QRodSystems

0.0.9

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Chapter 1

Hierarchical Index

1.1 Class Hierarchy

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

Chapter 2

Class Index

2.1 Class List

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

Chapter 3

File Index

3.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 4

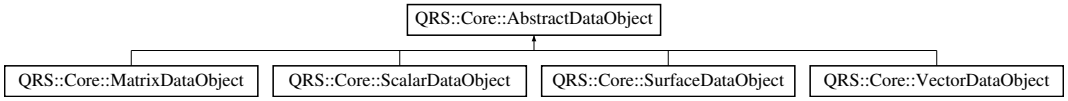
Class Documentation

4.1 QRS::Core::AbstractDataObject Class Reference

Data object which is designied in the way to be represented in a table easily.

`#include <abstractdataobject.h>`

Inheritance diagram for QRS::Core::AbstractDataObject:



Public Member Functions

- AbstractDataObject (DataObjectType type, QString const &name)

  Base constructor.
- virtual AbstractDataObject * **clone** () const =0
- virtual DataItemType & **addItem** (DataKeyType key)=0
- void removeItem (DataValueType key)

  Remove an entity with the specified key.
- bool changeItemKey (DataKeyType oldKey, DataKeyType newKey, DataHolder *items=nullptr)

  Modify a key existed.
- DataValueType getAvailableItemKey (DataValueType key, DataHolder const *items=nullptr) const
- bool setArrayValue (DataKeyType key, DataValueType newValue, uint iRow=0, uint iColumn=0)

  Set an array value with the specified indices.
- uint **numberItems** () const
- DataHolder & **getItems** ()
- DataItemType & **getItem** (DataValueType keyParameter)
- DataIDType **id** () const
- DataObjectType **type** () const
- QString const & **name** () const
- void **setName** (QString const &name)
- virtual void serialize (QDataStream &stream) const

  Serialize an abstract data object.
- virtual void deserialize (QDataStream &stream)

  Partly deserialize an abstract data object.
- virtual void **import** (QTextStream &stream)=0

Static Public Member Functions

- static uint **numberObjects** ()
- static void **setNumberObjects** (uint numObjects)

Protected Attributes

- const DataObjectType mType

  Object type.
- QString mName

  Name of an object.
- DataIDType mID

  Unique object identificator.
- DataHolder mItems

  Map contains all created entities.

Static Private Attributes

- static uint smNumObjects = 0

  Number of all objects created.

Friends

- QDataStream & operator<< (QDataStream &stream, AbstractDataObject const &obj)

  Print a data object to a stream.
- QDataStream & operator>> (QDataStream &stream, AbstractDataObject &obj)

  Read a data object from a stream.

4.1.1 Detailed Description

Data object which is designied in the way to be represented in a table easily.

4.1.2 Member Function Documentation

4.1.2.1 deserialize()

```
void AbstractDataObject::deserialize (
            QDataStream & stream )  [virtual]
```

Partly deserialize an abstract data object.

It is assumed that a type and name have already been assigned. So, only an identifier and items need to be set.

Reimplemented in QRS::Core::SurfaceDataObject.

4.1.2.2 getAvailableItemKey()

```
DataValueType AbstractDataObject::getAvailableItemKey (
            DataValueType key,
            DataHolder const * items = nullptr ) const
```

Check if a given key is unique

Returns

Returns the input value of the key if it is unique, otherwise – a first available key

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

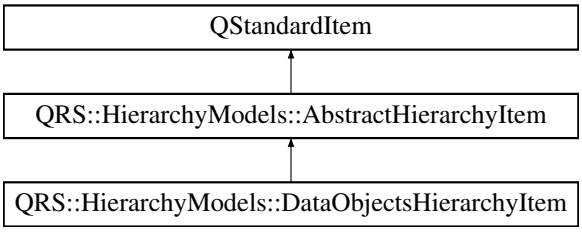
- /home/qinterfly/Library/Projects/QRodSystems/src/core/abstractdataobject.h
- /home/qinterfly/Library/Projects/QRodSystems/src/core/abstractdataobject.cpp

4.2 QRS::HierarchyModels::AbstractHierarchyItem Class Reference

Item to represent a hierarchy of elements of the same type.

`#include <abstracthierarchyitem.h>`

Inheritance diagram for QRS::HierarchyModels::AbstractHierarchyItem:



Public Member Functions

- **AbstractHierarchyItem** (QIcon const &icon, QString const &text, Core::HierarchyNode *pNode)
- void writePointer (QDataStream &out) const

  Write the pointer to the current item to a stream.
- virtual int **type** () const =0

Static Public Member Functions

- static AbstractHierarchyItem * readPointer (QDataStream &in)

  Retrieve a pointer to an item from a stream.

Protected Attributes

- Core::HierarchyNode * **mpNode** = nullptr

Friends

- class **AbstractHierarchyModel**

4.2.1 Detailed Description

Item to represent a hierarchy of elements of the same type.

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

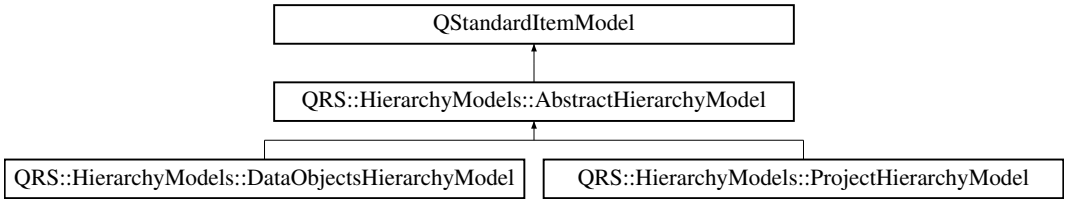
- /home/qinterfly/Library/Projects/QRodSystems/src/models/abstracthierarchyitem.h
- /home/qinterfly/Library/Projects/QRodSystems/src/models/abstracthierarchyitem.cpp

4.3 QRS::HierarchyModels::AbstractHierarchyModel Class Reference

Hierarchy model which enables one to drag and drop elements of the same type.

`#include <abstracthierarchymodel.h>`

Inheritance diagram for QRS::HierarchyModels::AbstractHierarchyModel:



Signals

- void **dataModified** (bool flag)

Public Member Functions

- **AbstractHierarchyModel** (QString const &mimeType, QTreeView *pView=nullptr)
- virtual void **updateContent** ()=0
- virtual void **clearContent** ()=0
- Qt::DropActions supportedDragActions () const override

  Specify allowed drag actions.
- Qt::DropActions supportedDropActions () const override

  Specify allowed drop actions.
- QStringList mimeTypes () const override

  Retrieve the mime types.
- QMimeData * mimeData (const QModelIndexList &indicies) const override

  Encode each item according to a given list of indicies.
- bool dropMimeData (QMimeData const *pMimeData, Qt::DropAction action, int row, int column, const QModelIndex &parent) override

  Process the drop action.

Protected Attributes

- QString const **kMimeType**

Private Member Functions

- bool processDropOnItem (QDataStream &stream, int &numItems, QModelIndex const &indexParent)

  Merge several items into one entity.
- bool processDropBetweenItems (QDataStream &stream, int &numItems, QModelIndex const &indexParent, int row)

  Change the order of items.
- void retrieveExpandedState (NodesState &nodesState, QModelIndex const &indexParent, QTreeView const *pView)

  Retrieve information about whether each directory is expanded.
- void setExpandedState (NodesState &nodesState, QModelIndex const &indexParent, QTreeView *pView)

  Set an expanded state of each directory.

4.3.1 Detailed Description

Hierarchy model which enables one to drag and drop elements of the same type.

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

- /home/qinterfly/Library/Projects/QRodSystems/src/models/abstracthierarchymodel.h
- /home/qinterfly/Library/Projects/QRodSystems/src/models/abstracthierarchymodel.cpp

4.4 QRS::Core::Array< T > Class Template Reference

Numerical array class.

`#include <array.h>`

Classes

- struct Row

  Proxy class to acquire a row by index.

Public Member Functions

- **Array** (IndexType numRows=0, IndexType numCols=0)
- Array (Array< T > const &another)

  Copy constructor.
- Array (Array< T > &&another)

  Move constructor.
- T * **data** ()
- void resize (IndexType numRows, IndexType numCols)

  Resize and copy previous values if possible.
- void removeColumn (IndexType iRemoveColumn)

  Remove a column by index.
- void swapColumns (IndexType iFirstColumn, IndexType iSecondColumn)

  Swap two columns.
- IndexType **rows** () const
- IndexType **cols** () const
- IndexType **size** () const
- Row< T > **operator[ ]** (IndexType iRow)

Private Attributes

- IndexType mNumRows

  Number of rows.
- IndexType mNumCols

  Number of columns.
- T * mpData = nullptr

  Pointer to the data stored.

Friends

- template<typename K >
  QDebug operator<< (QDebug stream, Array< K > &array)

  Print all array values using the matrix format.
- template<typename K >
  QDataStream & operator<< (QDataStream &stream, Array< K > const &array)

  Write an array to a stream.
- template<typename K >
  QDataStream & operator>> (QDataStream &stream, Array< K > &array)

  Read an array from a stream.

4.4.1 Detailed Description

template<typename T>
class QRS::Core::Array< T >

Numerical array class.

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

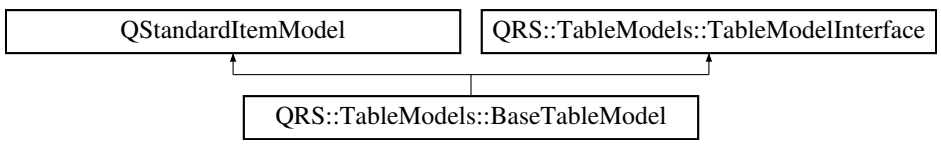
- /home/qinterfly/Library/Projects/QRodSystems/src/core/array.h
- /home/qinterfly/Library/Projects/QRodSystems/src/core/array.cpp

4.5 QRS::TableModels::BaseTableModel Class Reference

Table model to represent either a scalar or vector data object.

`#include <basetablemodel.h>`

Inheritance diagram for QRS::TableModels::BaseTableModel:



Public Member Functions

- **BaseTableModel** (QWidget *parent=nullptr)
- void setDataObject (Core::AbstractDataObject *pDataObject)

  Set a data object to represent.
- bool setData (const QModelIndex &indexEdit, const QVariant &value, int role=Qt::EditRole) override

  Set the data acquired from a delegate.
- void insertItemAfterSelected (QItemSelectionModel *pSelectionModel) override

  Insert a new item after selected one.
- void **insertLeadingItemAfterSelected** (QItemSelectionModel *) override
- void removeSelectedItem (QItemSelectionModel *pSelectionModel) override

  Remove an array under selection.
- void **removeSelectedLeadingItem** (QItemSelectionModel *) override

Private Member Functions

- void updateContent ()

  Represent all items which a data object contains.
- void clearContent ()

  Clear previously created items.

Private Attributes

- Core::AbstractDataObject * **mpDataObject** = nullptr

Additional Inherited Members

4.5.1 Detailed Description

Table model to represent either a scalar or vector data object.

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

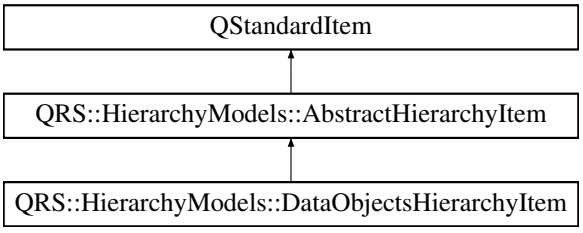
- /home/qinterfly/Library/Projects/QRodSystems/src/models/basetablemodel.h
- /home/qinterfly/Library/Projects/QRodSystems/src/models/basetablemodel.cpp

4.6 QRS::HierarchyModels::DataObjectsHierarchyItem Class Reference

Item to represent a hierarchy of data objects.

`#include <dataobjectshierarchyitem.h>`

Inheritance diagram for QRS::HierarchyModels::DataObjectsHierarchyItem:



Public Member Functions

- DataObjectsHierarchyItem (DataObjects &dataObjects, Core::HierarchyTree &hierarchyDataObjects, QString const &text="Root", QIcon const &icon=QIcon())

  Create the representer of the structure of data objects.
- DataObjectsHierarchyItem (Core::HierarchyNode *pNode, Core::AbstractDataObject *pDataObject)

  Construct an item to represent a data object.
- DataObjectsHierarchyItem (Core::HierarchyNode *pNode)

  Construct an item to represent a directory.
- int **type** () const override

Private Member Functions

- void **appendItems** (DataObjects &dataObjects, Core::HierarchyNode *pNode)

Private Attributes

- Core::AbstractDataObject * **mpDataObject** = nullptr

Friends

- class **DataObjectsHierarchyModel**
- class **DataObjectsPropertiesModel**
- class **ProjectHierarchyModel**

Additional Inherited Members

4.6.1 Detailed Description

Item to represent a hierarchy of data objects.

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

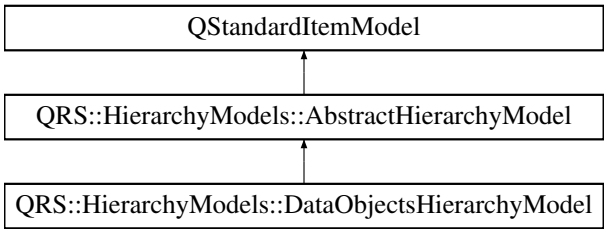
- /home/qinterfly/Library/Projects/QRodSystems/src/models/dataobjectshierarchyitem.h
- /home/qinterfly/Library/Projects/QRodSystems/src/models/dataobjectshierarchyitem.cpp

4.7 QRS::HierarchyModels::DataObjectsHierarchyModel Class Reference

Tree model to represent and modify a hierarchy of data objects.

`#include <dataobjectshierarchymodel.h>`

Inheritance diagram for QRS::HierarchyModels::DataObjectsHierarchyModel:



Public Slots

- void retrieveSelectedDataObject ()

  Retrieve a selected data object.
- void removeSelectedItems ()

  Remove data objects under selection.

Signals

- void **dataObjectSelected** (Core::DataIDType id)
- void **selectionCleared** ()

Public Member Functions

- **DataObjectsHierarchyModel** (DataObjects &dataObjects, Core::HierarchyTree &hierarchyDataObjects, QTreeView *pView=nullptr)
- void updateContent () override

  Update all the content.
- void clearContent () override

  Clear all the items.
- bool isEmpty () const

  Check if there are data objcects to represent.
- void selectItem (int iRow)

  Select an item by row index.

Private Slots

- void renameDataObject (QStandardItem *pStandardItem)

  Rename a data object after editing.

Private Attributes

- DataObjects & **mDataObjects**
- Core::HierarchyTree & **mHierarchyDataObjects**

Additional Inherited Members

4.7.1 Detailed Description

Tree model to represent and modify a hierarchy of data objects.

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

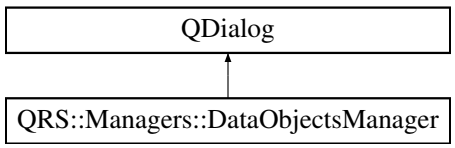
- /home/qinterfly/Library/Projects/QRodSystems/src/models/dataobjectshierarchymodel.h
- /home/qinterfly/Library/Projects/QRodSystems/src/models/dataobjectshierarchymodel.cpp

4.8 QRS::Managers::DataObjectsManager Class Reference

Manager to create objects of different types: scalars, vectors, matroces and surfaces.

`#include <dataobjectsmanager.h>`

Inheritance diagram for QRS::Managers::DataObjectsManager:



Public Slots

- void apply ()
  Apply all the changes made by user.
- Core::DataIDType addScalar ()
  Add a scalar object.
- Core::DataIDType addVector ()
  Add a vector object.
- Core::DataIDType addMatrix ()
  Add a matrix object.
- Core::DataIDType addSurface ()
  Add a surface object.
- void insertItemAfterSelected ()
  Insert a new array into the data object.
- void insertLeadingItemAfterSelected ()
  Insert a new leading item into the data object.
- void removeSelectedItem ()
  Remove a selected item.
- void removeSelectedLeadingItem ()
  Remove a selected leading item.
- void importDataObjects ()
  Import data objects from a file.
- void representDataObject (Core::DataIDType id)
  Represent a selected data object according to its type.
- void clearDataObjectRepresentation ()
  Clear a visual data of a data object.

Signals

- void **closed** ()

Public Member Functions

- **DataObjectsManager** (Core::Project &project, QSettings &settings, QString &lastPath, QWidget *parent=nullptr)
- void selectDataObject (int iRow)
  Select a data object by row index.
- mapDataObjects const & **getDataObjects** ()

Private Member Functions

- void closeEvent (QCloseEvent *pEvent) override

  Save settings and delete handling widgets before closing the window.
- void createContent ()

  Create all the widgets.
- ads::CDockWidget * createDataTableWidget ()

  Create a tabbed widget to interact with data tables.
- ads::CDockWidget * createDataObjectsWidget ()

  Create an object to present all data objects.
- ads::CDockWidget * createCodeWidget ()

  Create a widget enables to code data objects.
- QLayout * createDialogControls ()

  Create dialog controls.
- void retrieveDataObjects ()

  Make a copy of existed data objects.
- void restoreSettings ()

  Restore settings from a file.
- void saveSettings ()

  Save settings to a file.
- void emplaceDataObject (Core::AbstractDataObject *pDataObject)

  Helper function to insert data objects into the manager.
- bool isDataTableModifiable ()

  Helper function to check if it is possible to interact with data object content.
- void importDataObject (QString const &path, QString const &fileName)

  Import a data object from a file.

Private Attributes

- Ui::DataObjectsManager * **mpUi**
- ads::CDockManager * **mpDockManager**
- QTreeView * **mpTreeDataObjects**
- QTreeView * **mpDataTable**
- DoubleSpinBoxItemDelegate * **mpItemDelegate** = nullptr
- Core::Project & **mProject**
- QSettings & **mSettings**
- mapDataObjects **mDataObjects**
- Core::HierarchyTree **mHierarchyDataObjects**
- QString & **mLastPath**
- TableModels::TableModelInterface * **mpTableModelInterface** = nullptr
- TableModels::BaseTableModel * **mpBaseTableModel**
- TableModels::MatrixTableModel * **mpMatrixTableModel**
- TableModels::SurfaceTableModel * **mpSurfaceTableModel**
- HierarchyModels::DataObjectsHierarchyModel * **mpTreeDataObjectsModel**

4.8.1 Detailed Description

Manager to create objects of different types: scalars, vectors, matroces and surfaces.

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

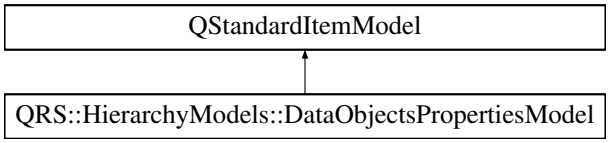
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/dataobjectsmanager.h
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/dataobjectsmanager.cpp

4.9 QRS::HierarchyModels::DataObjectsPropertiesModel Class Reference

Model to represent properties of selected data objects.

`#include <dataobjectspropertiesmodel.h>`

Inheritance diagram for QRS::HierarchyModels::DataObjectsPropertiesModel:



Public Member Functions

- **DataObjectsPropertiesModel** (QTableView *pView, QVector< HierarchyModels::AbstractHierarchyItem * > items)

Private Types

- enum **AttributeType** {
  kName , **kType** , **kNumberItems** , **kNumberEntities** ,
  kID }

Private Member Functions

- void setDirectoryAttributes ()

  Set directory characteristic attributes.
- void setObjectAttributes ()

  Set objects characteristic attributes.
- QList< QStandardItem * > **prepareProperty Row** (AttributeType type, QString const &title, QVariant const &value, bool isValueEditable) const

Private Attributes

- QVector< HierarchyModels::DataObjectsHierarchyItem * > **mItems**

4.9.1 Detailed Description

Model to represent properties of selected data objects.

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

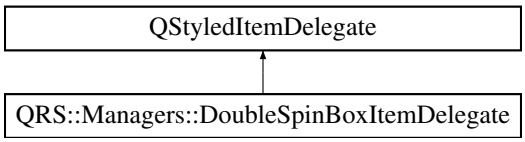
- /home/qinterfly/Library/Projects/QRodSystems/src/models/dataobjectspropertiesmodel.h
- /home/qinterfly/Library/Projects/QRodSystems/src/models/dataobjectspropertiesmodel.cpp

4.10 QRS::Managers::DoubleSpinBoxItemDelegate Class Reference

Class to specify how table values can be edited.

`#include <doublespinboxitemdelegate.h>`

Inheritance diagram for QRS::Managers::DoubleSpinBoxItemDelegate:



Public Member Functions

- **DoubleSpinBoxItemDelegate** (QObject *parent=nullptr)
- QWidget * createEditor (QWidget *parent, const QStyleOptionViewItem &option, const QModelIndex &index) const override

  Create a double value editor.
- void setEditorData (QWidget *pEditor, const QModelIndex &index) const override

  Specify data to show.
- void setModelData (QWidget *pEditor, QAbstractItemModel *pModel, const QModelIndex &index) const override

  Set data to a model.
- void updateEditorGeometry (QWidget *pEditor, const QStyleOptionViewItem &option, const QModelIndex &index) const override

  Set a geometry to render.

4.10.1 Detailed Description

Class to specify how table values can be edited.

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

- /home/qinterfly/Library/Projects/QRodSystems/src/managers/doublespinboxitemdelegate.h
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/doublespinboxitemdelegate.cpp

4.11 QRS::Core::HierarchyNode Class Reference

Hierarchy representative.

`#include <hierarchynode.h>`

Public Types

- enum **NodeType** { **kObject** , **kDirectory** }

Public Member Functions

- HierarchyNode (NodeType type, QVariant value)

  Node constructor.
- void appendChild (HierarchyNode *node)

  Add a child node.
- bool **hasParent** () const
- bool **hasChild** () const
- bool **hasNextSibling** () const
- HierarchyNode * **parent** ()
- HierarchyNode * **firstChild** ()
- HierarchyNode * **nextSibling** ()
- NodeType **type** () const
- QVariant & **value** ()
- HierarchyNode * groupNodes (HierarchyNode *pChildNode)

  Merge two nodes into one entity.
- bool setBefore (HierarchyNode *pSetNode)

  Set a given node before the current one.
- bool setAfter (HierarchyNode *pSetNode)

  Set a given node after the current one.

Private Member Functions

- void excludeNodeFromHierarchy ()

  Remove all links to the node.
- bool isSetAllowed (HierarchyNode const *pNode) const

  Check whether it is possible to place a given item before or after the current one.
- bool isParentOf (HierarchyNode const *pNode) const

  Check whether the current item containes a given node as a child.

Private Attributes

- HierarchyNode * **mpParent** = nullptr
- HierarchyNode * **mpFirstChild** = nullptr
- HierarchyNode * **mpNextSibling** = nullptr
- HierarchyNode * **mpPreviousSibling** = nullptr
- NodeType **mType**
- QVariant **mValue**

Friends

- class **HierarchyTree**

4.11.1 Detailed Description

Hierarchy representative.

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

- /home/qinterfly/Library/Projects/QRodSystems/src/core/hierarchynode.h
- /home/qinterfly/Library/Projects/QRodSystems/src/core/hierarchynode.cpp

4.12 QRS::Core::HierarchyTree Class Reference

Hierarchy of data objects (n-aray tree)

`#include <hierarchytree.h>`

Public Member Functions

- HierarchyTree ()
  Base tree constructor.
- HierarchyTree (HierarchyNode *pRootNode)
  Take the user defined node as the root.
- HierarchyTree (QDataStream &stream, int numNodes)
  Read a tree from a stream.
- HierarchyTree & operator= (HierarchyTree const &another)
  Copy assignment operator.
- HierarchyTree & operator= (HierarchyTree &&another)
  Move assignment operator.
- ~HierarchyTree ()
  Tree destructor.
- void clear ()
  Delete all nodes except the root node.
- void appendNode (HierarchyNode *pNode)
  Append a node to the root node.
- bool removeNode (HierarchyNode::NodeType type, QVariant const &value)
  Remove a node by type and value.
- void removeNode (HierarchyNode *pNode)
  Remove a node and all its subnodes.
- void changeNodeValue (HierarchyNode::NodeType type, QVariant const &oldValue, QVariant const &new↩ Value)
  Change the value of a node.
- HierarchyNode * **root** ()
- HierarchyTree clone () const
  Clone a tree.
- HierarchyNode * findNode (HierarchyNode *pBaseNode, HierarchyNode::NodeType type, QVariant const &value) const
  Find a node by type and value.
- int size () const
  Get a number of nodes.

Private Member Functions

- HierarchyNode * copyNode (HierarchyNode *pBaseNode, uint relativeLevel) const
  Copy a node.
- void removeNodeSiblings (HierarchyNode *pNode)
  Remove all subnodes.
- void printNode (uint level, HierarchyNode *pNode, QDebug stream) const
  Print a current node and all its subnodes.
- void writeNode (HierarchyNode *pNode, QDataStream &stream) const
  Print a current node and all its subnodes.
- int countNodes (HierarchyNode *pNode, int &numNodes) const
  Count all nodes.

Private Attributes

- HierarchyNode * **mpRootNode** = nullptr

Friends

- QDebug operator<< (QDebug stream, HierarchyTree &tree)

  Print a tree structure.
- QDataStream & operator<< (QDataStream &stream, HierarchyTree const &tree)

  Write a tree structure to a stream.

4.12.1 Detailed Description

Hierarchy of data objects (n-aray tree)

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

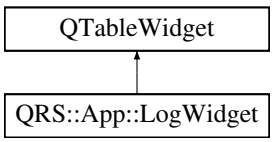
- /home/qinterfly/Library/Projects/QRodSystems/src/core/hierarchytree.h
- /home/qinterfly/Library/Projects/QRodSystems/src/core/hierarchytree.cpp

4.13 QRS::App::LogWidget Class Reference

Log all the messages sent.

`#include <logwidget.h>`

Inheritance diagram for QRS::App::LogWidget:



Public Member Functions

- **LogWidget** (QWidget *parent=nullptr)
- void log (QtMsgType messageType, const QString &message)

  Represent a message sent.

4.13.1 Detailed Description

Log all the messages sent.

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

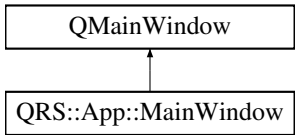
- /home/qinterfly/Library/Projects/QRodSystems/src/central/logwidget.h
- /home/qinterfly/Library/Projects/QRodSystems/src/central/logwidget.cpp

4.14 QRS::App::MainWindow Class Reference

The main window of the program.

`#include <mainwindow.h>`

Inheritance diagram for QRS::App::MainWindow:



Public Member Functions

- **MainWindow** (QWidget *parent=nullptr)
- void openProject (QString const &filePath)

  Open the specific project.
- bool saveProject ()

  Save the current project.

Static Public Attributes

- static LogWidget * **pLogger** = nullptr

Private Slots

- void createProject ()

  Create a project and substitute the current one with it.
- void openProjectDialog ()

  Open a project by using a dialog.
- void openRecentProject ()

  Open the project which was selected from the Recent Projects menu.
- bool saveAsProject ()

  Save the current project under a new name.
- void projectModified ()

  Whenever a project has been modified.
- void representHierarchyProperties (QVector< HierarchyModels::AbstractHierarchyItem * > items)

  Show information about the selected project items.
- void saveSettings ()

  Save the current window settings.
- void restoreSettings ()

  Restore window settings from a file.
- void createDataObjectsManager ()

  Show a manager for designing data objects.
- void createRodPropertiesManager ()

  Show a manager to set rod properties based on the created data objects.
- void createRodConstructorManager ()

  Show a manager to create a rod with assigned data properties.
- void deleteDataObjectsManager ()

  Delete a manager of data objects after being used.
- void aboutProgram ()

  Show information about a program.

Private Member Functions

- void initializeWindow ()

  Set a state and geometry of MainWindow.
- void createContent ()

  Create all the widgets and corresponding actions.
- void closeEvent (QCloseEvent *pEvent) override

  Save project and settings before exit.
- ads::CDockWidget * createProjectHierarchyWidget ()

  Create a widget to represent a project hierarchy.
- ads::CDockWidget * createGLWidget ()

  Create an OpenGL widget to render rods.
- ads::CDockWidget * createLogWidget ()

  Create a window for logging.
- ads::CDockWidget * createPropertiesWidget ()

  Create a window to modify properies of selected objercts.
- void setProjectTitle ()

  Show information a name of a project.
- void retrieveRecentProjects ()

  Retrieve recent projects from the settings file.
- void addToRecentProjects ()

  Add the current project to the recent ones.
- void specifyMenuConnections ()

  Set signals and slots for menu actions.
- void specifyProjectConnections ()

  Set signals and slots for a project.
- bool saveProjectChangesDialog ()

  Save project changes.
- bool saveProjectHelper (QString const &filePath)

  Helper method to perform saving of the current project.

Private Attributes

- Ui::MainWindow * **mpUi**
- ads::CDockManager * **mpDockManager**
- QLabel * **mpStatusLabel**
- QTableView * **mpPropertiesWidget**
- HierarchyModels::ProjectHierarchyModel * **mpProjectHierarchyModel** = nullptr
- Managers::DataObjectsManager * **mpDataObjectsManager** = nullptr
- Core::Project * **mpProject**
- QSharedPointer< QSettings > **mpSettings**
- QString **mLastPath**
- QList< QString > **mPathRecentProjects**

4.14.1 Detailed Description

The main window of the program.

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

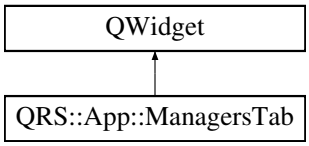
- /home/qinterfly/Library/Projects/QRodSystems/src/central/mainwindow.h
- /home/qinterfly/Library/Projects/QRodSystems/src/central/mainwindow.cpp

4.15 QRS::App::ManagersTab Class Reference

A toolbar consisted of object designers.

`#include <controltabs.h>`

Inheritance diagram for QRS::App::ManagersTab:



Signals

- void **actionDataObjectsTriggered** ()
- void **actionRodPropertiesTriggered** ()
- void **actionRodConstructorTriggered** ()

Public Member Functions

- ManagersTab (QWidget ∗parent=nullptr)

  Managers tab constructor.

4.15.1 Detailed Description

A toolbar consisted of object designers.

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

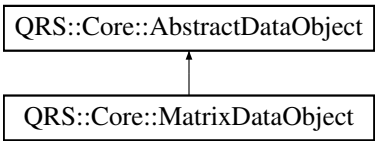
- /home/qinterfly/Library/Projects/QRodSystems/src/central/controltabs.h
- /home/qinterfly/Library/Projects/QRodSystems/src/central/controltabs.cpp

4.16 QRS::Core::MatrixDataObject Class Reference

Matrix data object.

`#include <matrixdataobject.h>`

Inheritance diagram for QRS::Core::MatrixDataObject:



Public Member Functions

- MatrixDataObject (QString const &name)

  Construct a matrix data object.
- AbstractDataObject * clone () const override

  Clone a matrix data object.
- DataItemType & addItem (DataValueType key) override

  Insert a new item into MatrixDataObject.
- virtual void import (QTextStream &stream) override

  Import a matrix data object from a file.

Static Public Member Functions

- static uint **numberInstances** ()
- static void **setNumberInstances** (uint numInstances)

Static Private Attributes

- static uint **smNumInstances** = 0

Additional Inherited Members

4.16.1 Detailed Description

Matrix data object.

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

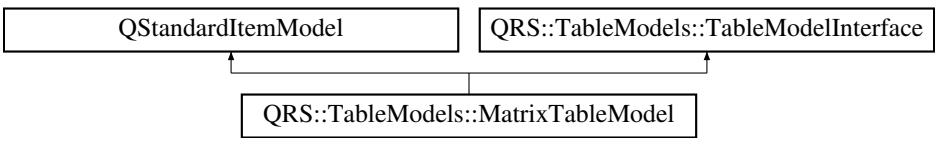
- /home/qinterfly/Library/Projects/QRodSystems/src/core/matrixdataobject.h
- /home/qinterfly/Library/Projects/QRodSystems/src/core/matrixdataobject.cpp

4.17 QRS::TableModels::MatrixTableModel Class Reference

Table model to represent a matrix data object.

`#include <matrixtablemodel.h>`

Inheritance diagram for QRS::TableModels::MatrixTableModel:



Public Member Functions

- **MatrixTableModel** (QWidget *parent=nullptr)
- void setDataObject (Core::AbstractDataObject *pDataObject)

  Set a data object to represent.
- bool setData (const QModelIndex &indexEdit, const QVariant &value, int role=Qt::EditRole) override

  Set the data acquired from a delegate.
- void insertItemAfterSelected (QItemSelectionModel *pSelectionModel) override

  Insert a new item after selected one.
- void **insertLeadingItemAfterSelected** (QItemSelectionModel *) override
- void removeSelectedItem (QItemSelectionModel *pSelectionModel) override

  Remove an array under selection.
- void **removeSelectedLeadingItem** (QItemSelectionModel *) override

Private Member Functions

- void updateContent ()

  Represent all items which a vector data object contains.
- void clearContent ()

  Clear previously created items.

Private Attributes

- Core::AbstractDataObject * **mpDataObject** = nullptr

Additional Inherited Members

4.17.1 Detailed Description

Table model to represent a matrix data object.

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

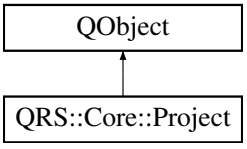
- /home/qinterfly/Library/Projects/QRodSystems/src/models/matrixtablemodel.h
- /home/qinterfly/Library/Projects/QRodSystems/src/models/matrixtablemodel.cpp

4.18 QRS::Core::Project Class Reference

Project class to interact with a created system of rods.

`#include <project.h>`

Inheritance diagram for QRS::Core::Project:



Public Slots

- bool save (QString const &dir, QString const &fileName)

  Save a project to a file.

Signals

- void **dataObjectAdded** (QRS::Core::DataIDType id)
- void **dataObjectRemoved** (QRS::Core::DataIDType id)
- void **dataObjectsChanged** ()
- void **modified** (bool modifiedState)

Public Member Functions

- Project (QString const &name)

  Construct a clean project with the user specified name.
- Project (QString const &path, QString const &fileName)

  Read a project from a file.
- bool **isModified** () const
- DataIDType **numberDataObjects** () const
- std::unordered_map< DataIDType, AbstractDataObject * > cloneDataObjects () const

  Clone data objects.
- DataIDType addDataObject (DataObjectType type)

  Create a data object with the specified type.
- void removeDataObject (DataIDType id)

  Remove a data object by id.
- void setDataObjects (std::unordered_map< DataIDType, AbstractDataObject * > dataObjects, HierarchyTree const &hierarchyDataObjects)

  Substitute current data objects with new ones.
- HierarchyTree cloneHierarchyDataObjects () const

  Clone a hierarchy of data objects.
- QString const & **name** () const
- QString const & **filePath** () const
- void importDataObjects (QString const &path, QString const &fileName)

  Import several data objects from a file.

Static Public Member Functions

- static QString const & **getFileExtension** ()

Private Slots

- void setModified (bool modifiedState=true)

  Set a modification state.

Private Attributes

- quint32 mID

  Unique project identifier.
- QString mName

  Project name.
- QString mFilePath

  Path to a file where a project is stored.
- bool mIsModified

  Flag whether a project has been modified since last saving.
- DataObjects mDataObjects

  Data objects.
- HierarchyTree mHierarchyDataObjects

  Hierarchy of data objects.

Static Private Attributes

- static const QString skProjectExtension = ".qrs"

  File extensionn.

Friends

- class **QRS::HierarchyModels::ProjectHierarchyModel**

4.18.1 Detailed Description

Project class to interact with a created system of rods.

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

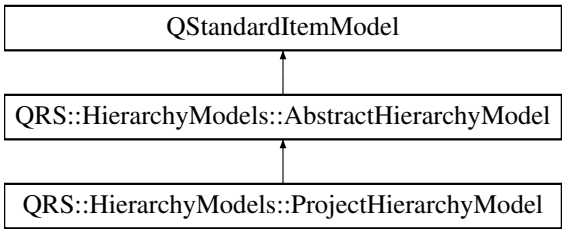
- /home/qinterfly/Library/Projects/QRodSystems/src/core/project.h
- /home/qinterfly/Library/Projects/QRodSystems/src/core/project.cpp

4.19 QRS::HierarchyModels::ProjectHierarchyModel Class Reference

Project hierarchy representative.

`#include <projecthierarchymodel.h>`

Inheritance diagram for QRS::HierarchyModels::ProjectHierarchyModel:



Public Slots

- void validateItemSelection ()

  Check if an item selection is correct and if it is not – correct it.

Signals

- void **selectionValidated** (QVector< QRS::HierarchyModels::AbstractHierarchyItem * > validatedItems)

Public Member Functions

- **ProjectHierarchyModel** (QTreeView *pView=nullptr)
- void updateContent () override

  Update all the content.
- void clearContent () override

  Clear all the items.
- void setProject (Core::Project *pProject)

  Set a project to represent.

Private Slots

- void renameItem (QStandardItem *pStandardItem)

  Rename an item.

Private Attributes

- Core::Project * **mpProject** = nullptr

Additional Inherited Members

4.19.1 Detailed Description

Project hierarchy representative.

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

- /home/qinterfly/Library/Projects/QRodSystems/src/models/projecthierarchymodel.h
- /home/qinterfly/Library/Projects/QRodSystems/src/models/projecthierarchymodel.cpp

4.20 QRS::Core::Array< T >::Row< U > Struct Template Reference

Proxy class to acquire a row by index.

Public Member Functions

- **Row** (T *pData)
- T & **operator[ ]** (IndexType iCol)

Public Attributes

- T * **pRow**

4.20.1 Detailed Description

template<typename T>
template<typename U>
struct QRS::Core::Array< T >::Row< U >

Proxy class to acquire a row by index.

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

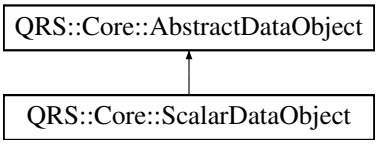
- /home/qinterfly/Library/Projects/QRodSystems/src/core/array.h

4.21 QRS::Core::ScalarDataObject Class Reference

Scalar data object.

`#include <scalardataobject.h>`

Inheritance diagram for QRS::Core::ScalarDataObject:



Public Member Functions

- ScalarDataObject (QString const &name)

  Construct a scalar data object.
- AbstractDataObject * clone () const override

  Clone a scalar data object.
- DataItemType & addItem (DataValueType key) override

  Insert a new item into ScalarDataObject.
- virtual void import (QTextStream &stream) override

  Import a scalar data object from a file.

Static Public Member Functions

- static uint **numberInstances** ()
- static void **setNumberInstances** (uint numInstances)

Static Private Attributes

- static uint **smNumInstances** = 0

Additional Inherited Members

4.21.1 Detailed Description

Scalar data object.

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

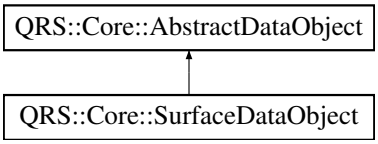
- /home/qinterfly/Library/Projects/QRodSystems/src/core/scalardataobject.h
- /home/qinterfly/Library/Projects/QRodSystems/src/core/scalardataobject.cpp

4.22 QRS::Core::SurfaceDataObject Class Reference

Surface data object.

`#include <surfacedataobject.h>`

Inheritance diagram for QRS::Core::SurfaceDataObject:



Public Member Functions

- SurfaceDataObject (QString const &name)
  Construct a surface data object.
- AbstractDataObject * clone () const override
  Clone a surface data object.
- DataItemType & addItem (DataValueType key) override
  Insert a new item into SurfaceDataObject.
- DataKeyType addLeadingItem (DataValueType key)
  Add a leading item.
- void removeLeadingItem (DataValueType key)
  Remove a leading item.
- bool changeLeadingItemKey (DataKeyType oldKey, DataKeyType newKey)
  Modify a leading item key.
- uint **numberLeadingItems** () const
- DataHolder & **getLeadingItems** ()
- void serialize (QDataStream &stream) const override
  Serialize additional data of a surface object.
- virtual void deserialize (QDataStream &stream) override
  Deserialize additional data of a surface object.
- virtual void import (QTextStream &stream) override
  Import a surface data object from a file.

Static Public Member Functions

- static uint **numberInstances** ()
- static void **setNumberInstances** (uint numInstances)

Private Attributes

- DataHolder **mLeadingItems**

Static Private Attributes

- static uint **smNumInstances** = 0

Additional Inherited Members

4.22.1 Detailed Description

Surface data object.

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

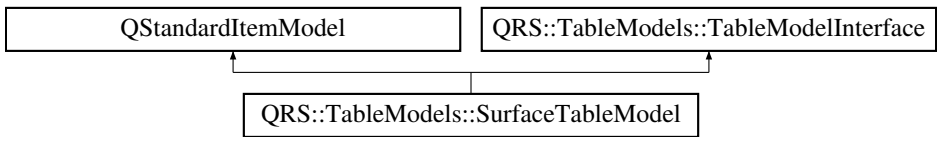
- /home/qinterfly/Library/Projects/QRodSystems/src/core/surfacedataobject.h
- /home/qinterfly/Library/Projects/QRodSystems/src/core/surfacedataobject.cpp

4.23 QRS::TableModels::SurfaceTableModel Class Reference

Table model to represent a surface data object.

`#include <surfacetablemodel.h>`

Inheritance diagram for QRS::TableModels::SurfaceTableModel:



Public Member Functions

- **SurfaceTableModel** (QWidget *parent=nullptr)
- void setDataObject (Core::SurfaceDataObject *pDataObject)

  Set a surface data object to represent.
- bool setData (const QModelIndex &indexEdit, const QVariant &value, int role=Qt::EditRole) override

  Set the data acquired from a delegate.
- void insertItemAfterSelected (QItemSelectionModel *pSelectionModel) override

  Insert a new item after selected one.
- void removeSelectedItem (QItemSelectionModel *pSelectionModel) override

  Remove an array under selection.
- void insertLeadingItemAfterSelected (QItemSelectionModel *pSelectionModel) override

  Add a new leading item after selected one.
- void removeSelectedLeadingItem (QItemSelectionModel *pSelectionModel) override

  Remove a selected leading item.

Private Member Functions

- void updateContent ()

  Represent all items which a data object contains.
- void clearContent ()

  Clear previously created items.

Private Attributes

- Core::SurfaceDataObject * **mpDataObject** = nullptr

Additional Inherited Members

4.23.1 Detailed Description

Table model to represent a surface data object.

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

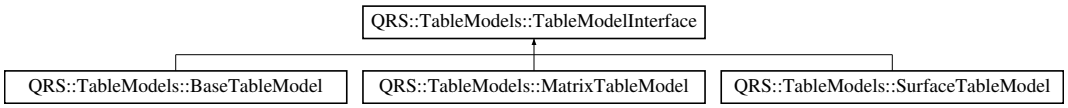
- /home/qinterfly/Library/Projects/QRodSystems/src/models/surfacetablemodel.h
- /home/qinterfly/Library/Projects/QRodSystems/src/models/surfacetablemodel.cpp

4.24 QRS::TableModels::TableModelInterface Class Reference

User interface to add and remove items.

`#include <tablemodelinterface.h>`

Inheritance diagram for QRS::TableModels::TableModelInterface:



Public Member Functions

- virtual void **insertItemAfterSelected** (QItemSelectionModel *pSelectionModel)=0
- virtual void **insertLeadingItemAfterSelected** (QItemSelectionModel *pSelectionModel)=0
- virtual void **removeSelectedItem** (QItemSelectionModel *pSelectionModel)=0
- virtual void **removeSelectedLeadingItem** (QItemSelectionModel *pSelectionModel)=0

Static Public Member Functions

- static QStandardItem * makeDoubleItem (double value)

  Helper function to make an item which holds a double value.
- static QList< QStandardItem * > prepareRow (Core::Array< double > &array, uint iRow)

  Helper function to copy a row from an array.
- static QList< QStandardItem * > prepareRow (double const &key, Core::Array< double > &array, uint iRow)

  Helper function to copy a row from an array and associate it with an key.
- static QList< QStandardItem * > prepareRow (QString const &name, Core::Array< double > &array, uint iRow)

  Helper function to copy a row from an array and associate it with a name.
- static QStandardItem * makeLabelItem (QString const &name)

  Helper function to create an item which holds a string and cannot be modfifed.

4.24.1 Detailed Description

User interface to add and remove items.

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

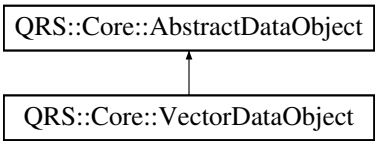
- /home/qinterfly/Library/Projects/QRodSystems/src/models/tablemodelinterface.h
- /home/qinterfly/Library/Projects/QRodSystems/src/models/tablemodelinterface.cpp

4.25 QRS::Core::VectorDataObject Class Reference

Vector data object.

`#include <vectordataobject.h>`

Inheritance diagram for QRS::Core::VectorDataObject:



Public Member Functions

- VectorDataObject (QString const &name)

  Construct a vector data object.
- AbstractDataObject * clone () const override

  Clone a vector data object.
- DataItemType & addItem (DataValueType key) override

  Insert a new item into VectorDataObject.
- virtual void import (QTextStream &stream) override

  Import a vector data object from a file.

Static Public Member Functions

- static uint **numberInstances** ()
- static void **setNumberInstances** (uint numInstances)

Static Private Attributes

- static uint **smNumInstances** = 0

Additional Inherited Members

4.25.1 Detailed Description

Vector data object.

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

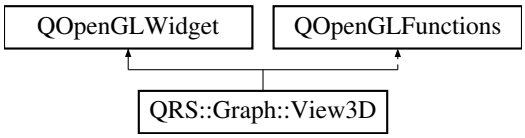
- /home/qinterfly/Library/Projects/QRodSystems/src/core/vectordataobject.h
- /home/qinterfly/Library/Projects/QRodSystems/src/core/vectordataobject.cpp

4.26 QRS::Graph::View3D Class Reference

A widget to represent the resulted rod system.

`#include <view3d.h>`

Inheritance diagram for QRS::Graph::View3D:



Public Member Functions

- **View3D** (QWidget *parent=nullptr)

Protected Member Functions

- void initializeGL () override

  Initialize a graphical scene.
- void paintGL () override

  Render its content.

Private Attributes

- bool **mCore**

4.26.1 Detailed Description

A widget to represent the resulted rod system.

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

- /home/qinterfly/Library/Projects/QRodSystems/src/render/view3d.h
- /home/qinterfly/Library/Projects/QRodSystems/src/render/view3d.cpp

Chapter 5

File Documentation

5.1 /home/qinterfly/Library/Projects/QRod↩ Systems/src/central/controltabs.cpp File Reference

Implementation of the ControlTabs class.

```
#include <QLayout>
#include <QToolBar>
#include <QIcon>
#include "controltabs.h"
```

5.1.1 Detailed Description

Implementation of the ControlTabs class.

Author

Pavel Lakiza

Date

March 2021

5.2 /home/qinterfly/Library/Projects/QRod↩ Systems/src/central/controltabs.h File Reference

Declaration of the ControlTabs class.

```
#include <QWidget>
```

Classes

- class QRS::App::ManagersTab

  A toolbar consisted of object designers.

5.2.1 Detailed Description

Declaration of the ControlTabs class.

Author

Pavel Lakiza

Date

March 2021

5.3 /home/qinterfly/Library/Projects/QRod↩ Systems/src/central/logwidget.cpp File Reference

Implementation of the LogWidget class.

```
#include <QHeaderView>
#include <QTime>
#include <QTimer>
#include "logwidget.h"
```

Enumerations

- enum **ColumnType** { **kTime** , **kType** , **kMessage** }

5.3.1 Detailed Description

Implementation of the LogWidget class.

Author

Pavel Lakiza

Date

May 2021

5.4 /home/qinterfly/Library/Projects/QRod↩ Systems/src/central/logwidget.h File Reference

Declaration of the LogWidget class.

```
#include <QTableWidget>
```

Classes

- class QRS::App::LogWidget
  Log all the messages sent.

5.4.1 Detailed Description

Declaration of the LogWidget class.

Author

Pavel Lakiza

Date

May 2021

5.5 /home/qinterfly/Library/Projects/QRod↩ Systems/src/central/mainwindow.cpp File Reference

Implementation of the MainWindow class.

```
#include <QDesktopWidget>
#include <QToolBar>
#include <QTreeView>
#include <QTableView>
#include <QHeaderView>
#include <QTextEdit>
#include <QVBoxLayout>
#include <QSettings>
#include <QMessageBox>
#include <QFileDialog>
#include <QLabel>
#include "DockManager.h"
#include "DockWidget.h"
#include "DockAreaWidget.h"
#include "ads_globals.h"
#include "mainwindow.h"
#include "ui_mainwindow.h"
#include "controltabs.h"
#include "logwidget.h"
#include "uiconstants.h"
#include "models/projecthierarchymodel.h"
#include "models/dataobjectspropertiesmodel.h"
#include "managers/dataobjectsmanager.h"
#include "render/view3d.h"
```

Functions

- void moveToCenter (QWidget *pWidget)

  Helper function to situate widgets at the center of their parent widgets.

5.5.1 Detailed Description

Implementation of the MainWindow class.

Author

Pavel Lakiza

Date

May 2021

5.6 /home/qinterfly/Library/Projects/QRod↩ Systems/src/central/mainwindow.h File Reference

Declaration of the MainWindow class.

```
#include <QMainWindow>
#include "logwidget.h"
#include "core/project.h"
```

Classes

- class QRS::App::MainWindow

  The main window of the program.

Functions

- void QRS::App::throwMessage (QtMsgType type, const QMessageLogContext &, const QString &message)

  Log all the messages.

5.6.1 Detailed Description

Declaration of the MainWindow class.

Author

Pavel Lakiza

Date

May 2021

5.7 /home/qinterfly/Library/Projects/QRod↩ Systems/src/central/uiconstants.h File Reference

Common graphical constants shared between several windows.

```
#include <QString>
```

Variables

- const QString **QRS::UiConstants::Settings::skGeometry** = "geometry"
- const QString **QRS::UiConstants::Settings::skState** = "state"
- const QString **QRS::UiConstants::Settings::skDockingState** = "dockingState"

5.7.1 Detailed Description

Common graphical constants shared between several windows.

Author

Pavel Lakiza

Date

April 2021

5.8 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/abstractdataobject.cpp File Reference

Implementation of the AbstractDataObject class.

```
#include "abstractdataobject.h"
```

5.8.1 Detailed Description

Implementation of the AbstractDataObject class.

Author

Pavel Lakiza

Date

April 2021

5.9 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/abstractdataobject.h File Reference

Declaration of the AbstractDataObject class.

```
#include <QString>
#include <QDataStream>
#include <unordered_map>
#include "array.h"
#include "datatypes.h"
```

Classes

- class QRS::Core::AbstractDataObject

  Data object which is designied in the way to be represented in a table easily.

Typedefs

- using **QRS::Core::DataItemType** = Array< DataValueType >
- using **QRS::Core::DataHolder** = std::map< DataKeyType, DataItemType >

Functions

- QDataStream & QRS::Core::operator<< (QDataStream &stream, AbstractDataObject const &obj)

  Print a data object to a stream.
- QDataStream & QRS::Core::operator>> (QDataStream &stream, AbstractDataObject &obj)

  Read a data object from a stream.

5.9.1 Detailed Description

Declaration of the AbstractDataObject class.

Author

Pavel Lakiza

Date

April 2021

5.10 /home/qinterfly/Library/Projects/QRodSystems/src/core/array.cpp File Reference

Implementation of the Array class.

```
#include "array.h"
```

5.10.1 Detailed Description

Implementation of the Array class.

Author

Pavel Lakiza

Date

March 2021

5.11 /home/qinterfly/Library/Projects/QRodSystems/src/core/array.h File Reference

Declaration of the Array class.

```
#include <QDebug>
```

Classes

- class QRS::Core::Array< T >
  Numerical array class.
- struct QRS::Core::Array< T >::Row< U >
  Proxy class to acquire a row by index.

Typedefs

- using **QRS::Core::IndexType** = unsigned int

Functions

- template<typename K >
  QDebug QRS::Core::operator<< (QDebug stream, Array< K > &array)
  Print all array values using the matrix format.
- template<typename K >
  QDataStream & QRS::Core::operator<< (QDataStream &stream, Array< K > const &array)
  Write an array to a stream.
- template<typename K >
  QDataStream & QRS::Core::operator>> (QDataStream &stream, Array< K > &array)
  Read an array from a stream.

5.11.1 Detailed Description

Declaration of the Array class.

Author

Pavel Lakiza

Date

March 2021

5.12 /home/qinterfly/Library/Projects/QRodSystems/src/core/datatypes.h File Reference

Specification of data types used in a project.

Typedefs

- using **QRS::Core::DataValueType** = double
- using **QRS::Core::DataKeyType** = double
- using **QRS::Core::DataIDType** = unsigned int

Enumerations

- enum **DataObjectType** { **kScalar** , **kVector** , **kMatrix** , **kSurface** }

5.12.1 Detailed Description

Specification of data types used in a project.

Author

Pavel Lakiza

Date

March 2021

5.13 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/hierarchynode.cpp File Reference

Implementation of the HierarchyNode class.

```
#include "hierarchynode.h"
```

5.13.1 Detailed Description

Implementation of the HierarchyNode class.

Author

Pavel Lakiza

Date

May 2021

5.14 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/hierarchynode.h File Reference

Declaration of the HierarchyNode class.

```
#include <QVariant>
#include <QDataStream>
#include <QSharedPointer>
```

Classes

- class QRS::Core::HierarchyNode
  Hierarchy representative.

5.14.1 Detailed Description

Declaration of the HierarchyNode class.

Author

Pavel Lakiza

Date

May 2021

5.15 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/hierarchytree.cpp File Reference

Implementation of the HierarchyTree class.

```
#include "hierarchytree.h"
```

5.15.1 Detailed Description

Implementation of the HierarchyTree class.

Author

Pavel Lakiza

Date

May 2021

5.16 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/hierarchytree.h File Reference

Declaration of the HierarchyTree class.

```
#include <QDebug>
#include "hierarchynode.h"
```

Classes

- class QRS::Core::HierarchyTree
  Hierarchy of data objects (n-aray tree)

Functions

- QDebug QRS::Core::operator<< (QDebug stream, HierarchyTree &tree)
  Print a tree structure.
- QDataStream & QRS::Core::operator<< (QDataStream &stream, HierarchyTree const &tree)
  Write a tree structure to a stream.

5.16.1 Detailed Description

Declaration of the HierarchyTree class.

Author

Pavel Lakiza

Date

April 2021

5.17 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/matrixdataobject.cpp File Reference

Implementation of the MatrixDataObject class.

```
#include "matrixdataobject.h"
```

Variables

- const IndexType **skNumElements** = 3

5.17.1 Detailed Description

Implementation of the MatrixDataObject class.

Author

Pavel Lakiza

Date

April 2021

5.18 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/matrixdataobject.h File Reference

Declaration of the MatrixDataObject class.

```
#include "abstractdataobject.h"
```

Classes

- class QRS::Core::MatrixDataObject
  Matrix data object.

5.18.1 Detailed Description

Declaration of the MatrixDataObject class.

Author

Pavel Lakiza

Date

April 2021

5.19 /home/qinterfly/Library/Projects/QRodSystems/src/core/project.cpp File Reference

Implementation of the Project class.

```
#include <QDebug>
#include <QRandomGenerator>
#include <QFileInfo>
#include <QDir>
#include <QDataStream>
#include <QDateTime>
#include "project.h"
#include "scalardataobject.h"
#include "vectordataobject.h"
#include "matrixdataobject.h"
#include "surfacedataobject.h"
#include "utilities.h"
```

Functions

- AbstractDataObject * createDataObject (DataObjectType type)

  Helper function to create DataObject instance by a type and name.

5.19.1 Detailed Description

Implementation of the Project class.

Author

Pavel Lakiza

Date

May 2021

5.20 /home/qinterfly/Library/Projects/QRodSystems/src/core/project.h File Reference

Declaration of the Project class.

```
#include <QObject>
#include <unordered_map>
#include <memory>
#include "abstractdataobject.h"
#include "array.h"
#include "hierarchytree.h"
```

Classes

- class QRS::Core::Project

  Project class to interact with a created system of rods.

Typedefs

- using **QRS::Core::DataObjects** = std::unordered_map< DataIDType, AbstractDataObject * >

5.20.1 Detailed Description

Declaration of the Project class.

Author

Pavel Lakiza

Date

May 2021

5.21 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/scalardataobject.cpp File Reference

Implementation of the ScalarDataObject class.

```
#include "scalardataobject.h"
```

5.21.1 Detailed Description

Implementation of the ScalarDataObject class.

Author

Pavel Lakiza

Date

April 2021

5.22 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/scalardataobject.h File Reference

Declaration of the ScalarDataObject class.

```
#include "abstractdataobject.h"
```

Classes

- class QRS::Core::ScalarDataObject

  Scalar data object.

5.22.1 Detailed Description

Declaration of the ScalarDataObject class.

Author

Pavel Lakiza

Date

April 2021

5.23 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/surfacedataobject.cpp File Reference

Implementation of the SurfaceDataObject class.

```
#include "surfacedataobject.h"
```

5.23.1 Detailed Description

Implementation of the SurfaceDataObject class.

Author

Pavel Lakiza

Date

April 2021

5.24 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/surfacedataobject.h File Reference

Declaration of the SurfaceDataObject class.

```
#include "abstractdataobject.h"
```

Classes

- class QRS::Core::SurfaceDataObject

  Surface data object.

5.24.1 Detailed Description

Declaration of the SurfaceDataObject class.

Author

Pavel Lakiza

Date

April 2021

5.25 /home/qinterfly/Library/Projects/QRodSystems/src/core/utilities.cpp File Reference

Implementation of utilities.

```
#include <QDebug>
#include <QString>
#include <QFile>
#include <QDir>
#include <QPair>
#include "utilities.h"
```

5.25.1 Detailed Description

Implementation of utilities.

Author

Pavel Lakiza

Date

May 2021

5.26 /home/qinterfly/Library/Projects/QRodSystems/src/core/utilities.h File Reference

Declaration of utilities.

```
#include <QSharedPointer>
#include "datatypes.h"
```

Functions

- QPair< Core::DataObjectType, QSharedPointer< QFile > > QRS::Utilities::File::getDataObjectFile (QString const &path, QString const &fileName)

  Retrieve a pair consisted of a data object file and its type.
- QString QRS::Utilities::File::loadFileContent (QString const &path)

  Load a style sheet.

5.26.1 Detailed Description

Declaration of utilities.

Author

Pavel Lakiza

Date

May 2021

5.27 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/vectordataobject.cpp File Reference

Implementation of the VectorDataObject class.

```
#include "vectordataobject.h"
```

Variables

- const IndexType **skNumElements** = 3

5.27.1 Detailed Description

Implementation of the VectorDataObject class.

Author

Pavel Lakiza

Date

April 2021

5.28 /home/qinterfly/Library/Projects/QRod↩ Systems/src/core/vectordataobject.h File Reference

Declaration of the VectorDataObject class.

```
#include "abstractdataobject.h"
```

Classes

- class QRS::Core::VectorDataObject
  Vector data object.

5.28.1 Detailed Description

Declaration of the VectorDataObject class.

Author

Pavel Lakiza

Date

April 2021

5.29 /home/qinterfly/Library/Projects/QRodSystems/src/main/main.cpp File Reference

The startup function.

```
#include <QFile>
#include <QApplication>
#include "mainwindow.h"
#include "utilities.h"
```

Functions

- int main (int argc, char ∗argv[ ])
  Entry point.

5.29.1 Detailed Description

The startup function.

Author

Pavel Lakiza

Date

May 2021

5.30 /home/qinterfly/Library/Projects/QRod↩ Systems/src/managers/dataobjectsmanager.cpp File Reference

Implementation of the DataObjectsManager class.

```
#include <QTreeView>
#include <QSettings>
#include <QHBoxLayout>
#include <QToolBar>
#include <QListWidget>
#include <QTextEdit>
#include <QPushButton>
#include <QSpacerItem>
#include <QMessageBox>
#include <QShortcut>
#include <QFileDialog>
#include "DockManager.h"
#include "DockWidget.h"
#include "DockAreaWidget.h"
#include "dataobjectsmanager.h"
#include "ui_dataobjectsmanager.h"
#include "central/uiconstants.h"
#include "core/project.h"
#include "core/scalardataobject.h"
#include "core/vectordataobject.h"
#include "core/matrixdataobject.h"
#include "core/surfacedataobject.h"
#include "core/utilities.h"
#include "models/basetablemodel.h"
#include "models/matrixtablemodel.h"
#include "models/surfacetablemodel.h"
#include "models/dataobjectshierarchymodel.h"
#include "doublespinboxitemdelegate.h"
```

Functions

- void setToolBarShortcutHints (QToolBar *pToolBar)

  Helper function to add a shortcut hint to all actions which a toolbar contains.
- QIcon getDataObjectIcon (DataObjectType type)

  Helper function to assign appropriate data object icon.

Variables

- const QString **skDataObjectsWindow** = "DataObjectsManager"

5.30.1 Detailed Description

Implementation of the DataObjectsManager class.

Author

Pavel Lakiza

Date

March 2021

5.31 /home/qinterfly/Library/Projects/QRod↩ Systems/src/managers/dataobjectsmanager.h File Reference

Declaration of the DataObjectsManager class.

```
#include <QSignalMapper>
#include <QDialog>
#include <unordered_map>
#include "../core/datatypes.h"
#include "../core/hierarchytree.h"
```

Classes

- class QRS::Managers::DataObjectsManager

  Manager to create objects of different types: scalars, vectors, matroces and surfaces.

Typedefs

- using **QRS::Managers::mapDataObjects** = std::unordered_map< Core::DataIDType, Core::Abstract↩ DataObject * >

5.31.1 Detailed Description

Declaration of the DataObjectsManager class.

Author

Pavel Lakiza

Date

March 2021

5.32 /home/qinterfly/Library/Projects/QRod↩ Systems/src/managers/doublespinboxitemdelegate.cpp File Reference

Implementation of the DoubleSpinBoxItemDelegate class.

```
#include <QDoubleSpinBox>
#include "doublespinboxitemdelegate.h"
```

5.32.1 Detailed Description

Implementation of the DoubleSpinBoxItemDelegate class.

Author

Pavel Lakiza

Date

March 2021

5.33 /home/qinterfly/Library/Projects/QRod↩ Systems/src/managers/doublespinboxitemdelegate.h File Reference

Declaration of the DoubleSpinBoxItemDelegate class.

```
#include <QStyledItemDelegate>
```

Classes

- class QRS::Managers::DoubleSpinBoxItemDelegate
  Class to specify how table values can be edited.

5.33.1 Detailed Description

Declaration of the DoubleSpinBoxItemDelegate class.

Author

Pavel Lakiza

Date

March 2021

5.34 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/abstracthierarchyitem.cpp File Reference

Definition of the AbstractHierarchyItem class.

```
#include "abstracthierarchyitem.h"
#include "core/hierarchynode.h"
```

5.34.1 Detailed Description

Definition of the AbstractHierarchyItem class.

Author

Pavel Lakiza

Date

May 2021

5.35 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/abstracthierarchyitem.h File Reference

Declaration of the AbstractHierarchyItem class.

```
#include <QStandardItem>
```

Classes

- class QRS::HierarchyModels::AbstractHierarchyItem
  Item to represent a hierarchy of elements of the same type.

Enumerations

- enum **HierarchyItemType** { **kDataObjects** = QStandardItem::UserType }

5.35.1 Detailed Description

Declaration of the AbstractHierarchyItem class.

Author

Pavel Lakiza

Date

May 2021

5.36 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/abstracthierarchymodel.cpp File Reference

Definition of the AbstractHierarchyModel class.

```
#include <QTreeView>
#include <QMimeData>
#include <unordered_map>
#include "abstracthierarchymodel.h"
#include "core/hierarchynode.h"
```

5.36.1 Detailed Description

Definition of the AbstractHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

5.37 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/abstracthierarchymodel.h File Reference

Declaration of the AbstractHierarchyModel class.

```
#include <QStandardItemModel>
#include "abstracthierarchyitem.h"
```

Classes

- class QRS::HierarchyModels::AbstractHierarchyModel

  Hierarchy model which enables one to drag and drop elements of the same type.

Typedefs

- using **QRS::HierarchyModels::NodesState** = std::unordered_map< Core::HierarchyNode *, bool >

5.37.1 Detailed Description

Declaration of the AbstractHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

5.38 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/basetablemodel.cpp File Reference

Implementation of the BaseTableModel class.

```
#include <QTreeView>
#include "basetablemodel.h"
#include "core/abstractdataobject.h"
```

5.38.1 Detailed Description

Implementation of the BaseTableModel class.

Author

Pavel Lakiza

Date

March 2021

5.39 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/basetablemodel.h File Reference

Declaration of the BaseTableModel class.

```
#include <QStandardItemModel>
#include "tablemodelinterface.h"
```

Classes

- class QRS::TableModels::BaseTableModel

  Table model to represent either a scalar or vector data object.

5.39.1 Detailed Description

Declaration of the BaseTableModel class.

Author

Pavel Lakiza

Date

March 2021

5.40 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/dataobjectshierarchyitem.cpp File Reference

Definition of the DataObjectsHierarchyItem class.

```
#include "dataobjectshierarchyitem.h"
#include "core/abstractdataobject.h"
#include "core/hierarchytree.h"
```

Functions

- QIcon getDataObjectIcon (DataObjectType type)
  Helper function to assign appropriate data object icon.

5.40.1 Detailed Description

Definition of the DataObjectsHierarchyItem class.

Author

Pavel Lakiza

Date

May 2021

5.41 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/dataobjectshierarchyitem.h File Reference

Declaration of the DataObjectsHierarchyItem class.

```
#include <unordered_map>
#include "models/abstracthierarchyitem.h"
#include "core/datatypes.h"
```

Classes

- class QRS::HierarchyModels::DataObjectsHierarchyItem

  Item to represent a hierarchy of data objects.

Typedefs

- using **QRS::HierarchyModels::DataObjects** = std::unordered_map< Core::DataIDType, Core::Abstract↩ DataObject * >

5.41.1 Detailed Description

Declaration of the DataObjectsHierarchyItem class.

Author

Pavel Lakiza

Date

May 2021

5.42 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/dataobjectshierarchymodel.cpp File Reference

Definition of the DataObjectsHierarchyModel class.

```
#include <QTreeView>
#include <QMimeData>
#include "dataobjectshierarchymodel.h"
#include "dataobjectshierarchyitem.h"
#include "core/abstractdataobject.h"
#include "core/hierarchytree.h"
```

5.42.1 Detailed Description

Definition of the DataObjectsHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

5.43 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/dataobjectshierarchymodel.h File Reference

Declaration of the DataObjectsHierarchyModel class.

```
#include "models/abstracthierarchymodel.h"
#include "dataobjectshierarchyitem.h"
```

Classes

- class QRS::HierarchyModels::DataObjectsHierarchyModel

  Tree model to represent and modify a hierarchy of data objects.

5.43.1 Detailed Description

Declaration of the DataObjectsHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

5.44 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/dataobjectspropertiesmodel.cpp File Reference

Definition of the DataObjectsPropertiesModel class.

```
#include <QTableView>
#include "core/abstractdataobject.h"
#include "core/surfacedataobject.h"
#include "core/hierarchynode.h"
#include "dataobjectspropertiesmodel.h"
#include "dataobjectshierarchyitem.h"
```

5.44.1 Detailed Description

Definition of the DataObjectsPropertiesModel class.

Author

Pavel Lakiza

Date

May 2021

5.45 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/dataobjectspropertiesmodel.h File Reference

Declaration of the DataObjectsPropertiesModel class.

```
#include <QStandardItemModel>
```

Classes

- class QRS::HierarchyModels::DataObjectsPropertiesModel

  Model to represent properties of selected data objects.

5.45.1 Detailed Description

Declaration of the DataObjectsPropertiesModel class.

Author

Pavel Lakiza

Date

May 2021

5.46 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/matrixtablemodel.cpp File Reference

Implementation of the MatrixTableModel class.

```
#include <QTreeView>
#include "matrixtablemodel.h"
#include "core/abstractdataobject.h"
```

5.46.1 Detailed Description

Implementation of the MatrixTableModel class.

Author

Pavel Lakiza

Date

March 2021

5.47 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/matrixtablemodel.h File Reference

Declaration of the MatrixTableModel class.

```
#include <QStandardItemModel>
#include "tablemodelinterface.h"
```

Classes

- class QRS::TableModels::MatrixTableModel

  Table model to represent a matrix data object.

5.47.1 Detailed Description

Declaration of the MatrixTableModel class.

Author

Pavel Lakiza

Date

March 2021

5.48 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/projecthierarchymodel.cpp File Reference

Definition of the ProjectHierarchyModel class.

```
#include <QTreeView>
#include "projecthierarchymodel.h"
#include "dataobjectshierarchyitem.h"
```

5.48.1 Detailed Description

Definition of the ProjectHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

5.49 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/projecthierarchymodel.h File Reference

Declaration of the ProjectHierarchyModel class.

```
#include "models/abstracthierarchymodel.h"
#include "core/datatypes.h"
#include "core/project.h"
```

Classes

- class QRS::HierarchyModels::ProjectHierarchyModel

  Project hierarchy representative.

5.49.1 Detailed Description

Declaration of the ProjectHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

5.50 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/surfacetablemodel.cpp File Reference

Implementation of the SurfaceTableModel class.

```
#include <QTreeView>
#include "surfacetablemodel.h"
#include "core/surfacedataobject.h"
```

5.50.1 Detailed Description

Implementation of the SurfaceTableModel class.

Author

Pavel Lakiza

Date

March 2021

5.51 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/surfacetablemodel.h File Reference

Declaration of the SurfaceTableModel class.

```
#include <QStandardItemModel>
#include "tablemodelinterface.h"
```

Classes

- class QRS::TableModels::SurfaceTableModel

  Table model to represent a surface data object.

5.51.1 Detailed Description

Declaration of the SurfaceTableModel class.

Author

Pavel Lakiza

Date

March 2021

5.52 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/tablemodelinterface.cpp File Reference

Implementation of static functions of TableModelInterface.

```
#include <QStandardItem>
#include "tablemodelinterface.h"
#include "core/array.h"
```

5.52.1 Detailed Description

Implementation of static functions of TableModelInterface.

Author

Pavel Lakiza

Date

May 2021

5.53 /home/qinterfly/Library/Projects/QRod↩ Systems/src/models/tablemodelinterface.h File Reference

Declaration of the TableModelInterface.

```
#include <QItemSelection>
```

Classes

- class QRS::TableModels::TableModelInterface
  User interface to add and remove items.

5.53.1 Detailed Description

Declaration of the TableModelInterface.

Author

Pavel Lakiza

Date

May 2021

5.54 /home/qinterfly/Library/Projects/QRod↩ Systems/src/render/view3d.cpp File Reference

Implementation of the View3D class.

```
#include <QOpenGLContext>
#include <QOpenGLPaintDevice>
#include <QPainter>
#include "view3d.h"
```

5.54.1 Detailed Description

Implementation of the View3D class.

Author

Pavel Lakiza

Date

March 2021

5.55 /home/qinterfly/Library/Projects/QRodSystems/src/render/view3d.h File Reference

Declaration of the View3D class.

```
#include <QOpenGLWidget>
#include <QOpenGLFunctions>
```

Classes

- class QRS::Graph::View3D

  A widget to represent the resulted rod system.

5.55.1 Detailed Description

Declaration of the View3D class.

Author

Pavel Lakiza

Date

March 2021