OsiBranchingObject**∗ OsiSOS::createBranch (**OsiSolverInterface** ∗ *solver,* const **OsiBranchingInformation** ∗ *info,* int *way*) const [virtual]

Creates a branching object.

The preferred direction is set by `way`, 0 for down, 1 for up.

Reimplemented from OsiObject.

8.34.3.6 virtual double OsiSOS::upEstimate ( ) const [virtual]

Return "up" estimate (default 1.0e-5)

Reimplemented from OsiObject.

8.34.3.7 virtual double OsiSOS::downEstimate ( ) const [virtual]

Return "down" estimate (default 1.0e-5)

Reimplemented from OsiObject.

8.34.3.8 virtual void OsiSOS::resetSequenceEtc (int *numberColumns,* const int ∗ *originalColumns*) [virtual]

Redoes data when sequence numbers change.

Reimplemented from OsiObject.

8.34.3.9 int OsiSOS::numberMembers ( ) const [inline]

Number of members.

Definition at line 726 of file OsiBranchingObject.hpp.

8.34.3.10 const int∗ OsiSOS::members ( ) const [inline]

Members (indices in range 0 ... numberColumns-1)

Definition at line 730 of file OsiBranchingObject.hpp.

8.34.3.11 int OsiSOS::sosType ( ) const [inline]

SOS type.

Definition at line 734 of file OsiBranchingObject.hpp.

8.34.3.12 int OsiSOS::setType ( ) const [inline]

SOS type.

Definition at line 738 of file OsiBranchingObject.hpp.

8.34.3.13 const double∗ OsiSOS::weights ( ) const [inline]

Array of weights.

Definition at line 742 of file OsiBranchingObject.hpp.

8.34.3.14 virtual bool OsiSOS::canDoHeuristics ( ) const [inline], [virtual]

Return true if object can take part in normal heuristics.

Reimplemented from OsiObject.

Definition at line 747 of file OsiBranchingObject.hpp.

8.34.3.15 void OsiSOS::setIntegerValued (bool *yesNo*) [inline]

Set whether set is integer valued or not.

Definition at line 750 of file OsiBranchingObject.hpp.

8.34.3.16 virtual bool OsiSOS::canHandleShadowPrices ( ) const [inline], [virtual]

Return true if knows how to deal with Pseudo Shadow Prices.

Reimplemented from OsiObject.

Definition at line 753 of file OsiBranchingObject.hpp.

8.34.3.17 void OsiSOS::setNumberMembers (int *value*) [inline]

Set number of members.

Definition at line 756 of file OsiBranchingObject.hpp.

8.34.3.18 int∗ OsiSOS::mutableMembers ( ) const [inline]

Members (indices in range 0 ... numberColumns-1)

Definition at line 760 of file OsiBranchingObject.hpp.

8.34.3.19 void OsiSOS::setSosType (int *value*) [inline]

Set SOS type.

Definition at line 764 of file OsiBranchingObject.hpp.

8.34.3.20 double∗ OsiSOS::mutableWeights ( ) const [inline]

Array of weights.

Definition at line 768 of file OsiBranchingObject.hpp.

8.34.4 Member Data Documentation

8.34.4.1 int∗ OsiSOS::members_ [protected]

data

Members (indices in range 0 ... numberColumns-1)

Definition at line 774 of file OsiBranchingObject.hpp.

8.34.4.2 double∗ OsiSOS::weights_ [protected]

Weights.

Definition at line 776 of file OsiBranchingObject.hpp.

8.34.4.3 int OsiSOS::numberMembers_ [protected]

Number of members.

Definition at line 779 of file OsiBranchingObject.hpp.

8.34.4.4 int OsiSOS::sosType_ [protected]

SOS type.

Definition at line 781 of file OsiBranchingObject.hpp.

8.34.4.5 bool OsiSOS::integerValued_ [protected]

Whether integer valued.

Definition at line 783 of file OsiBranchingObject.hpp.

The documentation for this class was generated from the following file:

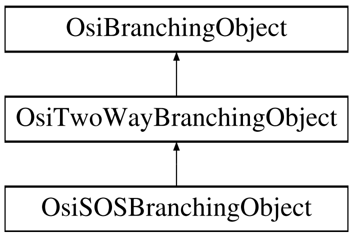
- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.35 OsiSOSBranchingObject Class Reference

Branching object for Special ordered sets.

`#include <OsiBranchingObject.hpp>`

Inheritance diagram for OsiSOSBranchingObject:



Public Member Functions

- OsiSOSBranchingObject ()
- OsiSOSBranchingObject (OsiSolverInterface ∗solver, const OsiSOS ∗originalObject, int way, double separator)
- OsiSOSBranchingObject (const OsiSOSBranchingObject &)
- OsiSOSBranchingObject & operator= (const OsiSOSBranchingObject &rhs)
- virtual OsiBranchingObject ∗ clone () const

  Clone.
- virtual ∼OsiSOSBranchingObject ()
- virtual double branch (OsiSolverInterface ∗solver)

  Does next branch and updates state.

- virtual void print (const OsiSolverInterface ∗solver=NULL)

  Print something about branch - only if log level high.

Additional Inherited Members

8.35.1 Detailed Description

Branching object for Special ordered sets.

Definition at line 789 of file OsiBranchingObject.hpp.

8.35.2 Constructor & Destructor Documentation

8.35.2.1 OsiSOSBranchingObject::OsiSOSBranchingObject ( )

8.35.2.2 OsiSOSBranchingObject::OsiSOSBranchingObject (OsiSolverInterface ∗ *solver,* const OsiSOS ∗ *originalObject,* int *way,* double *separator*)

8.35.2.3 OsiSOSBranchingObject::OsiSOSBranchingObject (const OsiSOSBranchingObject &)

8.35.2.4 virtual OsiSOSBranchingObject::∼OsiSOSBranchingObject ( ) `[virtual]`

8.35.3 Member Function Documentation

8.35.3.1 OsiSOSBranchingObject& OsiSOSBranchingObject::operator= (const OsiSOSBranchingObject & *rhs*)

8.35.3.2 virtual OsiBranchingObject∗ OsiSOSBranchingObject::clone ( ) const `[virtual]`

Clone.

Implements OsiBranchingObject.

8.35.3.3 virtual double OsiSOSBranchingObject::branch (OsiSolverInterface ∗ *solver*) `[virtual]`

Does next branch and updates state.

Implements OsiTwoWayBranchingObject.

8.35.3.4 virtual void OsiSOSBranchingObject::print (const OsiSolverInterface ∗ *solver* = `NULL`) `[virtual]`

Print something about branch - only if log level high.

The documentation for this class was generated from the following file:

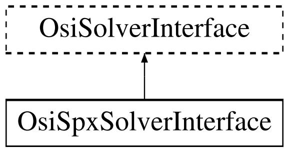
- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.36 OsiSpxSolverInterface Class Reference

SoPlex Solver Interface Instantiation of OsiSpxSolverInterface for SoPlex.

`#include <OsiSpxSolverInterface.hpp>`

Inheritance diagram for OsiSpxSolverInterface:



Public Member Functions

- virtual void setObjSense (double s)

  Set objective function sense (1 for min (default), -1 for max,)
- virtual void setColSolution (const double ∗colsol)

  Set the primal solution column values.
- virtual void setRowPrice (const double ∗rowprice)

  Set dual solution vector.

Solve methods

- virtual void initialSolve ()

  Solve initial LP relaxation.
- virtual void resolve ()

  Resolve an LP relaxation after problem modification.
- virtual void branchAndBound ()

  Invoke solver's built-in enumeration algorithm.

Parameter set/get methods

The set methods return true if the parameter was set to the given value, false otherwise.

There can be various reasons for failure: the given parameter is not applicable for the solver (e.g., refactorization frequency for the volume algorithm), the parameter is not yet implemented for the solver or simply the value of the parameter is out of the range the solver accepts. If a parameter setting call returns false check the details of your solver.

The get methods return true if the given parameter is applicable for the solver and is implemented. In this case the value of the parameter is returned in the second argument. Otherwise they return false.

- bool setIntParam (OsiIntParam key, int value)

  Set an integer parameter.
- bool setDblParam (OsiDblParam key, double value)

  Set a double parameter.
- bool getIntParam (OsiIntParam key, int &value) const

  Get an integer parameter.
- bool getDblParam (OsiDblParam key, double &value) const

  Get a double parameter.
- bool getStrParam (OsiStrParam key, std::string &value) const

  Get a string parameter.
- void setTimeLimit (double value)
- double getTimeLimit () const

Methods returning info on how the solution process terminated

- virtual bool isAbandoned () const

  Are there a numerical difficulties?
- virtual bool isProvenOptimal () const

Is optimality proven?
- virtual bool isProvenPrimalInfeasible () const
  Is primal infeasiblity proven?
- virtual bool isProvenDualInfeasible () const
  Is dual infeasiblity proven?
- virtual bool isDualObjectiveLimitReached () const
  Is the given dual objective limit reached?
- virtual bool isIterationLimitReached () const
  Iteration limit reached?
- virtual bool isTimeLimitReached () const
  Time limit reached?

WarmStart related methods

- CoinWarmStart ∗ getEmptyWarmStart () const
  Get empty warm start object.
- virtual CoinWarmStart ∗ getWarmStart () const
  Get warmstarting information.
- virtual bool setWarmStart (const CoinWarmStart ∗warmstart)
  Set warmstarting information.

Hotstart related methods (primarily used in strong branching). <br>

The user can create a hotstart (a snapshot) of the optimization process then reoptimize over and over again always starting from there.

***NOTE**: between hotstarted optimizations only bound changes are allowed.*

- virtual void markHotStart ()
  Create a hotstart point of the optimization process.
- virtual void solveFromHotStart ()
  Optimize starting from the hotstart.
- virtual void unmarkHotStart ()
  Delete the snapshot.

Methods related to querying the input data

- virtual int getNumCols () const
  Get number of columns.
- virtual int getNumRows () const
  Get number of rows.
- virtual int getNumElements () const
  Get number of nonzero elements.
- virtual const double ∗ getColLower () const
  Get pointer to array[getNumCols()] of column lower bounds.
- virtual const double ∗ getColUpper () const
  Get pointer to array[getNumCols()] of column upper bounds.
- virtual const char ∗ getRowSense () const
  Get pointer to array[getNumRows()] of row constraint senses.
- virtual const double ∗ getRightHandSide () const
  Get pointer to array[getNumRows()] of rows right-hand sides.
- virtual const double ∗ getRowRange () const
  Get pointer to array[getNumRows()] of row ranges.
- virtual const double ∗ getRowLower () const
  Get pointer to array[getNumRows()] of row lower bounds.
- virtual const double ∗ getRowUpper () const

Get pointer to array[getNumRows()] of row upper bounds.
- virtual const double $*$ getObjCoefficients () const

    Get pointer to array[getNumCols()] of objective function coefficients.
- virtual double getObjSense () const

    Get objective function sense (1 for min (default), -1 for max)
- virtual bool isContinuous (int colNumber) const

    Return true if column is continuous.
- virtual const CoinPackedMatrix $*$ getMatrixByRow () const

    Get pointer to row-wise copy of matrix.
- virtual const CoinPackedMatrix $*$ getMatrixByCol () const

    Get pointer to column-wise copy of matrix.
- virtual double getInfinity () const

    Get solver's value for infinity.

Methods related to querying the solution

- virtual const double $*$ getColSolution () const

    Get pointer to array[getNumCols()] of primal solution vector.
- virtual const double $*$ getRowPrice () const

    Get pointer to array[getNumRows()] of dual prices.
- virtual const double $*$ getReducedCost () const

    Get a pointer to array[getNumCols()] of reduced costs.
- virtual const double $*$ getRowActivity () const

    Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.
- virtual double getObjValue () const

    Get objective function value.
- virtual int getIterationCount () const

    Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.
- virtual std::vector$<$ double $* >$ getDualRays (int maxNumRays, bool fullRay=false) const

    Get as many dual rays as the solver can provide.
- virtual std::vector$<$ double $* >$ getPrimalRays (int maxNumRays) const

    Get as many primal rays as the solver can provide.

Changing bounds on variables and constraints

- virtual void setObjCoeff (int elementIndex, double elementValue)

    Set an objective function coefficient.
- virtual void setColLower (int elementIndex, double elementValue)

    Set a single column lower bound
    Use -COIN_DBL_MAX for -infinity.
- virtual void setColUpper (int elementIndex, double elementValue)

    Set a single column upper bound
    Use COIN_DBL_MAX for infinity.
- virtual void setColBounds (int elementIndex, double lower, double upper)

    Set a single column lower and upper bound
    The default implementation just invokes `setColLower` and `setColUpper`
- virtual void setRowLower (int elementIndex, double elementValue)

    Set a single row lower bound
    Use -COIN_DBL_MAX for -infinity.
- virtual void setRowUpper (int elementIndex, double elementValue)

    Set a single row upper bound
    Use COIN_DBL_MAX for infinity.
- virtual void setRowBounds (int elementIndex, double lower, double upper)

    Set a single row lower and upper bound
    The default implementation just invokes `setRowUower` and `setRowUpper`

- virtual void setRowType (int index, char sense, double rightHandSide, double range)

  Set the type of a single row

Integrality related changing methods

- virtual void setContinuous (int index)

  Set the index-th variable to be a continuous variable.
- virtual void setInteger (int index)

  Set the index-th variable to be an integer variable.

Methods to expand a problem.<br>

Note that if a column is added then by default it will correspond to a continuous variable.

- virtual void addCol (const CoinPackedVectorBase &vec, const double collb, const double colub, const double obj)

  Add a column (primal variable) to the problem.
- virtual void deleteCols (const int num, const int ∗colIndices)

  Remove a set of columns (primal variables) from the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const double rowlb, const double rowub)

  Add a row (constraint) to the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const char rowsen, const double rowrhs, const double rowrng)

  Add a row (constraint) to the problem.
- virtual void deleteRows (const int num, const int ∗rowIndices)

  Delete a set of rows (constraints) from the problem.

Methods to input a problem

- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)

  Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, double ∗&rowlb, double ∗&rowub)

  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, char ∗&rowsen, double ∗&rowrhs, double ∗&rowrng)

  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)

  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual int readMps (const char ∗filename, const char ∗extension="mps")

  Read an mps file from the given filename.
- virtual void writeMps (const char ∗filename, const char ∗extension="mps", double objSense=0.0) const

Write the problem into an mps file of the given filename.

Constructors and destructor

- OsiSpxSolverInterface ()

  Default Constructor.
- virtual OsiSolverInterface ∗ clone (bool copyData=true) const

  Clone.
- OsiSpxSolverInterface (const OsiSpxSolverInterface &)

  Copy constructor.
- OsiSpxSolverInterface & operator= (const OsiSpxSolverInterface &rhs)

  Assignment operator.
- virtual ∼OsiSpxSolverInterface ()

  Destructor.

Protected Member Functions

Protected methods

- virtual void applyRowCut (const OsiRowCut &rc)

  Apply a row cut. Return true if cut was applied.
- virtual void applyColCut (const OsiColCut &cc)

  Apply a column cut (bound adjustment).

Protected Attributes

Protected member data

- soplex::SoPlex ∗ soplex_

  SoPlex solver object.

Private Attributes

Private member data

- soplex::DIdxSet ∗ spxintvars_

  indices of integer variables
- void ∗ hotStartCStat_

  Hotstart information.
- int hotStartCStatSize_
- void ∗ hotStartRStat_
- int hotStartRStatSize_
- int hotStartMaxIteration_

Cached information derived from the SoPlex model

- soplex::DVector ∗ obj_

  Pointer to objective Vector.
- char ∗ rowsense_

  Pointer to dense vector of row sense indicators.
- double ∗ rhs_

  Pointer to dense vector of row right-hand side values.
- double ∗ rowrange_

Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)
- soplex::DVector ∗ colsol_

  Pointer to primal solution vector.
- soplex::DVector ∗ rowsol_

  Pointer to dual solution vector.
- soplex::DVector ∗ redcost_

  Pointer to reduced cost vector.
- soplex::DVector ∗ rowact_

  Pointer to row activity (slack) vector.
- CoinPackedMatrix ∗ matrixByRow_

  Pointer to row-wise copy of problem matrix coefficients.
- CoinPackedMatrix ∗ matrixByCol_

  Pointer to row-wise copy of problem matrix coefficients.

Friends

- void OsiSpxSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiSpxSolverInterface class.

Private methods

- enum keepCachedFlag {
  KEEPCACHED_NONE = 0, KEEPCACHED_COLUMN = 1, KEEPCACHED_ROW = 2, KEEPCACHED_MATRIX = 4,
  KEEPCACHED_RESULTS = 8, KEEPCACHED_PROBLEM = KEEPCACHED_COLUMN | KEEPCACHED_ROW | KEEPCACHED_MATRIX, KEEPCACHED_ALL = KEEPCACHED_PROBLEM | KEEPCACHED_RESULTS,
  FREECACHED_COLUMN = KEEPCACHED_PROBLEM & ∼KEEPCACHED_COLUMN,
  FREECACHED_ROW = KEEPCACHED_PROBLEM & ∼KEEPCACHED_ROW, FREECACHED_MATRIX = KEEPCACHED_PROBLEM & ∼KEEPCACHED_MATRIX, FREECACHED_RESULTS = KEEPCACHED_ALL & ∼KEEPCACHED_RESULTS }
- void freeCachedColRim ()

  free cached column rim vectors
- void freeCachedRowRim ()

  free cached row rim vectors
- void freeCachedResults ()

  free cached result vectors
- void freeCachedMatrix ()

  free cached matrices
- void freeCachedData (int keepCached=KEEPCACHED_NONE)

  free all cached data (except specified entries, see getLpPtr())
- void freeAllMemory ()

  free all allocated memory

Additional Inherited Members

8.36.1 Detailed Description

SoPlex Solver Interface Instantiation of OsiSpxSolverInterface for SoPlex.

Definition at line 32 of file OsiSpxSolverInterface.hpp.

8.36.2 Member Enumeration Documentation

8.36.2.1 enum OsiSpxSolverInterface::keepCachedFlag [private]

Enumerator

KEEPCACHED_NONE	discard all cached data (default)
KEEPCACHED_COLUMN	column information: objective values, lower and upper bounds, variable types
KEEPCACHED_ROW	row information: right hand sides, ranges and senses, lower and upper bounds for row
KEEPCACHED_MATRIX	problem matrix: matrix ordered by column and by row
KEEPCACHED_RESULTS	LP solution: primal and dual solution, reduced costs, row activities.
KEEPCACHED_PROBLEM	only discard cached LP solution
KEEPCACHED_ALL	keep all cached data (similar to getMutableLpPtr())
FREECACHED_COLUMN	free only cached column and LP solution information
FREECACHED_ROW	free only cached row and LP solution information
FREECACHED_MATRIX	free only cached matrix and LP solution information
FREECACHED_RESULTS	free only cached LP solution information

Definition at line 648 of file OsiSpxSolverInterface.hpp.

8.36.3 Constructor & Destructor Documentation

8.36.3.1 OsiSpxSolverInterface::OsiSpxSolverInterface ( )

Default Constructor.

8.36.3.2 OsiSpxSolverInterface::OsiSpxSolverInterface (const OsiSpxSolverInterface &)

Copy constructor.

8.36.3.3 virtual OsiSpxSolverInterface::∼OsiSpxSolverInterface ( ) [virtual]

Destructor.

8.36.4 Member Function Documentation

8.36.4.1 virtual void OsiSpxSolverInterface::initialSolve ( ) [virtual]

Solve initial LP relaxation.

Implements OsiSolverInterface.

8.36.4.2 virtual void OsiSpxSolverInterface::resolve ( ) [virtual]

Resolve an LP relaxation after problem modification.

Implements OsiSolverInterface.

8.36.4.3 virtual void OsiSpxSolverInterface::branchAndBound ( ) [virtual]

Invoke solver's built-in enumeration algorithm.

Implements OsiSolverInterface.

8.36.4.4 bool OsiSpxSolverInterface::setIntParam (OsiIntParam *key*, int *value*) [virtual]

Set an integer parameter.

Reimplemented from OsiSolverInterface.

8.36.4.5 bool OsiSpxSolverInterface::setDblParam (OsiDblParam *key*, double *value*) [virtual]

Set a double parameter.

Reimplemented from OsiSolverInterface.

8.36.4.6 bool OsiSpxSolverInterface::getIntParam (OsiIntParam *key*, int & *value*) const [virtual]

Get an integer parameter.

Reimplemented from OsiSolverInterface.

8.36.4.7 bool OsiSpxSolverInterface::getDblParam (OsiDblParam *key*, double & *value*) const [virtual]

Get a double parameter.

Reimplemented from OsiSolverInterface.

8.36.4.8 bool OsiSpxSolverInterface::getStrParam (OsiStrParam *key*, std::string & *value*) const [virtual]

Get a string parameter.

Reimplemented from OsiSolverInterface.

8.36.4.9 void OsiSpxSolverInterface::setTimeLimit (double *value*)

8.36.4.10 double OsiSpxSolverInterface::getTimeLimit ( ) const

8.36.4.11 virtual bool OsiSpxSolverInterface::isAbandoned ( ) const [virtual]

Are there a numerical difficulties?

Implements OsiSolverInterface.

8.36.4.12 virtual bool OsiSpxSolverInterface::isProvenOptimal ( ) const [virtual]

Is optimality proven?

Implements OsiSolverInterface.

8.36.4.13 virtual bool OsiSpxSolverInterface::isProvenPrimalInfeasible ( ) const [virtual]

Is primal infeasiblity proven?

Implements OsiSolverInterface.

8.36.4.14 virtual bool OsiSpxSolverInterface::isProvenDualInfeasible ( ) const [virtual]

Is dual infeasiblity proven?

Implements OsiSolverInterface.

8.36.4.15 virtual bool OsiSpxSolverInterface::isDualObjectiveLimitReached ( ) const [virtual]

Is the given dual objective limit reached?

Reimplemented from OsiSolverInterface.

8.36.4.16 virtual bool OsiSpxSolverInterface::isIterationLimitReached ( ) const [virtual]

Iteration limit reached?

Implements OsiSolverInterface.

8.36.4.17 virtual bool OsiSpxSolverInterface::isTimeLimitReached ( ) const [virtual]

Time limit reached?

8.36.4.18 CoinWarmStart∗ OsiSpxSolverInterface::getEmptyWarmStart ( ) const [inline], [virtual]

Get empty warm start object.

Implements OsiSolverInterface.

Definition at line 106 of file OsiSpxSolverInterface.hpp.

8.36.4.19 virtual CoinWarmStart∗ OsiSpxSolverInterface::getWarmStart ( ) const [virtual]

Get warmstarting information.

Implements OsiSolverInterface.

8.36.4.20 virtual bool OsiSpxSolverInterface::setWarmStart (const CoinWarmStart ∗ *warmstart*) [virtual]

Set warmstarting information.

Return true/false depending on whether the warmstart information was accepted or not.

Implements OsiSolverInterface.

8.36.4.21 virtual void OsiSpxSolverInterface::markHotStart ( ) [virtual]

Create a hotstart point of the optimization process.

Reimplemented from OsiSolverInterface.

8.36.4.22 virtual void OsiSpxSolverInterface::solveFromHotStart ( ) [virtual]

Optimize starting from the hotstart.

Reimplemented from OsiSolverInterface.

8.36.4.23 virtual void OsiSpxSolverInterface::unmarkHotStart ( ) [virtual]

Delete the snapshot.

Reimplemented from OsiSolverInterface.

8.36.4.24 virtual int OsiSpxSolverInterface::getNumCols ( ) const [virtual]

Get number of columns.

Implements OsiSolverInterface.

8.36.4.25 virtual int OsiSpxSolverInterface::getNumRows ( ) const [virtual]

Get number of rows.

Implements OsiSolverInterface.

8.36.4.26 virtual int OsiSpxSolverInterface::getNumElements ( ) const [virtual]

Get number of nonzero elements.

Implements OsiSolverInterface.

8.36.4.27 virtual const double* OsiSpxSolverInterface::getColLower ( ) const [virtual]

Get pointer to array[getNumCols()] of column lower bounds.

Implements OsiSolverInterface.

8.36.4.28 virtual const double* OsiSpxSolverInterface::getColUpper ( ) const [virtual]

Get pointer to array[getNumCols()] of column upper bounds.

Implements OsiSolverInterface.

8.36.4.29 virtual const char* OsiSpxSolverInterface::getRowSense ( ) const [virtual]

Get pointer to array[getNumRows()] of row constraint senses.

- 'L': <= constraint
- 'E': = constraint
- 'G': >= constraint
- 'R': ranged constraint
- 'N': free constraint

Implements OsiSolverInterface.

8.36.4.30 virtual const double* OsiSpxSolverInterface::getRightHandSide ( ) const [virtual]

Get pointer to array[getNumRows()] of rows right-hand sides.

- if rowsense()[i] == 'L' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'G' then rhs()[i] == rowlower()[i]
- if rowsense()[i] == 'R' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'N' then rhs()[i] == 0.0

Implements OsiSolverInterface.

8.36.4.31 virtual const double* OsiSpxSolverInterface::getRowRange ( ) const [virtual]

Get pointer to array[getNumRows()] of row ranges.

- if rowsense()[i] == 'R' then rowrange()[i] == rowupper()[i] - rowlower()[i]
- if rowsense()[i] != 'R' then rowrange()[i] is 0.0

Implements OsiSolverInterface.

8.36.4.32 virtual const double∗ OsiSpxSolverInterface::getRowLower ( ) const [virtual]

Get pointer to array[getNumRows()] of row lower bounds.

Implements OsiSolverInterface.

8.36.4.33 virtual const double∗ OsiSpxSolverInterface::getRowUpper ( ) const [virtual]

Get pointer to array[getNumRows()] of row upper bounds.

Implements OsiSolverInterface.

8.36.4.34 virtual const double∗ OsiSpxSolverInterface::getObjCoefficients ( ) const [virtual]

Get pointer to array[getNumCols()] of objective function coefficients.

Implements OsiSolverInterface.

8.36.4.35 virtual double OsiSpxSolverInterface::getObjSense ( ) const [virtual]

Get objective function sense (1 for min (default), -1 for max)

Implements OsiSolverInterface.

8.36.4.36 virtual bool OsiSpxSolverInterface::isContinuous (int *colNumber*) const [virtual]

Return true if column is continuous.

Implements OsiSolverInterface.

8.36.4.37 virtual const CoinPackedMatrix∗ OsiSpxSolverInterface::getMatrixByRow ( ) const [virtual]

Get pointer to row-wise copy of matrix.

Implements OsiSolverInterface.

8.36.4.38 virtual const CoinPackedMatrix∗ OsiSpxSolverInterface::getMatrixByCol ( ) const [virtual]

Get pointer to column-wise copy of matrix.

Implements OsiSolverInterface.

8.36.4.39 virtual double OsiSpxSolverInterface::getInfinity ( ) const [virtual]

Get solver's value for infinity.

Implements OsiSolverInterface.

8.36.4.40 virtual const double∗ OsiSpxSolverInterface::getColSolution ( ) const [virtual]

Get pointer to array[getNumCols()] of primal solution vector.

Implements OsiSolverInterface.

8.36.4.41 virtual const double∗ OsiSpxSolverInterface::getRowPrice ( ) const [virtual]

Get pointer to array[getNumRows()] of dual prices.

Implements OsiSolverInterface.

8.36.4.42 virtual const double∗ OsiSpxSolverInterface::getReducedCost ( ) const [virtual]

Get a pointer to array[getNumCols()] of reduced costs.

Implements OsiSolverInterface.

8.36.4.43 virtual const double∗ OsiSpxSolverInterface::getRowActivity ( ) const [virtual]

Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.

Implements OsiSolverInterface.

8.36.4.44 virtual double OsiSpxSolverInterface::getObjValue ( ) const [virtual]

Get objective function value.

Implements OsiSolverInterface.

8.36.4.45 virtual int OsiSpxSolverInterface::getIterationCount ( ) const [virtual]

Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.

Implements OsiSolverInterface.

8.36.4.46 virtual std::vector<double∗> OsiSpxSolverInterface::getDualRays (int *maxNumRays,* bool *fullRay* = `false`) const [virtual]

Get as many dual rays as the solver can provide.

(In case of proven primal infeasibility there should be at least one.)

The first getNumRows() ray components will always be associated with the row duals (as returned by getRowPrice()). If `fullRay` is true, the final getNumCols() entries will correspond to the ray components associated with the nonbasic variables. If the full ray is requested and the method cannot provide it, it will throw an exception.

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumRows() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.36.4.47 virtual std::vector<double∗> OsiSpxSolverInterface::getPrimalRays (int *maxNumRays*) const [virtual]

Get as many primal rays as the solver can provide.

(In case of proven dual infeasibility there should be at least one.)

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumCols() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.36.4.48 virtual void OsiSpxSolverInterface::setObjCoeff (int *elementIndex,* double *elementValue*) [virtual]

Set an objective function coefficient.

Implements OsiSolverInterface.

8.36.4.49 virtual void OsiSpxSolverInterface::setColLower (int *elementIndex,* double *elementValue*) [virtual]

Set a single column lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.36.4.50 virtual void OsiSpxSolverInterface::setColUpper (int *elementIndex,* double *elementValue*) [virtual]

Set a single column upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.36.4.51 virtual void OsiSpxSolverInterface::setColBounds (int *elementIndex,* double *lower,* double *upper*) [virtual]

Set a single column lower and upper bound

The default implementation just invokes `setColLower` and `setColUpper`

Reimplemented from OsiSolverInterface.

8.36.4.52 virtual void OsiSpxSolverInterface::setRowLower (int *elementIndex,* double *elementValue*) [virtual]

Set a single row lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.36.4.53 virtual void OsiSpxSolverInterface::setRowUpper (int *elementIndex,* double *elementValue*) [virtual]

Set a single row upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.36.4.54 virtual void OsiSpxSolverInterface::setRowBounds (int *elementIndex,* double *lower,* double *upper*) [virtual]

Set a single row lower and upper bound

The default implementation just invokes `setRowUower` and `setRowUpper`

Reimplemented from OsiSolverInterface.

8.36.4.55 virtual void OsiSpxSolverInterface::setRowType (int *index,* char *sense,* double *rightHandSide,* double *range*) [virtual]

Set the type of a single row

Implements OsiSolverInterface.

8.36.4.56 virtual void OsiSpxSolverInterface::setContinuous (int *index*) [virtual]

Set the index-th variable to be a continuous variable.

Implements OsiSolverInterface.

8.36.4.57 virtual void OsiSpxSolverInterface::setInteger (int *index*) [virtual]

Set the index-th variable to be an integer variable.

Implements OsiSolverInterface.

8.36.4.58 virtual void OsiSpxSolverInterface::setObjSense (double *s*) [virtual]

Set objective function sense (1 for min (default), -1 for max,)

Implements OsiSolverInterface.

8.36.4.59 virtual void OsiSpxSolverInterface::setColSolution (const double ∗ *colsol*) [virtual]

Set the primal solution column values.

colsol[numcols()] is an array of values of the problem column variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of colsol() until changed by another call to setColsol() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.36.4.60 virtual void OsiSpxSolverInterface::setRowPrice (const double ∗ *rowprice*) [virtual]

Set dual solution vector.

rowprice[numrows()] is an array of values of the problem row dual variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of rowprice() until changed by another call to setRowprice() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.36.4.61 virtual void OsiSpxSolverInterface::addCol (const CoinPackedVectorBase & *vec,* const double *collb,* const double *colub,* const double *obj*) [virtual]

Add a column (primal variable) to the problem.

Implements OsiSolverInterface.

8.36.4.62 virtual void OsiSpxSolverInterface::deleteCols (const int *num,* const int ∗ *colIndices*) [virtual]

Remove a set of columns (primal variables) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted variables are nonbasic.

Implements OsiSolverInterface.

8.36.4.63 virtual void OsiSpxSolverInterface::addRow (const CoinPackedVectorBase & *vec,* const double *rowlb,* const double *rowub*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.36.4.64 virtual void OsiSpxSolverInterface::addRow (const CoinPackedVectorBase & *vec,* const char *rowsen,* const double *rowrhs,* const double *rowrng*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.36.4.65 virtual void OsiSpxSolverInterface::deleteRows (const int *num,* const int ∗ *rowIndices*) [virtual]

Delete a set of rows (constraints) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted rows are loose.

Implements OsiSolverInterface.

8.36.4.66 virtual void OsiSpxSolverInterface::loadProblem (const CoinPackedMatrix & *matrix,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj,* const double ∗ *rowlb,* const double ∗ *rowub*) [virtual]

Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `rowub`: all rows have upper bound infinity
- `rowlb`: all rows have lower bound -infinity
- `obj`: all variables have 0 objective coefficient

Implements OsiSolverInterface.

8.36.4.67 virtual void OsiSpxSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix,* double ∗& *collb,* double ∗& *colub,* double ∗& *obj,* double ∗& *rowlb,* double ∗& *rowub*) [virtual]

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.36.4.68 virtual void OsiSpxSolverInterface::loadProblem (const CoinPackedMatrix & *matrix,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj,* const char ∗ *rowsen,* const double ∗ *rowrhs,* const double ∗ *rowrng*) [virtual]

Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `obj`: all variables have 0 objective coefficient
- `rowsen`: all rows are >=
- `rowrhs`: all right hand sides are 0
- `rowrng`: 0 for the ranged rows

Implements OsiSolverInterface.

8.36.4.69 virtual void OsiSpxSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix,* double ∗& *collb,* double ∗& *colub,* double ∗& *obj,* char ∗& *rowsen,* double ∗& *rowrhs,* double ∗& *rowrng*) `[virtual]`

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.36.4.70 virtual void OsiSpxSolverInterface::loadProblem (const int *numcols,* const int *numrows,* const int ∗ *start,* const int ∗ *index,* const double ∗ *value,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj,* const double ∗ *rowlb,* const double ∗ *rowub*) `[virtual]`

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.36.4.71 virtual void OsiSpxSolverInterface::loadProblem (const int *numcols,* const int *numrows,* const int ∗ *start,* const int ∗ *index,* const double ∗ *value,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj,* const char ∗ *rowsen,* const double ∗ *rowrhs,* const double ∗ *rowrng*) `[virtual]`

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.36.4.72 virtual int OsiSpxSolverInterface::readMps (const char ∗ *filename,* const char ∗ *extension* = `"mps"`) `[virtual]`

Read an mps file from the given filename.

Reimplemented from OsiSolverInterface.

8.36.4.73 virtual void OsiSpxSolverInterface::writeMps (const char ∗ *filename,* const char ∗ *extension* = `"mps"`, double *objSense* = `0.0`) const `[virtual]`

Write the problem into an mps file of the given filename.

If objSense is non zero then -1.0 forces the code to write a maximization objective and +1.0 to write a minimization one. If 0.0 then solver can do what it wants

Implements OsiSolverInterface.

8.36.4.74 virtual OsiSolverInterface∗ OsiSpxSolverInterface::clone (bool *copyData* = `true`) const `[virtual]`

Clone.

Implements OsiSolverInterface.

8.36.4.75 OsiSpxSolverInterface& OsiSpxSolverInterface::operator= (const OsiSpxSolverInterface & *rhs*)

Assignment operator.

8.36.4.76 virtual void OsiSpxSolverInterface::applyRowCut (const OsiRowCut & *rc*) `[protected]`, `[virtual]`

Apply a row cut. Return true if cut was applied.

Implements OsiSolverInterface.

8.36.4.77 virtual void OsiSpxSolverInterface::applyColCut (const OsiColCut & *cc*) `[protected]`, `[virtual]`

Apply a column cut (bound adjustment).

Return true if cut was applied.

Implements OsiSolverInterface.

8.36.4.78 void OsiSpxSolverInterface::freeCachedColRim ( ) [private]

free cached column rim vectors

8.36.4.79 void OsiSpxSolverInterface::freeCachedRowRim ( ) [private]

free cached row rim vectors

8.36.4.80 void OsiSpxSolverInterface::freeCachedResults ( ) [private]

free cached result vectors

8.36.4.81 void OsiSpxSolverInterface::freeCachedMatrix ( ) [private]

free cached matrices

8.36.4.82 void OsiSpxSolverInterface::freeCachedData (int *keepCached* = KEEPCACHED_NONE) [private]

free all cached data (except specified entries, see getLpPtr())

8.36.4.83 void OsiSpxSolverInterface::freeAllMemory ( ) [private]

free all allocated memory

8.36.5 Friends And Related Function Documentation

8.36.5.1 void OsiSpxSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*) [friend]

A function that tests the methods in the OsiSpxSolverInterface class.

8.36.6 Member Data Documentation

8.36.6.1 soplex::SoPlex∗ OsiSpxSolverInterface::soplex_ [protected]

SoPlex solver object.

Definition at line 628 of file OsiSpxSolverInterface.hpp.

8.36.6.2 soplex::DIdxSet∗ OsiSpxSolverInterface::spxintvars_ [private]

indices of integer variables

Definition at line 685 of file OsiSpxSolverInterface.hpp.

8.36.6.3 void∗ OsiSpxSolverInterface::hotStartCStat_ [private]

Hotstart information.

Definition at line 688 of file OsiSpxSolverInterface.hpp.

8.36.6.4 int OsiSpxSolverInterface::hotStartCStatSize_ [private]

Definition at line 689 of file OsiSpxSolverInterface.hpp.

8.36.6.5 void∗ OsiSpxSolverInterface::hotStartRStat_ `[private]`

Definition at line 690 of file OsiSpxSolverInterface.hpp.

8.36.6.6 int OsiSpxSolverInterface::hotStartRStatSize_ `[private]`

Definition at line 691 of file OsiSpxSolverInterface.hpp.

8.36.6.7 int OsiSpxSolverInterface::hotStartMaxIteration_ `[private]`

Definition at line 692 of file OsiSpxSolverInterface.hpp.

8.36.6.8 soplex::DVector∗ OsiSpxSolverInterface::obj_ `[mutable]`, `[private]`

Pointer to objective Vector.

Definition at line 697 of file OsiSpxSolverInterface.hpp.

8.36.6.9 char∗ OsiSpxSolverInterface::rowsense_ `[mutable]`, `[private]`

Pointer to dense vector of row sense indicators.

Definition at line 700 of file OsiSpxSolverInterface.hpp.

8.36.6.10 double∗ OsiSpxSolverInterface::rhs_ `[mutable]`, `[private]`

Pointer to dense vector of row right-hand side values.

Definition at line 703 of file OsiSpxSolverInterface.hpp.

8.36.6.11 double∗ OsiSpxSolverInterface::rowrange_ `[mutable]`, `[private]`

Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)

Definition at line 706 of file OsiSpxSolverInterface.hpp.

8.36.6.12 soplex::DVector∗ OsiSpxSolverInterface::colsol_ `[mutable]`, `[private]`

Pointer to primal solution vector.

Definition at line 709 of file OsiSpxSolverInterface.hpp.

8.36.6.13 soplex::DVector∗ OsiSpxSolverInterface::rowsol_ `[mutable]`, `[private]`

Pointer to dual solution vector.

Definition at line 712 of file OsiSpxSolverInterface.hpp.

8.36.6.14 soplex::DVector∗ OsiSpxSolverInterface::redcost_ `[mutable]`, `[private]`

Pointer to reduced cost vector.

Definition at line 715 of file OsiSpxSolverInterface.hpp.

8.36.6.15 soplex::DVector∗ OsiSpxSolverInterface::rowact_ `[mutable]`, `[private]`

Pointer to row activity (slack) vector.

Definition at line 718 of file OsiSpxSolverInterface.hpp.

8.36.6.16 CoinPackedMatrix∗ OsiSpxSolverInterface::matrixByRow_ [mutable], [private]

Pointer to row-wise copy of problem matrix coefficients.

Definition at line 721 of file OsiSpxSolverInterface.hpp.

8.36.6.17 CoinPackedMatrix∗ OsiSpxSolverInterface::matrixByCol_ [mutable], [private]

Pointer to row-wise copy of problem matrix coefficients.

Definition at line 724 of file OsiSpxSolverInterface.hpp.

The documentation for this class was generated from the following file:

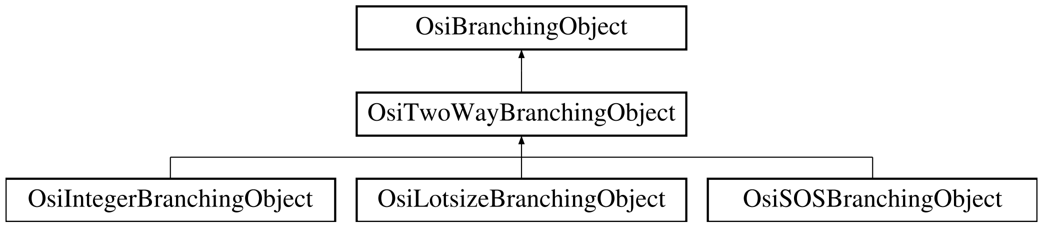
- /home/ted/COIN/trunk/Osi/src/OsiSpx/OsiSpxSolverInterface.hpp

8.37 OsiTwoWayBranchingObject Class Reference

This just adds two-wayness to a branching object.

`#include <OsiBranchingObject.hpp>`

Inheritance diagram for OsiTwoWayBranchingObject:



Public Member Functions

- OsiTwoWayBranchingObject ()

  Default constructor.
- OsiTwoWayBranchingObject (OsiSolverInterface ∗solver, const OsiObject ∗originalObject, int way, double value)

  Create a standard tw0-way branch object.
- OsiTwoWayBranchingObject (const OsiTwoWayBranchingObject &)

  Copy constructor.
- OsiTwoWayBranchingObject & operator= (const OsiTwoWayBranchingObject &rhs)

  Assignment operator.
- virtual ∼OsiTwoWayBranchingObject ()

  Destructor.
- virtual double branch (OsiSolverInterface ∗solver)=0

  Sets the bounds for the variable according to the current arm of the branch and advances the object state to the next arm.
- int firstBranch () const
- int way () const

  Way returns -1 on down +1 on up.

Protected Attributes

- int firstBranch_

  Which way was first branch -1 = down, +1 = up.

8.37.1 Detailed Description

This just adds two-wayness to a branching object.

Definition at line 467 of file OsiBranchingObject.hpp.

8.37.2 Constructor & Destructor Documentation

8.37.2.1 OsiTwoWayBranchingObject::OsiTwoWayBranchingObject ( )

Default constructor.

8.37.2.2 OsiTwoWayBranchingObject::OsiTwoWayBranchingObject (OsiSolverInterface ∗ *solver,* const OsiObject ∗ *originalObject,* int *way,* double *value*)

Create a standard tw0-way branch object.

Specifies a simple two-way branch. Specify way = -1 to set the object state to perform the down arm first, way = 1 for the up arm.

8.37.2.3 OsiTwoWayBranchingObject::OsiTwoWayBranchingObject (const OsiTwoWayBranchingObject &)

Copy constructor.

8.37.2.4 virtual OsiTwoWayBranchingObject::∼OsiTwoWayBranchingObject ( ) [virtual]

Destructor.

8.37.3 Member Function Documentation

8.37.3.1 OsiTwoWayBranchingObject& OsiTwoWayBranchingObject::operator= (const OsiTwoWayBranchingObject & *rhs*)

Assignment operator.

8.37.3.2 virtual double OsiTwoWayBranchingObject::branch (OsiSolverInterface ∗ *solver*) [pure virtual]

Sets the bounds for the variable according to the current arm of the branch and advances the object state to the next arm.

state. Returns change in guessed objective on next branch

Implements OsiBranchingObject.

Implemented in OsiLotsizeBranchingObject, OsiSOSBranchingObject, and OsiIntegerBranchingObject.

8.37.3.3 int OsiTwoWayBranchingObject::firstBranch ( ) const [inline]

Definition at line 500 of file OsiBranchingObject.hpp.

8.37.3.4 int OsiTwoWayBranchingObject::way ( ) const [inline]

Way returns -1 on down +1 on up.

Definition at line 502 of file OsiBranchingObject.hpp.

8.37.4 Member Data Documentation

8.37.4.1 int OsiTwoWayBranchingObject::firstBranch_ [protected]

Which way was first branch -1 = down, +1 = up.

Definition at line 506 of file OsiBranchingObject.hpp.

The documentation for this class was generated from the following file:

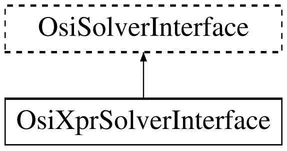
- /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp

8.38 OsiXprSolverInterface Class Reference

XPRESS-MP Solver Interface.

`#include <OsiXprSolverInterface.hpp>`

Inheritance diagram for OsiXprSolverInterface:



Public Member Functions

- virtual void setObjSense (double s)

  Set objective function sense (1 for min (default), -1 for max,)
- virtual void setColSolution (const double ∗colsol)

  Set the primal solution column values.
- virtual void setRowPrice (const double ∗rowprice)

  Set dual solution vector.

Solve methods

- virtual void initialSolve ()

  Solve initial LP relaxation.
- virtual void resolve ()

  Resolve an LP relaxation after problem modification.
- virtual void branchAndBound ()

  Invoke solver's built-in enumeration algorithm.

Parameter set/get methods

The set methods return true if the parameter was set to the given value, false otherwise.

There can be various reasons for failure: the given parameter is not applicable for the solver (e.g., refactorization frequency for the volume algorithm), the parameter is not yet implemented for the solver or simply the value of the parameter is out of the range the solver accepts. If a parameter setting call returns false check the details of your solver.

The get methods return true if the given parameter is applicable for the solver and is implemented. In this case the value of the parameter is returned in the second argument. Otherwise they return false.

- bool setIntParam (OsiIntParam key, int value)
  Set an integer parameter.
- bool setDblParam (OsiDblParam key, double value)
  Set a double parameter.
- bool setStrParam (OsiStrParam key, const std::string &value)
  Set a string parameter.
- bool getIntParam (OsiIntParam key, int &value) const
  Get an integer parameter.
- bool getDblParam (OsiDblParam key, double &value) const
  Get a double parameter.
- bool getStrParam (OsiStrParam key, std::string &value) const
  Get a string parameter.
- void setMipStart (bool value)
- bool getMipStart () const

Methods returning info on how the solution process terminated

- virtual bool isAbandoned () const
  Are there a numerical difficulties?
- virtual bool isProvenOptimal () const
  Is optimality proven?
- virtual bool isProvenPrimalInfeasible () const
  Is primal infeasiblity proven?
- virtual bool isProvenDualInfeasible () const
  Is dual infeasiblity proven?
- virtual bool isPrimalObjectiveLimitReached () const
  Is the given primal objective limit reached?
- virtual bool isDualObjectiveLimitReached () const
  Is the given dual objective limit reached?
- virtual bool isIterationLimitReached () const
  Iteration limit reached?

WarmStart related methods

- CoinWarmStart ∗ getEmptyWarmStart () const
  Get empty warm start object.
- virtual CoinWarmStart ∗ getWarmStart () const
  Get warmstarting information.
- virtual bool setWarmStart (const CoinWarmStart ∗warmstart)
  Set warmstarting information.

Hotstart related methods (primarily used in strong branching). <br>

The user can create a hotstart (a snapshot) of the optimization process then reoptimize over and over again always starting from there.

***NOTE**: between hotstarted optimizations only bound changes are allowed.*

- virtual void markHotStart ()

Create a hotstart point of the optimization process.
- virtual void solveFromHotStart ()

  Optimize starting from the hotstart.
- virtual void unmarkHotStart ()

  Delete the snapshot.

Methods related to querying the input data

- virtual int getNumCols () const

  Get number of columns.
- virtual int getNumRows () const

  Get number of rows.
- virtual int getNumElements () const

  Get number of nonzero elements.
- virtual const double $*$ getColLower () const

  Get pointer to array[getNumCols()] of column lower bounds.
- virtual const double $*$ getColUpper () const

  Get pointer to array[getNumCols()] of column upper bounds.
- virtual const char $*$ getRowSense () const

  Get pointer to array[getNumRows()] of row constraint senses.
- virtual const double $*$ getRightHandSide () const

  Get pointer to array[getNumRows()] of rows right-hand sides.
- virtual const double $*$ getRowRange () const

  Get pointer to array[getNumRows()] of row ranges.
- virtual const double $*$ getRowLower () const

  Get pointer to array[getNumRows()] of row lower bounds.
- virtual const double $*$ getRowUpper () const

  Get pointer to array[getNumRows()] of row upper bounds.
- virtual const double $*$ getObjCoefficients () const

  Get pointer to array[getNumCols()] of objective function coefficients.
- virtual double getObjSense () const

  Get objective function sense (1 for min (default), -1 for max)
- virtual bool isContinuous (int colIndex) const

  Return true if variable is continuous.
- virtual const CoinPackedMatrix $*$ getMatrixByRow () const

  Get pointer to row-wise copy of matrix.
- virtual const CoinPackedMatrix $*$ getMatrixByCol () const

  Get pointer to column-wise copy of matrix.
- virtual double getInfinity () const

  Get solver's value for infinity.

Methods related to querying the solution

- virtual const double $*$ getColSolution () const

  Get pointer to array[getNumCols()] of primal solution vector.
- virtual const double $*$ getRowPrice () const

  Get pointer to array[getNumRows()] of dual prices.
- virtual const double $*$ getReducedCost () const

  Get a pointer to array[getNumCols()] of reduced costs.
- virtual const double $*$ getRowActivity () const

  Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.
- virtual double getObjValue () const

  Get objective function value.
- virtual int getIterationCount () const

Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.

- virtual std::vector< double ∗ > getDualRays (int maxNumRays, bool fullRay=false) const

  Get as many dual rays as the solver can provide.
- virtual std::vector< double ∗ > getPrimalRays (int maxNumRays) const

  Get as many primal rays as the solver can provide.

Changing bounds on variables and constraints

- virtual void setObjCoeff (int elementIndex, double elementValue)

  Set an objective function coefficient.
- virtual void setColLower (int elementIndex, double elementValue)

  Set a single column lower bound
  Use -COIN_DBL_MAX for -infinity.
- virtual void setColUpper (int elementIndex, double elementValue)

  Set a single column upper bound
  Use COIN_DBL_MAX for infinity.
- virtual void setColBounds (int elementIndex, double lower, double upper)

  Set a single column lower and upper bound
  The default implementation just invokes setColLower() and setColUpper()
- virtual void setColSetBounds (const int ∗indexFirst, const int ∗indexLast, const double ∗boundList)

  Set the bounds on a number of columns simultaneously
  The default implementation just invokes setColLower() and setColUpper() over and over again.
- virtual void setRowLower (int elementIndex, double elementValue)

  Set a single row lower bound
  Use -COIN_DBL_MAX for -infinity.
- virtual void setRowUpper (int elementIndex, double elementValue)

  Set a single row upper bound
  Use COIN_DBL_MAX for infinity.
- virtual void setRowBounds (int elementIndex, double lower, double upper)

  Set a single row lower and upper bound
  The default implementation just invokes setRowLower() and setRowUpper()
- virtual void setRowType (int index, char sense, double rightHandSide, double range)

  Set the type of a single row
- virtual void setRowSetBounds (const int ∗indexFirst, const int ∗indexLast, const double ∗boundList)

  Set the bounds on a number of rows simultaneously
  The default implementation just invokes setRowLower() and setRowUpper() over and over again.
- virtual void setRowSetTypes (const int ∗indexFirst, const int ∗indexLast, const char ∗senseList, const double ∗rhsList, const double ∗rangeList)

  Set the type of a number of rows simultaneously
  The default implementation just invokes setRowType() over and over again.

Integrality related changing methods

- virtual void setContinuous (int index)

  Set the index-th variable to be a continuous variable.
- virtual void setInteger (int index)

  Set the index-th variable to be an integer variable.
- virtual void setContinuous (const int ∗indices, int len)

  Set the variables listed in indices (which is of length len) to be continuous variables.
- virtual void setInteger (const int ∗indices, int len)

  Set the variables listed in indices (which is of length len) to be integer variables.

Methods to expand a problem.<br>

Note that if a column is added then by default it will correspond to a continuous variable.

- virtual void addCol (const CoinPackedVectorBase &vec, const double collb, const double colub, const double obj)

  Add a column (primal variable) to the problem.
- virtual void addCols (const int numcols, const CoinPackedVectorBase ∗const ∗cols, const double ∗collb, const double ∗colub, const double ∗obj)

  Add a set of columns (primal variables) to the problem.
- virtual void deleteCols (const int num, const int ∗colIndices)

  Remove a set of columns (primal variables) from the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const double rowlb, const double rowub)

  Add a row (constraint) to the problem.
- virtual void addRow (const CoinPackedVectorBase &vec, const char rowsen, const double rowrhs, const double rowrng)

  Add a row (constraint) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const double ∗rowlb, const double ∗rowub)

  Add a set of rows (constraints) to the problem.
- virtual void addRows (const int numrows, const CoinPackedVectorBase ∗const ∗rows, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Add a set of rows (constraints) to the problem.
- virtual void deleteRows (const int num, const int ∗rowIndices)

  Delete a set of rows (constraints) from the problem.

Methods to input a problem

- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)

  Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, double ∗&rowlb, double ∗&rowub)

  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).
- virtual void loadProblem (const CoinPackedMatrix &matrix, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void assignProblem (CoinPackedMatrix ∗&matrix, double ∗&collb, double ∗&colub, double ∗&obj, char ∗&rowsen, double ∗&rowrhs, double ∗&rowrng)

  Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const double ∗rowlb, const double ∗rowub)

  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual void loadProblem (const int numcols, const int numrows, const int ∗start, const int ∗index, const double ∗value, const double ∗collb, const double ∗colub, const double ∗obj, const char ∗rowsen, const double ∗rowrhs, const double ∗rowrng)

  Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).
- virtual int readMps (const char ∗filename, const char ∗extension="mps")

  Read an mps file from the given filename.
- virtual void writeMps (const char ∗filename, const char ∗extension="mps", double objSense=0.0) const

  Write the problem into an mps file of the given filename.

Message handling

- void passInMessageHandler (CoinMessageHandler ∗handler)

Pass in a message handler It is the client's responsibility to destroy a message handler installed by this routine; it will not be destroyed when the solver interface is destroyed.

Constructors and destructors

- OsiXprSolverInterface (int newrows=50, int newnz=100)
  Default Constructor.
- virtual OsiSolverInterface ∗ clone (bool copyData=true) const
  Clone.
- OsiXprSolverInterface (const OsiXprSolverInterface &)
  Copy constructor.
- OsiXprSolverInterface & operator= (const OsiXprSolverInterface &rhs)
  Assignment operator.
- virtual ∼OsiXprSolverInterface ()
  Destructor.

Static Public Member Functions

- static int version ()
  Return XPRESS-MP Version number.

Protected Member Functions

Protected methods

- virtual void applyRowCut (const OsiRowCut &rc)
  Apply a row cut. Return true if cut was applied.
- virtual void applyColCut (const OsiColCut &cc)
  Apply a column cut (bound adjustment).

Private Member Functions

Private methods

- void gutsOfCopy (const OsiXprSolverInterface &source)
  The real work of a copy constructor (used by copy and assignment)
- void gutsOfConstructor ()
  The real work of a constructor (used by construct and assignment)
- void gutsOfDestructor ()
  The real work of a destructor (used by copy and assignment)
- void freeSolution ()
  Destroy cached copy of solution data (whenever it changes)
- void freeCachedResults ()
  Destroy cached copies of problem and solution data (whenever they change)
- int getNumIntVars () const
  Number of integer variables in the problem.

Methods to support for XPRESS-MP multiple matrix facility

- void getVarTypes () const
  Build cached copy of variable types.
- void activateMe () const
  Save the current problem in XPRESS (if necessary) and make this problem current (restore if necessary).
- bool isDataLoaded () const
  Save and restore are necessary if there is data associated with this problem.

Private Attributes

- bool domipstart

  Whether to pass a column solution to XPRESS before starting MIP solve (loadmipsol)

Data to support for XPRESS-MP multiple matrix facility

- XPRSprob prob_
- std::string xprProbname_

  XPRESS problem name (should be unique for each saved problem)

Cached copies of XPRESS-MP problem data

- CoinPackedMatrix ∗ matrixByRow_

  Pointer to row-wise copy of problem matrix coefficients.
- CoinPackedMatrix ∗ matrixByCol_
- double ∗ colupper_

  Pointer to dense vector of structural variable upper bounds.
- double ∗ collower_

  Pointer to dense vector of structural variable lower bounds.
- double ∗ rowupper_

  Pointer to dense vector of slack variable upper bounds.
- double ∗ rowlower_

  Pointer to dense vector of slack variable lower bounds.
- char ∗ rowsense_

  Pointer to dense vector of row sense indicators.
- double ∗ rhs_

  Pointer to dense vector of row right-hand side values.
- double ∗ rowrange_

  Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)
- double ∗ objcoeffs_

  Pointer to dense vector of objective coefficients.
- double objsense_

  Sense of objective (1 for min; -1 for max)
- double ∗ colsol_

  Pointer to dense vector of primal structural variable values.
- double ∗ rowsol_

  Pointer to dense vector of primal slack variable values.
- double ∗ rowact_

  Pointer to dense vector of primal slack variable values.
- double ∗ rowprice_

  Pointer to dense vector of dual row variable values.
- double ∗ colprice_

  Pointer to dense vector of dual column variable values.
- int ∗ ivarind_

  Pointer to list of indices of XPRESS "global" variables.
- char ∗ ivartype_

  Pointer to list of global variable types:
- char ∗ vartype_

  Pointer to dense vector of variable types (as above, or 'C' for continuous)
- bool lastsolvewasmip

  Indicates whether the last solve was for a MIP or an LP.

Static Private Attributes

Private static class data

- static const char ∗ logFileName_
  Name of the logfile.
- static FILE ∗ logFilePtr_
  The FILE∗ to the logfile.
- static unsigned int numInstances_
  Number of live problem instances.
- static unsigned int osiSerial_
  Counts calls to incrementInstanceCounter()

Friends

- void OsiXprSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)
  A function that tests the methods in the OsiXprSolverInterface class.

Static instance counter methods

- XPRSprob getLpPtr ()
  Return a pointer to the XPRESS problem.
- static void incrementInstanceCounter ()
  XPRESS has a context that must be created prior to all other XPRESS calls.
- static void decrementInstanceCounter ()
  XPRESS has a context that should be deleted after XPRESS calls.
- static unsigned int getNumInstances ()
  Return the number of instances of instantiated objects using XPRESS services.

Log File

- static int iXprCallCount_
- static FILE ∗ getLogFilePtr ()
  Get logfile FILE ∗.
- static void setLogFileName (const char ∗filename)
  Set logfile name.

Additional Inherited Members

8.38.1 Detailed Description

XPRESS-MP Solver Interface.

Instantiation of OsiSolverInterface for XPRESS-MP

Definition at line 21 of file OsiXprSolverInterface.hpp.

8.38.2 Constructor & Destructor Documentation

8.38.2.1 OsiXprSolverInterface::OsiXprSolverInterface (int *newrows* = `50`, int *newnz* = `100`)

Default Constructor.

8.38.2.2 OsiXprSolverInterface::OsiXprSolverInterface (const **OsiXprSolverInterface** &)

Copy constructor.

8.38.2.3 virtual OsiXprSolverInterface::∼OsiXprSolverInterface ( ) `[virtual]`

Destructor.

8.38.3 Member Function Documentation

8.38.3.1 virtual void OsiXprSolverInterface::initialSolve ( ) `[virtual]`

Solve initial LP relaxation.

Implements OsiSolverInterface.

8.38.3.2 virtual void OsiXprSolverInterface::resolve ( ) `[virtual]`

Resolve an LP relaxation after problem modification.

Implements OsiSolverInterface.

8.38.3.3 virtual void OsiXprSolverInterface::branchAndBound ( ) `[virtual]`

Invoke solver's built-in enumeration algorithm.

Implements OsiSolverInterface.

8.38.3.4 bool OsiXprSolverInterface::setIntParam (**OsiIntParam** *key*, int *value*) `[virtual]`

Set an integer parameter.

Reimplemented from OsiSolverInterface.

8.38.3.5 bool OsiXprSolverInterface::setDblParam (**OsiDblParam** *key*, double *value*) `[virtual]`

Set a double parameter.

Reimplemented from OsiSolverInterface.

8.38.3.6 bool OsiXprSolverInterface::setStrParam (**OsiStrParam** *key*, const std::string & *value*) `[virtual]`

Set a string parameter.

Reimplemented from OsiSolverInterface.

8.38.3.7 bool OsiXprSolverInterface::getIntParam (**OsiIntParam** *key*, int & *value*) const `[virtual]`

Get an integer parameter.

Reimplemented from OsiSolverInterface.

8.38.3.8 bool OsiXprSolverInterface::getDblParam (**OsiDblParam** *key*, double & *value*) const `[virtual]`

Get a double parameter.

Reimplemented from OsiSolverInterface.

8.38.3.9 bool OsiXprSolverInterface::getStrParam (OsiStrParam *key*, std::string & *value*) const [virtual]

Get a string parameter.

Reimplemented from OsiSolverInterface.

8.38.3.10 void OsiXprSolverInterface::setMipStart (bool *value*) [inline]

Definition at line 64 of file OsiXprSolverInterface.hpp.

8.38.3.11 bool OsiXprSolverInterface::getMipStart ( ) const [inline]

Definition at line 66 of file OsiXprSolverInterface.hpp.

8.38.3.12 virtual bool OsiXprSolverInterface::isAbandoned ( ) const [virtual]

Are there a numerical difficulties?

Implements OsiSolverInterface.

8.38.3.13 virtual bool OsiXprSolverInterface::isProvenOptimal ( ) const [virtual]

Is optimality proven?

Implements OsiSolverInterface.

8.38.3.14 virtual bool OsiXprSolverInterface::isProvenPrimalInfeasible ( ) const [virtual]

Is primal infeasiblity proven?

Implements OsiSolverInterface.

8.38.3.15 virtual bool OsiXprSolverInterface::isProvenDualInfeasible ( ) const [virtual]

Is dual infeasiblity proven?

Implements OsiSolverInterface.

8.38.3.16 virtual bool OsiXprSolverInterface::isPrimalObjectiveLimitReached ( ) const [virtual]

Is the given primal objective limit reached?

Reimplemented from OsiSolverInterface.

8.38.3.17 virtual bool OsiXprSolverInterface::isDualObjectiveLimitReached ( ) const [virtual]

Is the given dual objective limit reached?

Reimplemented from OsiSolverInterface.

8.38.3.18 virtual bool OsiXprSolverInterface::isIterationLimitReached ( ) const [virtual]

Iteration limit reached?

Implements OsiSolverInterface.

8.38.3.19 CoinWarmStart∗ OsiXprSolverInterface::getEmptyWarmStart ( ) const [virtual]

Get empty warm start object.

Implements OsiSolverInterface.

8.38.3.20 virtual CoinWarmStart∗ OsiXprSolverInterface::getWarmStart ( ) const [virtual]

Get warmstarting information.

Implements OsiSolverInterface.

8.38.3.21 virtual bool OsiXprSolverInterface::setWarmStart (const CoinWarmStart ∗ *warmstart*) [virtual]

Set warmstarting information.

Return true/false depending on whether the warmstart information was accepted or not.

Implements OsiSolverInterface.

8.38.3.22 virtual void OsiXprSolverInterface::markHotStart ( ) [virtual]

Create a hotstart point of the optimization process.

Reimplemented from OsiSolverInterface.

8.38.3.23 virtual void OsiXprSolverInterface::solveFromHotStart ( ) [virtual]

Optimize starting from the hotstart.

Reimplemented from OsiSolverInterface.

8.38.3.24 virtual void OsiXprSolverInterface::unmarkHotStart ( ) [virtual]

Delete the snapshot.

Reimplemented from OsiSolverInterface.

8.38.3.25 virtual int OsiXprSolverInterface::getNumCols ( ) const [virtual]

Get number of columns.

Implements OsiSolverInterface.

8.38.3.26 virtual int OsiXprSolverInterface::getNumRows ( ) const [virtual]

Get number of rows.

Implements OsiSolverInterface.

8.38.3.27 virtual int OsiXprSolverInterface::getNumElements ( ) const [virtual]

Get number of nonzero elements.

Implements OsiSolverInterface.

8.38.3.28 virtual const double∗ OsiXprSolverInterface::getColLower ( ) const [virtual]

Get pointer to array[getNumCols()] of column lower bounds.

Implements OsiSolverInterface.

8.38.3.29 virtual const double∗ OsiXprSolverInterface::getColUpper ( ) const [virtual]

Get pointer to array[getNumCols()] of column upper bounds.

Implements OsiSolverInterface.

8.38.3.30 virtual const char* OsiXprSolverInterface::getRowSense ( ) const [virtual]

Get pointer to array[getNumRows()] of row constraint senses.

- 'L': <= constraint
- 'E': = constraint
- 'G': >= constraint
- 'R': ranged constraint
- 'N': free constraint

Implements OsiSolverInterface.

8.38.3.31 virtual const double* OsiXprSolverInterface::getRightHandSide ( ) const [virtual]

Get pointer to array[getNumRows()] of rows right-hand sides.

- if rowsense()[i] == 'L' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'G' then rhs()[i] == rowlower()[i]
- if rowsense()[i] == 'R' then rhs()[i] == rowupper()[i]
- if rowsense()[i] == 'N' then rhs()[i] == 0.0

Implements OsiSolverInterface.

8.38.3.32 virtual const double* OsiXprSolverInterface::getRowRange ( ) const [virtual]

Get pointer to array[getNumRows()] of row ranges.

- if rowsense()[i] == 'R' then rowrange()[i] == rowupper()[i] - rowlower()[i]
- if rowsense()[i] != 'R' then rowrange()[i] is 0.0

Implements OsiSolverInterface.

8.38.3.33 virtual const double* OsiXprSolverInterface::getRowLower ( ) const [virtual]

Get pointer to array[getNumRows()] of row lower bounds.

Implements OsiSolverInterface.

8.38.3.34 virtual const double* OsiXprSolverInterface::getRowUpper ( ) const [virtual]

Get pointer to array[getNumRows()] of row upper bounds.

Implements OsiSolverInterface.

8.38.3.35 virtual const double* OsiXprSolverInterface::getObjCoefficients ( ) const [virtual]

Get pointer to array[getNumCols()] of objective function coefficients.

Implements OsiSolverInterface.

8.38.3.36 virtual double OsiXprSolverInterface::getObjSense ( ) const [virtual]

Get objective function sense (1 for min (default), -1 for max)

Implements OsiSolverInterface.

8.38.3.37 virtual bool OsiXprSolverInterface::isContinuous (int *colIndex*) const [virtual]

Return true if variable is continuous.

Implements OsiSolverInterface.

8.38.3.38 virtual const CoinPackedMatrix∗ OsiXprSolverInterface::getMatrixByRow ( ) const [virtual]

Get pointer to row-wise copy of matrix.

Implements OsiSolverInterface.

8.38.3.39 virtual const CoinPackedMatrix∗ OsiXprSolverInterface::getMatrixByCol ( ) const [virtual]

Get pointer to column-wise copy of matrix.

Implements OsiSolverInterface.

8.38.3.40 virtual double OsiXprSolverInterface::getInfinity ( ) const [virtual]

Get solver's value for infinity.

Implements OsiSolverInterface.

8.38.3.41 virtual const double∗ OsiXprSolverInterface::getColSolution ( ) const [virtual]

Get pointer to array[getNumCols()] of primal solution vector.

Implements OsiSolverInterface.

8.38.3.42 virtual const double∗ OsiXprSolverInterface::getRowPrice ( ) const [virtual]

Get pointer to array[getNumRows()] of dual prices.

Implements OsiSolverInterface.

8.38.3.43 virtual const double∗ OsiXprSolverInterface::getReducedCost ( ) const [virtual]

Get a pointer to array[getNumCols()] of reduced costs.

Implements OsiSolverInterface.

8.38.3.44 virtual const double∗ OsiXprSolverInterface::getRowActivity ( ) const [virtual]

Get pointer to array[getNumRows()] of row activity levels (constraint matrix times the solution vector.

Implements OsiSolverInterface.

8.38.3.45 virtual double OsiXprSolverInterface::getObjValue ( ) const [virtual]

Get objective function value.

Implements OsiSolverInterface.

8.38.3.46 virtual int OsiXprSolverInterface::getIterationCount ( ) const [virtual]

Get how many iterations it took to solve the problem (whatever "iteration" mean to the solver.

Implements OsiSolverInterface.

8.38.3.47 virtual std::vector<double*> OsiXprSolverInterface::getDualRays (int *maxNumRays*, bool *fullRay* = `false`) const [virtual]

Get as many dual rays as the solver can provide.

(In case of proven primal infeasibility there should be at least one.)

The first getNumRows() ray components will always be associated with the row duals (as returned by getRowPrice()). If `fullRay` is true, the final getNumCols() entries will correspond to the ray components associated with the nonbasic variables. If the full ray is requested and the method cannot provide it, it will throw an exception.

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumRows() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.38.3.48 virtual std::vector<double*> OsiXprSolverInterface::getPrimalRays (int *maxNumRays*) const [virtual]

Get as many primal rays as the solver can provide.

(In case of proven dual infeasibility there should be at least one.)

NOTE for implementers of solver interfaces:

The double pointers in the vector should point to arrays of length getNumCols() and they should be allocated via new[].

NOTE for users of solver interfaces:

It is the user's responsibility to free the double pointers in the vector using delete[].

Implements OsiSolverInterface.

8.38.3.49 virtual void OsiXprSolverInterface::setObjCoeff (int *elementIndex*, double *elementValue*) [virtual]

Set an objective function coefficient.

Implements OsiSolverInterface.

8.38.3.50 virtual void OsiXprSolverInterface::setColLower (int *elementIndex*, double *elementValue*) [virtual]

Set a single column lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.38.3.51 virtual void OsiXprSolverInterface::setColUpper (int *elementIndex*, double *elementValue*) [virtual]

Set a single column upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.38.3.52 virtual void OsiXprSolverInterface::setColBounds (int *elementIndex*, double *lower*, double *upper*) [virtual]

Set a single column lower and upper bound

The default implementation just invokes setColLower() and setColUpper()

Reimplemented from OsiSolverInterface.

8.38.3.53 virtual void OsiXprSolverInterface::setColSetBounds (const int ∗ *indexFirst*, const int ∗ *indexLast*, const double ∗ *boundList*) [virtual]

Set the bounds on a number of columns simultaneously

The default implementation just invokes setColLower() and setColUpper() over and over again.

Parameters

indexFirst,index-Last	pointers to the beginning and after the end of the array of the indices of the variables whose *either* bound changes
boundList	the new lower/upper bound pairs for the variables

Reimplemented from OsiSolverInterface.

8.38.3.54 virtual void OsiXprSolverInterface::setRowLower (int *elementIndex*, double *elementValue*) [virtual]

Set a single row lower bound

Use -COIN_DBL_MAX for -infinity.

Implements OsiSolverInterface.

8.38.3.55 virtual void OsiXprSolverInterface::setRowUpper (int *elementIndex*, double *elementValue*) [virtual]

Set a single row upper bound

Use COIN_DBL_MAX for infinity.

Implements OsiSolverInterface.

8.38.3.56 virtual void OsiXprSolverInterface::setRowBounds (int *elementIndex*, double *lower*, double *upper*) [virtual]

Set a single row lower and upper bound

The default implementation just invokes setRowLower() and setRowUpper()

Reimplemented from OsiSolverInterface.

8.38.3.57 virtual void OsiXprSolverInterface::setRowType (int *index*, char *sense*, double *rightHandSide*, double *range*) [virtual]

Set the type of a single row

Implements OsiSolverInterface.

8.38.3.58 virtual void OsiXprSolverInterface::setRowSetBounds (const int ∗ *indexFirst*, const int ∗ *indexLast*, const double ∗ *boundList*) [virtual]

Set the bounds on a number of rows simultaneously

The default implementation just invokes setRowLower() and setRowUpper() over and over again.

Parameters

indexFirst,index-Last	pointers to the beginning and after the end of the array of the indices of the constraints whose *either* bound changes
boundList	the new lower/upper bound pairs for the constraints

Reimplemented from OsiSolverInterface.

8.38.3.59 virtual void OsiXprSolverInterface::setRowSetTypes (const int * *indexFirst*, const int * *indexLast*, const char * *senseList*, const double * *rhsList*, const double * *rangeList*) [virtual]

Set the type of a number of rows simultaneously

The default implementation just invokes setRowType() over and over again.

Parameters

indexFirst,index-Last	pointers to the beginning and after the end of the array of the indices of the constraints whose *any* characteristics changes
senseList	the new senses
rhsList	the new right hand sides
rangeList	the new ranges

Reimplemented from OsiSolverInterface.

8.38.3.60 virtual void OsiXprSolverInterface::setContinuous (int *index*) [virtual]

Set the index-th variable to be a continuous variable.

Implements OsiSolverInterface.

8.38.3.61 virtual void OsiXprSolverInterface::setInteger (int *index*) [virtual]

Set the index-th variable to be an integer variable.

Implements OsiSolverInterface.

8.38.3.62 virtual void OsiXprSolverInterface::setContinuous (const int * *indices*, int *len*) [virtual]

Set the variables listed in indices (which is of length len) to be continuous variables.

Reimplemented from OsiSolverInterface.

8.38.3.63 virtual void OsiXprSolverInterface::setInteger (const int * *indices*, int *len*) [virtual]

Set the variables listed in indices (which is of length len) to be integer variables.

Reimplemented from OsiSolverInterface.

8.38.3.64 virtual void OsiXprSolverInterface::setObjSense (double *s*) [virtual]

Set objective function sense (1 for min (default), -1 for max,)

Implements OsiSolverInterface.

8.38.3.65 virtual void OsiXprSolverInterface::setColSolution (const double * *colsol*) [virtual]

Set the primal solution column values.

colsol[numcols()] is an array of values of the problem column variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of colsol() until changed by another call to setColsol()

or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.38.3.66 virtual void OsiXprSolverInterface::setRowPrice (const double ∗ *rowprice*) [virtual]

Set dual solution vector.

rowprice[numrows()] is an array of values of the problem row dual variables. These values are copied to memory owned by the solver object or the solver. They will be returned as the result of rowprice() until changed by another call to setRowprice() or by a call to any solver routine. Whether the solver makes use of the solution in any way is solver-dependent.

Implements OsiSolverInterface.

8.38.3.67 virtual void OsiXprSolverInterface::addCol (const CoinPackedVectorBase & *vec*, const double *collb*, const double *colub*, const double *obj*) [virtual]

Add a column (primal variable) to the problem.

Implements OsiSolverInterface.

8.38.3.68 virtual void OsiXprSolverInterface::addCols (const int *numcols*, const CoinPackedVectorBase ∗const ∗ *cols*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*) [virtual]

Add a set of columns (primal variables) to the problem.

The default implementation simply makes repeated calls to addCol().

Reimplemented from OsiSolverInterface.

8.38.3.69 virtual void OsiXprSolverInterface::deleteCols (const int *num*, const int ∗ *colIndices*) [virtual]

Remove a set of columns (primal variables) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted variables are nonbasic.

Implements OsiSolverInterface.

8.38.3.70 virtual void OsiXprSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const double *rowlb*, const double *rowub*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.38.3.71 virtual void OsiXprSolverInterface::addRow (const CoinPackedVectorBase & *vec*, const char *rowsen*, const double *rowrhs*, const double *rowrng*) [virtual]

Add a row (constraint) to the problem.

Implements OsiSolverInterface.

8.38.3.72 virtual void OsiXprSolverInterface::addRows (const int *numrows*, const CoinPackedVectorBase ∗const ∗ *rows*, const double ∗ *rowlb*, const double ∗ *rowub*) [virtual]

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented from OsiSolverInterface.

8.38.3.73 virtual void OsiXprSolverInterface::addRows (const int *numrows*, const CoinPackedVectorBase ∗const ∗ *rows*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) `[virtual]`

Add a set of rows (constraints) to the problem.

The default implementation simply makes repeated calls to addRow().

Reimplemented from OsiSolverInterface.

8.38.3.74 virtual void OsiXprSolverInterface::deleteRows (const int *num*, const int ∗ *rowIndices*) `[virtual]`

Delete a set of rows (constraints) from the problem.

The solver interface for a basis-oriented solver will maintain valid warm start information if all deleted rows are loose.

Implements OsiSolverInterface.

8.38.3.75 virtual void OsiXprSolverInterface::loadProblem (const CoinPackedMatrix & *matrix*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const double ∗ *rowlb*, const double ∗ *rowub*) `[virtual]`

Load in an problem by copying the arguments (the constraints on the rows are given by lower and upper bounds).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `rowub`: all rows have upper bound infinity
- `rowlb`: all rows have lower bound -infinity
- `obj`: all variables have 0 objective coefficient

Implements OsiSolverInterface.

8.38.3.76 virtual void OsiXprSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix*, double ∗& *collb*, double ∗& *colub*, double ∗& *obj*, double ∗& *rowlb*, double ∗& *rowub*) `[virtual]`

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by lower and upper bounds).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.38.3.77 virtual void OsiXprSolverInterface::loadProblem (const CoinPackedMatrix & *matrix*, const double ∗ *collb*, const double ∗ *colub*, const double ∗ *obj*, const char ∗ *rowsen*, const double ∗ *rowrhs*, const double ∗ *rowrng*) `[virtual]`

Load in an problem by copying the arguments (the constraints on the rows are given by sense/rhs/range triplets).

If a pointer is 0 then the following values are the default:

- `colub`: all columns have upper bound infinity
- `collb`: all columns have lower bound 0
- `obj`: all variables have 0 objective coefficient
- `rowsen`: all rows are $>=$

- `rowrhs`: all right hand sides are 0
- `rowrng`: 0 for the ranged rows

Implements OsiSolverInterface.

8.38.3.78 virtual void OsiXprSolverInterface::assignProblem (CoinPackedMatrix ∗& *matrix,* double ∗& *collb,* double ∗& *colub,* double ∗& *obj,* char ∗& *rowsen,* double ∗& *rowrhs,* double ∗& *rowrng*) `[virtual]`

Load in an problem by assuming ownership of the arguments (the constraints on the rows are given by sense/rhs/range triplets).

For default values see the previous method.

WARNING: The arguments passed to this method will be freed using the C++ `delete` and `delete[]` functions.

Implements OsiSolverInterface.

8.38.3.79 virtual void OsiXprSolverInterface::loadProblem (const int *numcols,* const int *numrows,* const int ∗ *start,* const int ∗ *index,* const double ∗ *value,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj,* const double ∗ *rowlb,* const double ∗ *rowub*) `[virtual]`

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.38.3.80 virtual void OsiXprSolverInterface::loadProblem (const int *numcols,* const int *numrows,* const int ∗ *start,* const int ∗ *index,* const double ∗ *value,* const double ∗ *collb,* const double ∗ *colub,* const double ∗ *obj,* const char ∗ *rowsen,* const double ∗ *rowrhs,* const double ∗ *rowrng*) `[virtual]`

Just like the other loadProblem() methods except that the matrix is given in a standard column major ordered format (without gaps).

8.38.3.81 virtual int OsiXprSolverInterface::readMps (const char ∗ *filename,* const char ∗ *extension* = `"mps"`) `[virtual]`

Read an mps file from the given filename.

Reimplemented from OsiSolverInterface.

8.38.3.82 virtual void OsiXprSolverInterface::writeMps (const char ∗ *filename,* const char ∗ *extension* = `"mps"`, double *objSense* = `0.0`) const `[virtual]`

Write the problem into an mps file of the given filename.

If objSense is non zero then -1.0 forces the code to write a maximization objective and +1.0 to write a minimization one. If 0.0 then solver can do what it wants

Implements OsiSolverInterface.

8.38.3.83 void OsiXprSolverInterface::passInMessageHandler (CoinMessageHandler ∗ *handler*) `[virtual]`

Pass in a message handler It is the client's responsibility to destroy a message handler installed by this routine; it will not be destroyed when the solver interface is destroyed.

Reimplemented from OsiSolverInterface.

8.38.3.84 static void OsiXprSolverInterface::incrementInstanceCounter ( ) `[static]`

XPRESS has a context that must be created prior to all other XPRESS calls.

This method:

- Increments by 1 the number of uses of the XPRESS environment.
- Creates the XPRESS context when the number of uses is changed to 1 from 0.

8.38.3.85 static void OsiXprSolverInterface::decrementInstanceCounter ( ) `[static]`

XPRESS has a context that should be deleted after XPRESS calls.

This method:

- Decrements by 1 the number of uses of the XPRESS environment.
- Deletes the XPRESS context when the number of uses is change to 0 from 1.

8.38.3.86 static unsigned int OsiXprSolverInterface::getNumInstances ( ) `[static]`

Return the number of instances of instantiated objects using XPRESS services.

8.38.3.87 XPRSprob OsiXprSolverInterface::getLpPtr ( ) `[inline]`

Return a pointer to the XPRESS problem.

Definition at line 606 of file OsiXprSolverInterface.hpp.

8.38.3.88 static int OsiXprSolverInterface::version ( ) `[static]`

Return XPRESS-MP Version number.

8.38.3.89 static FILE∗ OsiXprSolverInterface::getLogFilePtr ( ) `[static]`

Get logfile FILE ∗.

8.38.3.90 static void OsiXprSolverInterface::setLogFileName (const char ∗ *filename*) `[static]`

Set logfile name.

The logfile is an attempt to capture the calls to Xpress functions for debugging.

8.38.3.91 virtual OsiSolverInterface∗ OsiXprSolverInterface::clone (bool *copyData* = `true`) const `[virtual]`

Clone.

Implements OsiSolverInterface.

8.38.3.92 OsiXprSolverInterface& OsiXprSolverInterface::operator= (const OsiXprSolverInterface & *rhs*)

Assignment operator.

8.38.3.93 virtual void OsiXprSolverInterface::applyRowCut (const OsiRowCut & *rc*) `[protected]`, `[virtual]`

Apply a row cut. Return true if cut was applied.

Implements OsiSolverInterface.

8.38.3.94 virtual void OsiXprSolverInterface::applyColCut (const OsiColCut & *cc*) `[protected]`, `[virtual]`

Apply a column cut (bound adjustment).

Return true if cut was applied.

Implements OsiSolverInterface.

8.38.3.95 void OsiXprSolverInterface::gutsOfCopy (const **OsiXprSolverInterface** & *source*) [private]

The real work of a copy constructor (used by copy and assignment)

8.38.3.96 void OsiXprSolverInterface::gutsOfConstructor ( ) [private]

The real work of a constructor (used by construct and assignment)

8.38.3.97 void OsiXprSolverInterface::gutsOfDestructor ( ) [private]

The real work of a destructor (used by copy and assignment)

8.38.3.98 void OsiXprSolverInterface::freeSolution ( ) [private]

Destroy cached copy of solution data (whenever it changes)

8.38.3.99 void OsiXprSolverInterface::freeCachedResults ( ) [private]

Destroy cached copies of problem and solution data (whenever they change)

8.38.3.100 int OsiXprSolverInterface::getNumIntVars ( ) const [private]

Number of integer variables in the problem.

8.38.3.101 void OsiXprSolverInterface::getVarTypes ( ) const [private]

Build cached copy of variable types.

8.38.3.102 void OsiXprSolverInterface::activateMe ( ) const [private]

Save the current problem in XPRESS (if necessary) and make this problem current (restore if necessary).

8.38.3.103 bool OsiXprSolverInterface::isDataLoaded ( ) const [private]

Save and restore are necessary if there is data associated with this problem.

Also, queries to a problem with no data should respond sensibly; XPRESS query results are undefined.

8.38.4 Friends And Related Function Documentation

8.38.4.1 void OsiXprSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*) [friend]

A function that tests the methods in the OsiXprSolverInterface class.

8.38.5 Member Data Documentation

8.38.5.1 int OsiXprSolverInterface::iXprCallCount_ [static]

Definition at line 614 of file OsiXprSolverInterface.hpp.

8.38.5.2 const char∗ OsiXprSolverInterface::logFileName_ [static], [private]

Name of the logfile.

Definition at line 661 of file OsiXprSolverInterface.hpp.

8.38.5.3 FILE∗ OsiXprSolverInterface::logFilePtr_ [static], [private]

The FILE∗ to the logfile.

Definition at line 664 of file OsiXprSolverInterface.hpp.

8.38.5.4 unsigned int OsiXprSolverInterface::numInstances_ [static], [private]

Number of live problem instances.

Definition at line 667 of file OsiXprSolverInterface.hpp.

8.38.5.5 unsigned int OsiXprSolverInterface::osiSerial_ [static], [private]

Counts calls to incrementInstanceCounter()

Definition at line 670 of file OsiXprSolverInterface.hpp.

8.38.5.6 XPRSprob OsiXprSolverInterface::prob_ [mutable], [private]

Definition at line 719 of file OsiXprSolverInterface.hpp.

8.38.5.7 std::string OsiXprSolverInterface::xprProbname_ [mutable], [private]

XPRESS problem name (should be unique for each saved problem)

Definition at line 722 of file OsiXprSolverInterface.hpp.

8.38.5.8 CoinPackedMatrix∗ OsiXprSolverInterface::matrixByRow_ [mutable], [private]

Pointer to row-wise copy of problem matrix coefficients.

Note that XPRESS keeps the objective row in the problem matrix, so row indices and counts are adjusted accordingly.

Definition at line 732 of file OsiXprSolverInterface.hpp.

8.38.5.9 CoinPackedMatrix∗ OsiXprSolverInterface::matrixByCol_ [mutable], [private]

Definition at line 733 of file OsiXprSolverInterface.hpp.

8.38.5.10 double∗ OsiXprSolverInterface::colupper_ [mutable], [private]

Pointer to dense vector of structural variable upper bounds.

Definition at line 736 of file OsiXprSolverInterface.hpp.

8.38.5.11 double∗ OsiXprSolverInterface::collower_ [mutable], [private]

Pointer to dense vector of structural variable lower bounds.

Definition at line 739 of file OsiXprSolverInterface.hpp.

8.38.5.12 double∗ OsiXprSolverInterface::rowupper_ [mutable], [private]

Pointer to dense vector of slack variable upper bounds.

Definition at line 742 of file OsiXprSolverInterface.hpp.

8.38.5.13 double∗ OsiXprSolverInterface::rowlower_ [mutable], [private]

Pointer to dense vector of slack variable lower bounds.

Definition at line 745 of file OsiXprSolverInterface.hpp.

8.38.5.14 char* OsiXprSolverInterface::rowsense_ [mutable], [private]

Pointer to dense vector of row sense indicators.

Definition at line 748 of file OsiXprSolverInterface.hpp.

8.38.5.15 double* OsiXprSolverInterface::rhs_ [mutable], [private]

Pointer to dense vector of row right-hand side values.

Definition at line 751 of file OsiXprSolverInterface.hpp.

8.38.5.16 double* OsiXprSolverInterface::rowrange_ [mutable], [private]

Pointer to dense vector of slack upper bounds for range constraints (undefined for non-range rows)

Definition at line 756 of file OsiXprSolverInterface.hpp.

8.38.5.17 double* OsiXprSolverInterface::objcoeffs_ [mutable], [private]

Pointer to dense vector of objective coefficients.

Definition at line 759 of file OsiXprSolverInterface.hpp.

8.38.5.18 double OsiXprSolverInterface::objsense_ [mutable], [private]

Sense of objective (1 for min; -1 for max)

Definition at line 762 of file OsiXprSolverInterface.hpp.

8.38.5.19 double* OsiXprSolverInterface::colsol_ [mutable], [private]

Pointer to dense vector of primal structural variable values.

Definition at line 765 of file OsiXprSolverInterface.hpp.

8.38.5.20 double* OsiXprSolverInterface::rowsol_ [mutable], [private]

Pointer to dense vector of primal slack variable values.

Definition at line 768 of file OsiXprSolverInterface.hpp.

8.38.5.21 double* OsiXprSolverInterface::rowact_ [mutable], [private]

Pointer to dense vector of primal slack variable values.

Definition at line 771 of file OsiXprSolverInterface.hpp.

8.38.5.22 double* OsiXprSolverInterface::rowprice_ [mutable], [private]

Pointer to dense vector of dual row variable values.

Definition at line 774 of file OsiXprSolverInterface.hpp.

8.38.5.23 double* OsiXprSolverInterface::colprice_ [mutable], [private]

Pointer to dense vector of dual column variable values.

Definition at line 777 of file OsiXprSolverInterface.hpp.

8.38.5.24 int∗ OsiXprSolverInterface::ivarind_ `[mutable], [private]`

Pointer to list of indices of XPRESS "global" variables.

Definition at line 780 of file OsiXprSolverInterface.hpp.

8.38.5.25 char∗ OsiXprSolverInterface::ivartype_ `[mutable], [private]`

Pointer to list of global variable types:

- 'B': binary variable
- 'I': general integer variable (but might have 0-1 bounds)
- 'P': partial integer variable (not currently supported)
- 'S': sem-continuous variable (not currently supported)

Definition at line 790 of file OsiXprSolverInterface.hpp.

8.38.5.26 char∗ OsiXprSolverInterface::vartype_ `[mutable], [private]`

Pointer to dense vector of variable types (as above, or 'C' for continuous)

Definition at line 795 of file OsiXprSolverInterface.hpp.

8.38.5.27 bool OsiXprSolverInterface::lastsolvewasmip `[mutable], [private]`

Indicates whether the last solve was for a MIP or an LP.

Definition at line 798 of file OsiXprSolverInterface.hpp.

8.38.5.28 bool OsiXprSolverInterface::domipstart `[private]`

Whether to pass a column solution to XPRESS before starting MIP solve (loadmipsol)

Definition at line 803 of file OsiXprSolverInterface.hpp.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/OsiXpr/OsiXprSolverInterface.hpp

8.39 OsiUnitTest::TestOutcome Class Reference

A single test outcome record.

```
#include <OsiUnitTests.hpp>
```

Public Types

- enum SeverityLevel {
  NOTE = 0, PASSED = 1, WARNING = 2, ERROR = 3,
  LAST = 4 }

  Test result.

Public Member Functions

- TestOutcome (const std::string &comp, const std::string &tst, const char ∗cond, SeverityLevel sev, const char ∗file, int line, bool exp=false)

  Standard constructor.
- void print () const

  Print the test outcome.

Public Attributes

- std::string component

  Name of component under test.
- std::string testname

  Name of test.
- std::string testcond

  Condition being tested.
- SeverityLevel severity

  Test result.
- bool expected

  Set to true if problem is expected.
- std::string filename

  Name of code file where test executed.
- int linenumber

  Line number in code file where test executed.

Static Public Attributes

- static std::string SeverityLevelName [LAST]

  Print strings for SeverityLevel.

8.39.1 Detailed Description

A single test outcome record.

Definition at line 166 of file OsiUnitTests.hpp.

8.39.2 Member Enumeration Documentation

8.39.2.1 enum OsiUnitTest::TestOutcome::SeverityLevel

Test result.

Enumerator

NOTE

PASSED

WARNING

ERROR

LAST

Definition at line 169 of file OsiUnitTests.hpp.

8.39.3 Constructor & Destructor Documentation

8.39.3.1 OsiUnitTest::TestOutcome::TestOutcome (const std::string & *comp*, const std::string & *tst*, const char ∗ *cond*, SeverityLevel *sev*, const char ∗ *file*, int *line*, bool *exp* = false) [inline]

Standard constructor.

Definition at line 193 of file OsiUnitTests.hpp.

8.39.4 Member Function Documentation

8.39.4.1 void OsiUnitTest::TestOutcome::print ( ) const

Print the test outcome.

8.39.5 Member Data Documentation

8.39.5.1 std::string OsiUnitTest::TestOutcome::SeverityLevelName[LAST] [static]

Print strings for SeverityLevel.

Definition at line 177 of file OsiUnitTests.hpp.

8.39.5.2 std::string OsiUnitTest::TestOutcome::component

Name of component under test.

Definition at line 179 of file OsiUnitTests.hpp.

8.39.5.3 std::string OsiUnitTest::TestOutcome::testname

Name of test.

Definition at line 181 of file OsiUnitTests.hpp.

8.39.5.4 std::string OsiUnitTest::TestOutcome::testcond

Condition being tested.

Definition at line 183 of file OsiUnitTests.hpp.

8.39.5.5 SeverityLevel OsiUnitTest::TestOutcome::severity

Test result.

Definition at line 185 of file OsiUnitTests.hpp.

8.39.5.6 bool OsiUnitTest::TestOutcome::expected

Set to true if problem is expected.

Definition at line 187 of file OsiUnitTests.hpp.

8.39.5.7 std::string OsiUnitTest::TestOutcome::filename

Name of code file where test executed.

Definition at line 189 of file OsiUnitTests.hpp.

8.39.5.8 int OsiUnitTest::TestOutcome::linenumber

Line number in code file where test executed.

Definition at line 191 of file OsiUnitTests.hpp.

The documentation for this class was generated from the following file:

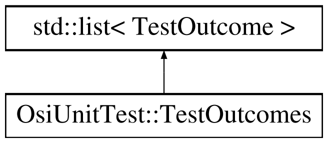
- /home/ted/COIN/trunk/Osi/src/OsiCommonTest/OsiUnitTests.hpp

8.40 OsiUnitTest::TestOutcomes Class Reference

Utility class to maintain a list of test outcomes.

`#include <OsiUnitTests.hpp>`

Inheritance diagram for OsiUnitTest::TestOutcomes:



Public Member Functions

- void add (std::string comp, std::string tst, const char ∗cond, TestOutcome::SeverityLevel sev, const char ∗file, int line, bool exp=false)

    Add an outcome to the list.
- void add (const OsiSolverInterface &si, std::string tst, const char ∗cond, TestOutcome::SeverityLevel sev, const char ∗file, int line, bool exp=false)

    Add an outcome to the list.
- void print () const

    Print the list of outcomes.
- void getCountBySeverity (TestOutcome::SeverityLevel sev, int &total, int &expected) const

    Count total and expected outcomes at given severity level.

Additional Inherited Members

8.40.1 Detailed Description

Utility class to maintain a list of test outcomes.

Definition at line 204 of file OsiUnitTests.hpp.

8.40.2 Member Function Documentation

8.40.2.1 void OsiUnitTest::TestOutcomes::add (std::string *comp,* std::string *tst,* const char ∗ *cond,* TestOutcome::SeverityLevel *sev,* const char ∗ *file,* int *line,* bool *exp* = `false`) `[inline]`

Add an outcome to the list.

Definition at line 207 of file OsiUnitTests.hpp.

8.40.2.2 void OsiUnitTest::TestOutcomes::add (const OsiSolverInterface & *si*, std::string *tst*, const char * *cond*, TestOutcome::SeverityLevel *sev*, const char * *file*, int *line*, bool *exp* = `false`)

Add an outcome to the list.

Get the component name from the solver interface.

8.40.2.3 void OsiUnitTest::TestOutcomes::print ( ) const

Print the list of outcomes.

8.40.2.4 void OsiUnitTest::TestOutcomes::getCountBySeverity (TestOutcome::SeverityLevel *sev*, int & *total*, int & *expected*) const

Count total and expected outcomes at given severity level.

Given a severity level, walk the list of outcomes and count the total number of outcomes at this severity level and the number expected.

The documentation for this class was generated from the following file:

- /home/ted/COIN/trunk/Osi/src/OsiCommonTest/OsiUnitTests.hpp

9 File Documentation

9.1 /home/ted/COIN/trunk/Osi/src/Osi/config_default.h File Reference

```
#include "configall_system.h"
#include "config_osi_default.h"
```

Macros

- #define COIN_OSI_CHECKLEVEL 0
- #define COIN_OSI_VERBOSITY 0
- #define COIN_HAS_COINUTILS 1

9.1.1 Macro Definition Documentation

9.1.1.1 #define COIN_OSI_CHECKLEVEL 0

Definition at line 14 of file config_default.h.

9.1.1.2 #define COIN_OSI_VERBOSITY 0

Definition at line 17 of file config_default.h.

9.1.1.3 #define COIN_HAS_COINUTILS 1

Definition at line 22 of file config_default.h.

9.2 /home/ted/COIN/trunk/Osi/src/Osi/config_osi_default.h File Reference

Macros

- #define OSI_VERSION "trunk"
- #define OSI_VERSION_MAJOR 9999
- #define OSI_VERSION_MINOR 9999
- #define OSI_VERSION_RELEASE 9999

9.2.1 Macro Definition Documentation

9.2.1.1 #define OSI_VERSION "trunk"

Definition at line 8 of file config_osi_default.h.

9.2.1.2 #define OSI_VERSION_MAJOR 9999

Definition at line 11 of file config_osi_default.h.

9.2.1.3 #define OSI_VERSION_MINOR 9999

Definition at line 14 of file config_osi_default.h.

9.2.1.4 #define OSI_VERSION_RELEASE 9999

Definition at line 17 of file config_osi_default.h.

9.3 /home/ted/COIN/trunk/Osi/src/Osi/OsiAuxInfo.hpp File Reference

Classes

- class OsiAuxInfo

  This class allows for a more structured use of algorithmic tweaking to an OsiSolverInterface.
- class OsiBabSolver

  This class allows for the use of more exotic solvers e.g.

9.4 /home/ted/COIN/trunk/Osi/src/Osi/OsiBranchingObject.hpp File Reference

```
#include <cassert>
#include <string>
#include <vector>
#include "CoinError.hpp"
#include "CoinTypes.hpp"
```

Classes

- class OsiObject

  Abstract base class for ‘objects’.
- class OsiObject2

  Define a class to add a bit of complexity to OsiObject This assumes 2 way branching.
- class OsiBranchingObject

Abstract branching object base class.
- class OsiBranchingInformation
- class OsiTwoWayBranchingObject

  This just adds two-wayness to a branching object.
- class OsiSimpleInteger

  Define a single integer class.
- class OsiIntegerBranchingObject

  Simple branching object for an integer variable.
- class OsiSOS

  Define Special Ordered Sets of type 1 and 2.
- class OsiSOSBranchingObject

  Branching object for Special ordered sets.
- class OsiLotsize

  Lotsize class.
- class OsiLotsizeBranchingObject

  Lotsize branching object.

9.5 /home/ted/COIN/trunk/Osi/src/Osi/OsiChooseVariable.hpp File Reference

```
#include <string>
#include <vector>
#include "CoinWarmStartBasis.hpp"
#include "OsiBranchingObject.hpp"
```

Classes

- class OsiChooseVariable

  This class chooses a variable to branch on.
- class OsiPseudoCosts

  This class is the placeholder for the pseudocosts used by OsiChooseStrong.
- class OsiChooseStrong

  This class chooses a variable to branch on.
- class OsiHotInfo

  This class contains the result of strong branching on a variable When created it stores enough information for strong branching.

9.6 /home/ted/COIN/trunk/Osi/src/Osi/OsiColCut.hpp File Reference

```
#include <string>
#include "CoinPackedVector.hpp"
#include "OsiCollections.hpp"
#include "OsiCut.hpp"
```

Classes

- class OsiColCut

  Column Cut Class.

9.7 /home/ted/COIN/trunk/Osi/src/Osi/OsiCollections.hpp File Reference

```
#include <vector>
```

Typedefs

Typedefs for Standard Template Library collections of Osi Objects.

- typedef std::vector< int > OsiVectorInt
  Vector of int.
- typedef std::vector< double > OsiVectorDouble
  Vector of double.
- typedef std::vector< OsiColCut ∗ > OsiVectorColCutPtr
  Vector of OsiColCut pointers.
- typedef std::vector< OsiRowCut ∗ > OsiVectorRowCutPtr
  Vector of OsiRowCut pointers.
- typedef std::vector< OsiCut ∗ > OsiVectorCutPtr
  Vector of OsiCut pointers.

9.7.1 Typedef Documentation

9.7.1.1 typedef std::vector<int> **OsiVectorInt**

Vector of int.

Definition at line 22 of file OsiCollections.hpp.

9.7.1.2 typedef std::vector<double> **OsiVectorDouble**

Vector of double.

Definition at line 24 of file OsiCollections.hpp.

9.7.1.3 typedef std::vector<**OsiColCut** ∗> **OsiVectorColCutPtr**

Vector of OsiColCut pointers.

Definition at line 26 of file OsiCollections.hpp.

9.7.1.4 typedef std::vector<**OsiRowCut** ∗> **OsiVectorRowCutPtr**

Vector of OsiRowCut pointers.

Definition at line 28 of file OsiCollections.hpp.

9.7.1.5 typedef std::vector<**OsiCut** ∗> **OsiVectorCutPtr**

Vector of OsiCut pointers.

Definition at line 30 of file OsiCollections.hpp.

9.8 /home/ted/COIN/trunk/Osi/src/Osi/OsiConfig.h File Reference

```
#include "config_osi_default.h"
```

9.9 /home/ted/COIN/trunk/Osi/src/Osi/OsiCut.hpp File Reference

```
#include "OsiCollections.hpp"
#include "OsiSolverInterface.hpp"
```

Classes

- class OsiCut

Macros

- #define COIN_DEFAULT_VALUE_FOR_DUPLICATE true

  Base Class for cut.

9.9.1 Macro Definition Documentation

9.9.1.1 #define COIN_DEFAULT_VALUE_FOR_DUPLICATE true

Base Class for cut.

The Base cut class contains:

- a measure of the cut's effectivness

Definition at line 30 of file OsiCut.hpp.

9.10 /home/ted/COIN/trunk/Osi/src/Osi/OsiCuts.hpp File Reference

```
#include "CoinPragma.hpp"
#include <cmath>
#include <cfloat>
#include "OsiCollections.hpp"
#include "OsiRowCut.hpp"
#include "OsiColCut.hpp"
#include "CoinFloatEqual.hpp"
```

Classes

- class OsiCuts

  Collections of row cuts and column cuts.
- class OsiCuts::iterator

  Iterator.
- class OsiCuts::const_iterator

  Const Iterator.
- class OsiCuts::OsiCutCompare

9.11 /home/ted/COIN/trunk/Osi/src/Osi/OsiPresolve.hpp File Reference

```
#include "OsiSolverInterface.hpp"
#include "CoinPresolveMatrix.hpp"
```

Classes

- class OsiPresolve

  OSI interface to COIN problem simplification capabilities.

9.12 /home/ted/COIN/trunk/Osi/src/Osi/OsiRowCut.hpp File Reference

```
#include "CoinPackedVector.hpp"
#include "OsiCollections.hpp"
#include "OsiCut.hpp"
```

Classes

- class OsiRowCut

  Row Cut Class.
- class OsiRowCut2

  Row Cut Class which refers back to row which created it.

Macros

- #define OsiRowCut_inline

9.12.1 Macro Definition Documentation

9.12.1.1 #define OsiRowCut_inline

Definition at line 17 of file OsiRowCut.hpp.

9.13 /home/ted/COIN/trunk/Osi/src/Osi/OsiRowCutDebugger.hpp File Reference

Provides a facility to validate cut constraints to ensure that they do not cut off a given solution.

```
#include <string>
#include "OsiCuts.hpp"
#include "OsiSolverInterface.hpp"
```

Classes

- class OsiRowCutDebugger

  Validate cuts against a known solution.

9.13.1 Detailed Description

Provides a facility to validate cut constraints to ensure that they do not cut off a given solution.

Definition in file OsiRowCutDebugger.hpp.

9.14 /home/ted/COIN/trunk/Osi/src/Osi/OsiSolverBranch.hpp File Reference

```
#include "CoinWarmStartBasis.hpp"
```

Classes

- class OsiSolverBranch

  Solver Branch Class.
- class OsiSolverResult

  Solver Result Class.

9.15 /home/ted/COIN/trunk/Osi/src/Osi/OsiSolverInterface.hpp File Reference

```
#include <cstdlib>
#include <string>
#include <vector>
#include "CoinTypes.hpp"
#include "CoinMessageHandler.hpp"
#include "CoinPackedVectorBase.hpp"
#include "CoinPackedMatrix.hpp"
#include "CoinWarmStart.hpp"
#include "CoinFinite.hpp"
#include "CoinError.hpp"
#include "OsiCollections.hpp"
#include "OsiSolverParameters.hpp"
```

Classes

- class OsiSolverInterface

  Abstract Base Class for describing an interface to a solver.
- class OsiSolverInterface::ApplyCutsReturnCode

  Internal class for obtaining status from the applyCuts method.

9.16 /home/ted/COIN/trunk/Osi/src/Osi/OsiSolverParameters.hpp File Reference

Enumerations

- enum OsiIntParam { OsiMaxNumIteration = 0, OsiMaxNumIterationHotStart, OsiNameDiscipline, OsiLastIntParam }
- enum OsiDblParam {
  OsiDualObjectiveLimit = 0, OsiPrimalObjectiveLimit, OsiDualTolerance, OsiPrimalTolerance,
  OsiObjOffset, OsiLastDblParam }

- enum OsiStrParam { OsiProbName = 0, OsiSolverName, OsiLastStrParam }
- enum OsiHintParam {
  OsiDoPresolveInInitial = 0, OsiDoDualInInitial, OsiDoPresolveInResolve, OsiDoDualInResolve,
  OsiDoScale, OsiDoCrash, OsiDoReducePrint, OsiDoInBranchAndCut,
  OsiLastHintParam }
- enum OsiHintStrength { OsiHintIgnore = 0, OsiHintTry, OsiHintDo, OsiForceDo }

9.16.1 Enumeration Type Documentation

9.16.1.1 enum OsiIntParam

Enumerator

OsiMaxNumIteration Iteration limit for initial solve and resolve. The maximum number of iterations (whatever that means for the given solver) the solver can execute in the OsiSolverinterface::initialSolve() and OsiSolverinterface::resolve() methods before terminating.

OsiMaxNumIterationHotStart Iteration limit for hot start. The maximum number of iterations (whatever that means for the given solver) the solver can execute in the OsiSolverinterface::solveFromHotStart() method before terminating.

OsiNameDiscipline Handling of row and column names. The name discipline specifies how the solver will handle row and column names:

- 0: Auto names: Names cannot be set by the client. Names of the form Rnnnnnnn or Cnnnnnnn are generated on demand when a name for a specific row or column is requested; nnnnnnn is derived from the row or column index. Requests for a vector of names return a vector with zero entries.
- 1: Lazy names: Names supplied by the client are retained. Names of the form Rnnnnnnn or Cnnnnnnn are generated on demand if no name has been supplied by the client. Requests for a vector of names return a vector sized to the largest index of a name supplied by the client; some entries in the vector may be null strings.
- 2: Full names: Names supplied by the client are retained. Names of the form Rnnnnnnn or Cnnnnnnn are generated on demand if no name has been supplied by the client. Requests for a vector of names return a vector sized to match the constraint system, and all entries will contain either the name specified by the client or a generated name.

OsiLastIntParam End marker. Used by OsiSolverInterface to allocate a fixed-sized array to store integer parameters.

Definition at line 8 of file OsiSolverParameters.hpp.

9.16.1.2 enum OsiDblParam

Enumerator

OsiDualObjectiveLimit Dual objective limit. This is to be used as a termination criteria in algorithms where the dual objective changes monotonically (e.g., dual simplex, volume algorithm).

OsiPrimalObjectiveLimit Primal objective limit. This is to be used as a termination criteria in algorithms where the primal objective changes monotonically (e.g., primal simplex)

OsiDualTolerance Dual feasibility tolerance. The maximum amount a dual constraint can be violated and still be considered feasible.

OsiPrimalTolerance Primal feasibility tolerance. The maximum amount a primal constraint can be violated and still be considered feasible.

OsiObjOffset The value of any constant term in the objective function.

OsiLastDblParam End marker. Used by OsiSolverInterface to allocate a fixed-sized array to store double parameters.

Definition at line 52 of file OsiSolverParameters.hpp.

9.16.1.3 enum OsiStrParam

Enumerator

OsiProbName The name of the loaded problem. This is the string specified on the Name card of an mps file.

OsiSolverName The name of the solver. This parameter is read-only.

OsiLastStrParam End marker. Used by OsiSolverInterface to allocate a fixed-sized array to store string parameters.

Definition at line 88 of file OsiSolverParameters.hpp.

9.16.1.4 enum OsiHintParam

Enumerator

OsiDoPresolveInInitial Whether to do a presolve in initialSolve.

OsiDoDualInInitial Whether to use a dual algorithm in initialSolve. The reverse is to use a primal algorithm

OsiDoPresolveInResolve Whether to do a presolve in resolve.

OsiDoDualInResolve Whether to use a dual algorithm in resolve. The reverse is to use a primal algorithm

OsiDoScale Whether to scale problem.

OsiDoCrash Whether to create a non-slack basis (only in initialSolve)

OsiDoReducePrint Whether to reduce amount of printout, e.g., for branch and cut.

OsiDoInBranchAndCut Whether we are in branch and cut - so can modify behavior.

OsiLastHintParam Just a marker, so that OsiSolverInterface can allocate a static sized array to store parameters.

Definition at line 107 of file OsiSolverParameters.hpp.

9.16.1.5 enum OsiHintStrength

Enumerator

OsiHintIgnore Ignore hint (default)

OsiHintTry This means it is only a hint.

OsiHintDo This means do hint if at all possible.

OsiForceDo And this means throw an exception if not possible.

Definition at line 131 of file OsiSolverParameters.hpp.

9.17 /home/ted/COIN/trunk/Osi/src/OsiCommonTest/OsiUnitTests.hpp File Reference

Utility methods for OSI unit tests.

```
#include <cstdio>
#include <cstdlib>
#include <iostream>
#include <string>
#include <sstream>
#include <vector>
#include <list>
#include <map>
```

Classes

- class OsiUnitTest::TestOutcome

  A single test outcome record.
- class OsiUnitTest::TestOutcomes

  Utility class to maintain a list of test outcomes.

Namespaces

- OsiUnitTest

  A namespace so we can define a few 'global' variables to use during tests.

Macros

- #define OSIUNITTEST_QUOTEME_(x) #x

  Convert parameter to a string (stringification)
- #define OSIUNITTEST_QUOTEME(x) OSIUNITTEST_QUOTEME_(x)

  Convert to string with one level of expansion of the parameter.
- #define OSIUNITTEST_ADD_OUTCOME(component, testname, testcondition, severity, expected)

  Add a test outcome to the list held in OsiUnitTest::outcomes.
- #define OSIUNITTEST_ASSERT_SEVERITY_EXPECTED(condition, failurecode, component, testname, severity, expected)

  Test for a condition and record the result.
- #define OSIUNITTEST_ASSERT_ERROR(condition, failurecode, component, testname)

  Perform a test with severity OsiUnitTest::TestOutcome::ERROR, failure not expected.
- #define OSIUNITTEST_ASSERT_WARNING(condition, failurecode, component, testname)

  Perform a test with severity OsiUnitTest::TestOutcome::WARNING, failure not expected.
- #define OSIUNITTEST_CATCH_SEVERITY_EXPECTED(trycode, catchcode, component, testname, severity, expected)

  Perform a test surrounded by a try/catch block.
- #define OSIUNITTEST_CATCH_ERROR(trycode, catchcode, component, testname) OSIUNITTEST_CATCH_SEVERITY_EXPECTED(trycode, catchcode, component, testname, OsiUnitTest::TestOutcome::ERROR, false)

  Perform a try/catch test with severity OsiUnitTest::TestOutcome::ERROR, failure not expected.
- #define OSIUNITTEST_CATCH_WARNING(trycode, catchcode, component, testname) OSIUNITTEST_CATCH_SEVERITY_EXPECTED(trycode, catchcode, component, testname, OsiUnitTest::TestOutcome::WARNING, false)

  Perform a try/catch test with severity OsiUnitTest::TestOutcome::WARNING, failure not expected.

Functions

- void OsiSolverInterfaceMpsUnitTest (const std::vector< OsiSolverInterface * > &vecEmptySiP, const std::string &mpsDir)

  A function that tests that a lot of problems given in MPS files (mostly the NETLIB problems) solve properly with all the specified solvers.
- void OsiSolverInterfaceCommonUnitTest (const OsiSolverInterface *emptySi, const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiSolverInterface class.
- void OsiColCutUnitTest (const OsiSolverInterface *baseSiP, const std::string &mpsDir)

A function that tests the methods in the OsiColCut class.

- void OsiRowCutUnitTest (const OsiSolverInterface ∗baseSiP, const std::string &mpsDir)

  A function that tests the methods in the OsiRowCut class.

- void OsiRowCutDebuggerUnitTest (const OsiSolverInterface ∗siP, const std::string &mpsDir)

  A function that tests the methods in the OsiRowCutDebugger class.

- void OsiCutsUnitTest ()

  A function that tests the methods in the OsiCuts class.

- void OsiUnitTest::failureMessage (const std::string &solverName, const std::string &message)

  Print an error message.

- void OsiUnitTest::failureMessage (const OsiSolverInterface &si, const std::string &message)
- void OsiUnitTest::failureMessage (const std::string &solverName, const std::string &testname, const std::string &testcond)

  Print an error message, specifying the test name and condition.

- void OsiUnitTest::failureMessage (const OsiSolverInterface &si, const std::string &testname, const std::string &testcond)
- void OsiUnitTest::testingMessage (const char ∗const msg)

  Print a message.

- bool OsiUnitTest::equivalentVectors (const OsiSolverInterface ∗si1, const OsiSolverInterface ∗si2, double tol, const double ∗v1, const double ∗v2, int size)

  Utility method to check equality.

- bool OsiUnitTest::compareProblems (OsiSolverInterface ∗osi1, OsiSolverInterface ∗osi2)

  Compare two problems for equality.

- bool OsiUnitTest::isEquivalent (const CoinPackedVectorBase &pv, int n, const double ∗fv)

  Compare a packed vector with an expanded vector.

- bool OsiUnitTest::processParameters (int argc, const char ∗∗argv, std::map< std::string, std::string > &parms, const std::map< std::string, int > &ignorekeywords=std::map< std::string, int >())

  Process command line parameters.

- template<typename Component >
  bool OsiUnitTest::OsiUnitTestAssertSeverityExpected (bool condition, const char ∗condition_str, const char ∗filename, int line, const Component &component, const std::string &testname, TestOutcome::SeverityLevel severity, bool expected)

Variables

- unsigned int OsiUnitTest::verbosity

  Verbosity level of unit tests.

- unsigned int OsiUnitTest::haltonerror

  Behaviour on failing a test.

- TestOutcomes OsiUnitTest::outcomes

  Test outcomes.

9.17.1 Detailed Description

Utility methods for OSI unit tests.

Definition in file OsiUnitTests.hpp.

9.17.2 Macro Definition Documentation

9.17.2.1 #define OSIUNITTEST_QUOTEME_(*x*) #x

Convert parameter to a string (stringification)

Definition at line 231 of file OsiUnitTests.hpp.

9.17.2.2 #define OSIUNITTEST_QUOTEME(*x*) OSIUNITTEST_QUOTEME_(x)

Convert to string with one level of expansion of the parameter.

Definition at line 233 of file OsiUnitTests.hpp.

9.17.2.3 #define OSIUNITTEST_ADD_OUTCOME(*component,* *testname,* *testcondition,* *severity,* *expected*)

Value:

```
OsiUnitTest::outcomes.add(component,testname,testcondition,severity,\
    __FILE__,__LINE__,expected)
```

Add a test outcome to the list held in OsiUnitTest::outcomes.

Definition at line 268 of file OsiUnitTests.hpp.

9.17.2.4 #define OSIUNITTEST_ASSERT_SEVERITY_EXPECTED(*condition,* *failurecode,* *component,* *testname,* *severity,* *expected*)

Value:

```
{ \
  if (!OsiUnitTestAssertSeverityExpected(condition, #condition, \
      __FILE__, __LINE__, component, testname, severity, expected)) { \
    failurecode; \
  } \
}
```

Test for a condition and record the result.

Test `condition` and record the result in OsiUnitTest::outcomes. If it succeeds, record the result as OsiUnitTest::-TestOutcome::PASSED and print a message for OsiUnitTest::verbosity >= 2. If it fails, record the test as failed with `severity` and `expected` and react as specified by OsiUnitTest::haltonerror.

`failurecode` is executed when failure is not fatal.

Definition at line 281 of file OsiUnitTests.hpp.

9.17.2.5 #define OSIUNITTEST_ASSERT_ERROR(*condition,* *failurecode,* *component,* *testname*)

Value:

```
OSIUNITTEST_ASSERT_SEVERITY_EXPECTED(condition,failurecode,component,
      testname,\
                                       OsiUnitTest::TestOutcome::ERROR,false
      )
```

Perform a test with severity OsiUnitTest::TestOutcome::ERROR, failure not expected.

Definition at line 293 of file OsiUnitTests.hpp.

9.17.2.6 #define OSIUNITTEST_ASSERT_WARNING(*condition,* *failurecode,* *component,* *testname*)

Value:

```
OSIUNITTEST_ASSERT_SEVERITY_EXPECTED(condition,failurecode,component,
      testname,\
                                              OsiUnitTest::TestOutcome::WARNING,
      false)
```

Perform a test with severity OsiUnitTest::TestOutcome::WARNING, failure not expected.

Definition at line 300 of file OsiUnitTests.hpp.

9.17.2.7 #define OSIUNITTEST_CATCH_SEVERITY_EXPECTED(*trycode, catchcode, component, testname, severity, expected*)

Perform a test surrounded by a try/catch block.

`trycode` is executed in a try/catch block; if there's no throw the test is deemed to have succeeded and is recorded in OsiUnitTest::outcomes with status OsiUnitTest::TestOutcome::PASSED. If the `trycode` throws a CoinError, the failure is recorded with status `severity` and `expected` and the value of OsiUnitTest::haltonerror is consulted. If the failure is not fatal, `catchcode` is executed. If any other error is thrown, the failure is recorded as for a CoinError and `catchcode` is executed (haltonerror is not consulted).

Definition at line 314 of file OsiUnitTests.hpp.

9.17.2.8 #define OSIUNITTEST_CATCH_ERROR(*trycode, catchcode, component, testname*) OSIUNITTEST_CATCH-_SEVERITY_EXPECTED(trycode, catchcode, component, testname, OsiUnitTest::TestOutcome::ERROR, false)

Perform a try/catch test with severity OsiUnitTest::TestOutcome::ERROR, failure not expected.

Definition at line 363 of file OsiUnitTests.hpp.

9.17.2.9 #define OSIUNITTEST_CATCH_WARNING(*trycode, catchcode, component, testname*) OSIUNITTEST_CATCH_S-EVERITY_EXPECTED(trycode, catchcode, component, testname, OsiUnitTest::TestOutcome::WARNING, false)

Perform a try/catch test with severity OsiUnitTest::TestOutcome::WARNING, failure not expected.

Definition at line 369 of file OsiUnitTests.hpp.

9.17.3 Function Documentation

9.17.3.1 void OsiSolverInterfaceMpsUnitTest (const std::vector< OsiSolverInterface * > & *vecEmptySiP,* const std::string & *mpsDir*)

A function that tests that a lot of problems given in MPS files (mostly the NETLIB problems) solve properly with all the specified solvers.

The routine creates a vector of NetLib problems (problem name, objective, various other characteristics), and a vector of solvers to be tested.

Each solver is run on each problem. The run is deemed successful if the solver reports the correct problem size after loading and returns the correct objective value after optimization.

If multiple solvers are available, the results are compared pairwise against the results reported by adjacent solvers in the solver vector. Due to limitations of the volume solver, it must be the last solver in vecEmptySiP.

9.17.3.2 void OsiSolverInterfaceCommonUnitTest (const OsiSolverInterface * *emptySi,* const std::string & *mpsDir,* const std::string & *netlibDir*)

A function that tests the methods in the OsiSolverInterface class.

Some time ago, if this method is compiled with optimization, the compilation took 10-15 minutes and the machine pages (has 256M core memory!)...

9.17.3.3 void OsiColCutUnitTest (const **OsiSolverInterface** ∗ *baseSiP,* const std::string & *mpsDir*)

A function that tests the methods in the OsiColCut class.

9.17.3.4 void OsiRowCutUnitTest (const **OsiSolverInterface** ∗ *baseSiP,* const std::string & *mpsDir*)

A function that tests the methods in the OsiRowCut class.

9.17.3.5 void OsiRowCutDebuggerUnitTest (const **OsiSolverInterface** ∗ *siP,* const std::string & *mpsDir*)

A function that tests the methods in the OsiRowCutDebugger class.

9.17.3.6 void OsiCutsUnitTest ( )

A function that tests the methods in the OsiCuts class.

9.18 /home/ted/COIN/trunk/Osi/src/OsiCpx/OsiCpxSolverInterface.hpp File Reference

```
#include "OsiSolverInterface.hpp"
#include "CoinWarmStartBasis.hpp"
#include "OsiColCut.hpp"
#include "OsiRowCut.hpp"
```

Classes

- class OsiCpxSolverInterface

  CPLEX Solver Interface.

Typedefs

- typedef struct cpxlp ∗ CPXLPptr
- typedef struct cpxenv ∗ CPXENVptr

Functions

- void OsiCpxSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiCpxSolverInterface class.

9.18.1 Typedef Documentation

9.18.1.1 typedef struct cpxlp∗ **CPXLPptr**

Definition at line 21 of file OsiCpxSolverInterface.hpp.

9.18.1.2 typedef struct cpxenv∗ **CPXENVptr**

Definition at line 22 of file OsiCpxSolverInterface.hpp.

9.18.2 Function Documentation

9.18.2.1 void OsiCpxSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*)

A function that tests the methods in the OsiCpxSolverInterface class.

9.19 /home/ted/COIN/trunk/Osi/src/OsiGlpk/OsiGlpkSolverInterface.hpp File Reference

```
#include <string>
#include "OsiSolverInterface.hpp"
#include "CoinPackedMatrix.hpp"
#include "CoinWarmStartBasis.hpp"
```

Classes

- struct glp_prob
- class OsiGlpkSolverInterface

Macros

- #define LPX glp_prob

  GPLK Solver Interface.
- #define GLP_PROB_DEFINED

Functions

- void OsiGlpkSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiGlpkSolverInterface class.

9.19.1 Macro Definition Documentation

9.19.1.1 #define LPX glp_prob

GPLK Solver Interface.

Instantiation of OsiGlpkSolverInterface for GPLK

Definition at line 24 of file OsiGlpkSolverInterface.hpp.

9.19.1.2 #define GLP_PROB_DEFINED

Definition at line 28 of file OsiGlpkSolverInterface.hpp.

9.19.2 Function Documentation

9.19.2.1 void OsiGlpkSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*)

A function that tests the methods in the OsiGlpkSolverInterface class.

9.20 /home/ted/COIN/trunk/Osi/src/OsiGrb/OsiGrbSolverInterface.hpp File Reference

```
#include <string>
#include "OsiSolverInterface.hpp"
```

Classes

- class OsiGrbSolverInterface

  Gurobi Solver Interface.

Typedefs

- typedef struct _GRBmodel GRBmodel
- typedef struct _GRBenv GRBenv

Functions

- void OsiGrbSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiGrbSolverInterface class.

9.20.1 Typedef Documentation

9.20.1.1 typedef struct _GRBmodel **GRBmodel**

Definition at line 21 of file OsiGrbSolverInterface.hpp.

9.20.1.2 typedef struct _GRBenv **GRBenv**

Definition at line 22 of file OsiGrbSolverInterface.hpp.

9.20.2 Function Documentation

9.20.2.1 void OsiGrbSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*)

A function that tests the methods in the OsiGrbSolverInterface class.

9.21 /home/ted/COIN/trunk/Osi/src/OsiMsk/OsiMskSolverInterface.hpp File Reference

```
#include "OsiSolverInterface.hpp"
```

Classes

- class OsiMskSolverInterface

Typedefs

- typedef void ∗ MSKtask_t
- typedef void ∗ MSKenv_t

Functions

- void OsiMskSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiMskSolverInterface class.

9.21.1 Typedef Documentation

9.21.1.1 typedef void∗ **MSKtask_t**

Definition at line 16 of file OsiMskSolverInterface.hpp.

9.21.1.2 typedef void∗ **MSKenv_t**

Definition at line 17 of file OsiMskSolverInterface.hpp.

9.21.2 Function Documentation

9.21.2.1 void OsiMskSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*)

A function that tests the methods in the OsiMskSolverInterface class.

9.22 /home/ted/COIN/trunk/Osi/src/OsiSpx/OsiSpxSolverInterface.hpp File Reference

```
#include <string>
#include "OsiSolverInterface.hpp"
#include "CoinWarmStartBasis.hpp"
```

Classes

- class OsiSpxSolverInterface

  SoPlex Solver Interface Instantiation of OsiSpxSolverInterface for SoPlex.

Namespaces

- soplex

Functions

- void OsiSpxSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiSpxSolverInterface class.

9.22.1 Function Documentation

9.22.1.1 void OsiSpxSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*)

A function that tests the methods in the OsiSpxSolverInterface class.

9.23 /home/ted/COIN/trunk/Osi/src/OsiXpr/OsiXprSolverInterface.hpp File Reference

```
#include <string>
#include <cstdio>
#include "OsiSolverInterface.hpp"
```

Classes

- class OsiXprSolverInterface

  XPRESS-MP Solver Interface.

Typedefs

- typedef struct xo_prob_struct ∗ XPRSprob

Functions

- void OsiXprSolverInterfaceUnitTest (const std::string &mpsDir, const std::string &netlibDir)

  A function that tests the methods in the OsiXprSolverInterface class.

9.23.1 Typedef Documentation

9.23.1.1 typedef struct xo_prob_struct∗ XPRSprob

Definition at line 13 of file OsiXprSolverInterface.hpp.

9.23.2 Function Documentation

9.23.2.1 void OsiXprSolverInterfaceUnitTest (const std::string & *mpsDir,* const std::string & *netlibDir*)

A function that tests the methods in the OsiXprSolverInterface class.

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