

QRodSystems

0.0.6

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Chapter 1

Hierarchical Index

1.1 Class Hierarchy

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

QRS::AbstractDataObject	??
QRS::MatrixDataObject	??
QRS::ScalarDataObject	??
QRS::SurfaceDataObject	??
QRS::VectorDataObject	??
QRS::Array< T >	??
QRS::HierarchyNode	??
QRS::HierarchyTree	??
QDialog	
DataObjectsManager	??
QMainWindow	
MainWindow	??
QObject	
QRS::Project	??
QOpenGLFunctions	
View3D	??
QOpenGLWidget	
View3D	??
QStandardItem	
HierarchyItem	??
DataObjectsHierarchyItem	??
QStandardItemModel	
BaseTableModel	??
DataObjectsHierarchyModel	??
MatrixTableModel	??
SurfaceTableModel	??
QStyledItemDelegate	
DoubleSpinBoxItemDelegate	??
QTableWidget	
LogWidget	??
QWidget	
ManagersTab	??
QRS::Array< T >::Row< U >	??
TableModelInterface	??
BaseTableModel	??
MatrixTableModel	??
SurfaceTableModel	??

Chapter 2

Class Index

2.1 Class List

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

QRS::AbstractDataObject	Data object which is designed in the way to be represented in a table easily	??
QRS::Array< T >	Numerical array class	??
BaseTableModel	Table model to represent either a scalar or vector data object	??
DataObjectsHierarchyItem	Item to represent a hierarchy of data objects	??
DataObjectsHierarchyModel	Tree model to represent and modify a hierarchy of data objects	??
DataObjectsManager	Manager to create objects of different types: scalars, vectors, matroces and surfaces	??
DoubleSpinBoxItemDelegate	Class to specify how table values can be edited	??
HierarchyItem	Item to represent a hierarchy of elements of the same type	??
QRS::HierarchyNode	Hierarchy representative	??
QRS::HierarchyTree	Hierarchy of data objects (n-aray tree)	??
LogWidget	Log all the messages sent	??
MainWindow	The main window of the program	??
ManagersTab	A toolbar consisted of object designers	??
QRS::MatrixDataObject	Matrix data object	??
MatrixTableModel	Table model to represent a matrix data object	??
QRS::Project	Project class to interact with a created system of rods	??
QRS::Array< T >::Row< U >	Proxy class to acquire a row by index	??
QRS::ScalarDataObject	Scalar data object	??

QRS::SurfaceDataObject	
Surface data object	??
SurfaceTableModel	
Table model to represent a surface data object	??
TableModelInterface	
User interface to add and remove items	??
QRS::VectorDataObject	
Vector data object	??
View3D	
A widget to represent the resulted rod system	??

Chapter 3

File Index

3.1 File List

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

/home/qinterfly/Library/Projects/QRodSystems/src/central/ controltabs.cpp	
Implementation of the ControlTabs class	??
/home/qinterfly/Library/Projects/QRodSystems/src/central/ controltabs.h	
Declaration of the ControlTabs class	??
/home/qinterfly/Library/Projects/QRodSystems/src/central/ logwidget.cpp	
Implementation of the LogWidget class	??
/home/qinterfly/Library/Projects/QRodSystems/src/central/ logwidget.h	
Declaration of the LogWidget class	??
/home/qinterfly/Library/Projects/QRodSystems/src/central/ mainwindow.cpp	
Implementation of the MainWindow class	??
/home/qinterfly/Library/Projects/QRodSystems/src/central/ mainwindow.h	
Declaration of the MainWindow class	??
/home/qinterfly/Library/Projects/QRodSystems/src/central/ uiconstants.h	
Common graphical constants shared between several windows	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ abstractdataobject.cpp	
Implementation of the AbstractDataObject class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ abstractdataobject.h	
Declaration of the AbstractDataObject class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ array.cpp	
Implementation of the Array class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ array.h	
Declaration of the Array class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ datatypes.h	
Specification of data types used in a project	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ hierarchyndoe.cpp	
Implementation of the HierarchyNode class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ hierarchyndoe.h	
Declaration of the HierarchyNode class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ hierarchytree.cpp	
Implementation of the HierarchyTree class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ hierarchytree.h	
Declaration of the HierarchyTree class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ matrixdataobject.cpp	
Implementation of the MatrixDataObject class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/ matrixdataobject.h	
Declaration of the MatrixDataObject class	??

/home/qinterfly/Library/Projects/QRodSystems/src/core/project.cpp	
Implementation of the QRS::Project class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/project.h	
Declaration of the QRS::Project class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/scalardataobject.cpp	
Implementation of the ScalarDataObject class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/scalardataobject.h	
Declaration of the ScalarDataObject class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/surfacedataobject.cpp	
Implementation of the SurfaceDataObject class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/surfacedataobject.h	
Declaration of the SurfaceDataObject class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/utilities.cpp	
Implementation of utilities	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/utilities.h	
Declaration of utilities	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/vectordataobject.cpp	
Implementation of the VectorDataObject class	??
/home/qinterfly/Library/Projects/QRodSystems/src/core/vectordataobject.h	
Declaration of the VectorDataObject class	??
/home/qinterfly/Library/Projects/QRodSystems/src/main/main.cpp	
The startup function	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/basetablemodel.cpp	
Implementation of the BaseTableModel class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/basetablemodel.h	
Declaration of the BaseTableModel class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/dataobjectshierarchyitem.cpp	
Definition of the DataObjectsHierarchyItem class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/dataobjectshierarchyitem.h	
Declaration of the DataObjectsHierarchyItem class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/dataobjectshierarchymodel.cpp	
Definition of the DataObjectsHierarchyModel class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/dataobjectshierarchymodel.h	
Declaration of the DataObjectsHierarchyModel class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/dataobjectsmanager.cpp	
Implementation of the DataObjectsManager class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/dataobjectsmanager.h	
Declaration of the DataObjectsManager class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/doublespinboxitemdelegate.cpp	
Implementation of the DoubleSpinBoxItemDelegate class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/doublespinboxitemdelegate.h	
Declaration of the DoubleSpinBoxItemDelegate class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/hierachyitem.cpp	
Definition of the HierarchyItem class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/hierachyitem.h	
Declaration of the HierarchyItem class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/matrixtablemodel.cpp	
Implementation of the MatrixTableModel class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/matrixtablemodel.h	
Declaration of the MatrixTableModel class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/surfacetablemodel.cpp	
Implementation of the SurfaceTableModel class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/surfacetablemodel.h	
Declaration of the SurfaceTableModel class	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/tablemodelinterface.cpp	
Implementation of static functions of TableModelInterface	??
/home/qinterfly/Library/Projects/QRodSystems/src/managers/tablemodelinterface.h	
Declaration of the TableModelInterface	??

/home/qinterfly/Library/Projects/QRodSystems/src/render/ view3d.cpp	
Implementation of the View3D class	??
/home/qinterfly/Library/Projects/QRodSystems/src/render/ view3d.h	
Declaration of the View3D class	??

Chapter 4

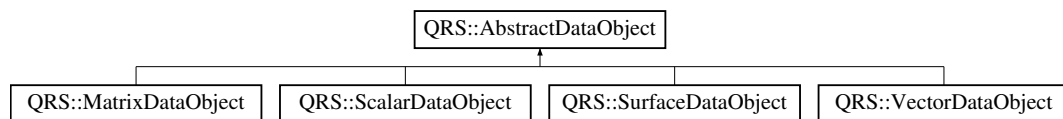
Class Documentation

4.1 QRS::AbstractDataObject Class Reference

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

```
#include <abstractdataobject.h>
```

Inheritance diagram for QRS::AbstractDataObject:



Public Member Functions

- [AbstractDataObject](#) (DataObjectType type, QString const &name)
Base constructor.
- virtual [AbstractDataObject](#) * **clone** () const =0
- virtual [DataItem](#) & **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.
- DataHolder & **getItems** ()
- [DataItem](#) & **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 **numberOfObjects** ()
- static void **setNumberOfObjects** (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 designed 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::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::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.

4.2.1 Detailed Description

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

Numerical array class.

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

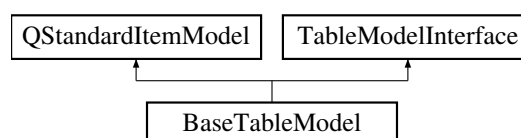
- /home/qinterfly/Library/Projects/QRodSystems/src/core/array.h
- /home/qinterfly/Library/Projects/QRodSystems/src/core/array.cpp

4.3 BaseTableModel Class Reference

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

```
#include <basetablemodel.h>
```

Inheritance diagram for BaseTableModel:



Public Member Functions

- **BaseTableModel** (QWidget *parent=nullptr)
- void **setDataObject** (QRS::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

- QRS::AbstractDataObject * **mpDataObject** = nullptr

Additional Inherited Members

4.3.1 Detailed Description

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

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

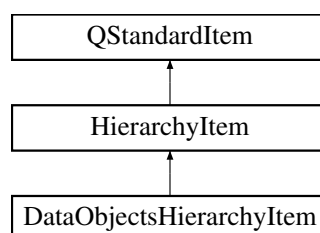
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/[basetablemodel.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/[basetablemodel.cpp](#)

4.4 DataObjectsHierarchyItem Class Reference

Item to represent a hierarchy of data objects.

```
#include <dataobjectshierarchyitem.h>
```

Inheritance diagram for DataObjectsHierarchyItem:



Public Member Functions

- [DataObjectsHierarchyItem](#) (mapDataObjects &dataObjects, [QRS::HierarchyTree](#) &hierarchyDataObjects, QString const &name="Root")
Create the representer of the structure of data objects.
- [DataObjectsHierarchyItem](#) ([QRS::HierarchyNode](#) *pNode, [QRS::AbstractDataObject](#) *pDataObject)
Construct an item to represent a data object.
- [DataObjectsHierarchyItem](#) ([QRS::HierarchyNode](#) *pNode)
Construct an item to represent a directory.
- int **type** () const override
- void **write** (QDataStream &out) const override
Write a hierarchy item to a stream.
- void **read** (QDataStream &in) override
Read a hierarchy item from a stream.

Private Member Functions

- void **appendItems** (mapDataObjects &dataObjects, [QRS::HierarchyNode](#) *pNode)

Private Attributes

- [QRS::AbstractDataObject](#) * **mpDataObject** = nullptr

Friends

- class **DataObjectsHierarchyModel**

Additional Inherited Members

4.4.1 Detailed Description

Item to represent a hierarchy of data objects.

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

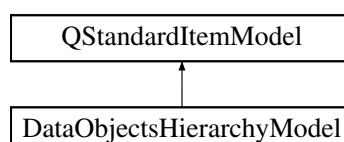
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/[dataobjectshierarchyitem.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/[dataobjectshierarchyitem.cpp](#)

4.5 DataObjectsHierarchyModel Class Reference

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

```
#include <dataobjectshierarchymodel.h>
```

Inheritance diagram for DataObjectsHierarchyModel:



Public Slots

- void [retrieveSelectedDataObject](#) ()
Retrieve a selected data object.
- void [removeSelectedItems](#) ()
Remove data objects under selection.

Signals

- void **dataModified** (bool flag)
- void **dataObjectSelected** (QRS::DataIDType id)
- void **selectionCleared** ()

Public Member Functions

- **DataObjectsHierarchyModel** (mapDataObjects &dataObjects, [QRS::HierarchyTree](#) &hierarchyData↔ Objects, QTreeView *pView=nullptr)
- void [updateContent](#) ()
Update all the content.
- void [clearContent](#) ()
Clear all.
- bool [isEmpty](#) () const
Check if there are data objects to represent.
- 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.
- bool [dropMimeData](#) (QMimeData const *pMimeData, Qt::DropAction action, int row, int column, const QModelIndex &parent) override
Process the drop action.
- QMimeData * [mimeData](#) (const QModelIndexList &indicies) const override
Encode each item according to a given list of indicies.
- void [selectItem](#) (int iRow)
Select an item by row index.

Private Slots

- void [renameDataObject](#) (QStandardItem *pStandardItem)
Rename a data object after editing.

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.

Private Attributes

- mapDataObjects & mDataObjects
- [QRS::HierarchyTree](#) & mHierarchyDataObjects

4.5.1 Detailed Description

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

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

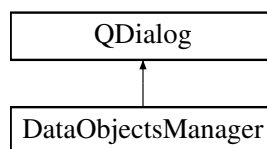
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/[dataobjectshierarchymodel.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/[dataobjectshierarchymodel.cpp](#)

4.6 DataObjectsManager Class Reference

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

```
#include <dataobjectsmanager.h>
```

Inheritance diagram for DataObjectsManager:



Public Slots

- void [apply](#) ()
Apply all the changes made by user.
- QRS::DataIDType [addScalar](#) ()
Add a scalar object.
- QRS::DataIDType [addVector](#) ()
Add a vector object.
- QRS::DataIDType [addMatrix](#) ()
Add a matrix object.
- QRS::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](#) (QRS::DataIDType id)
Represent a selected data object according to its type.
- void [clearDataObjectRepresentation](#) ()
Clear a visual data of a data object.

Public Member Functions

- **DataObjectsManager** ([QRS::Project](#) &project, QSettings &settings, QString &lastPath, QWidget *parent=nullptr)
- void [closeEvent](#) (QCloseEvent *event) override
Save settings and delete handling widgets before closing the window.
- void [selectDataObject](#) (int iRow)
Select a data object by row index.
- mapDataObjects const & **getDataObjects** ()

Private Member Functions

- 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](#) (QRS::AbstractDataObject *pDataObject)
Helper function to insert data objects into the manager.
- void **addListDataObjects** (QRS::AbstractDataObject *pDataObject)
- 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**
- [QRS::Project](#) & **mProject**
- QSettings & **mSettings**
- mapDataObjects **mDataObjects**
- [QRS::HierarchyTree](#) **mHierarchyDataObjects**
- QString & **mLastPath**
- [TableModelInterface](#) * **mpTableModelInterface** = nullptr
- [BaseTableModel](#) * **mpBaseTableModel**
- [MatrixTableModel](#) * **mpMatrixTableModel**
- [SurfaceTableModel](#) * **mpSurfaceTableModel**
- [DataObjectsHierarchyModel](#) * **mpTreeDataObjectsModel**

4.6.1 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:

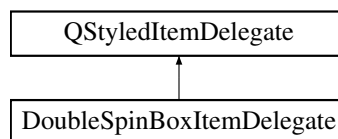
- </home/qinterfly/Library/Projects/QRodSystems/src/managers/dataobjectsmanager.h>
- </home/qinterfly/Library/Projects/QRodSystems/src/managers/dataobjectsmanager.cpp>

4.7 DoubleSpinBoxItemDelegate Class Reference

Class to specify how table values can be edited.

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

Inheritance diagram for 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.

4.7.1 Detailed Description

Class to specify how table values can be edited.

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

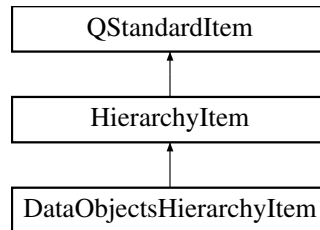
- </home/qinterfly/Library/Projects/QRodSystems/src/managers/doublespinboxitemdelegate.h>
- </home/qinterfly/Library/Projects/QRodSystems/src/managers/doublespinboxitemdelegate.cpp>

4.8 HierarchyItem Class Reference

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

```
#include <hierachyitem.h>
```

Inheritance diagram for HierarchyItem:



Public Member Functions

- **HierarchyItem** (const QIcon &icon, const QString &text, [QRS::HierarchyNode](#) *pNode)
- int **type** () const override
- void **write** (QDataStream &out) const override
Write a hierarchy item to a stream.
- void **read** (QDataStream &in) override
Read a hierarchy item from a stream.

Protected Attributes

- [QRS::HierarchyNode](#) * **mpNode** = nullptr

4.8.1 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/managers/[hierachyitem.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/[hierachyitem.cpp](#)

4.9 QRS::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** ()

Private Attributes

- [HierarchyNode](#) * **mpParent** = nullptr
- [HierarchyNode](#) * **mpFirstChild** = nullptr
- [HierarchyNode](#) * **mpNextSibling** = nullptr
- [HierarchyNode](#) * **mpPreviousSibling** = nullptr
- NodeType **mType**
- QVariant **mValue**

Friends

- class **HierarchyTree**

4.9.1 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](#)

4.10 QRS::HierarchyTree Class Reference

Hierarchy of data objects (n-array 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 &newValue)
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.
- [HierarchyNode](#) * [groupNodes](#) ([HierarchyNode](#) *pBaseNode, [HierarchyNode](#) *pChildNode)
Encompass two nodes.
- void [setBefore](#) ([HierarchyNode](#) *pBaseNode, [HierarchyNode](#) *pSetNode)
Set a given node before a base one.
- void [setAfter](#) ([HierarchyNode](#) *pBaseNode, [HierarchyNode](#) *pSetNode)
Set a given node after a base one.

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.
- void [excludeNodeFromHierarchy](#) ([HierarchyNode](#) *pNode)
Remove all links to a given node.

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.

4.10.1 Detailed Description

Hierarchy of data objects (n-array tree)

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

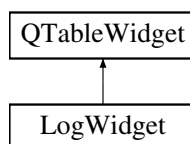
- /home/qinterfly/Library/Projects/QRodSystems/src/core/[hierarchytree.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/core/[hierarchytree.cpp](#)

4.11 LogWidget Class Reference

Log all the messages sent.

```
#include <logwidget.h>
```

Inheritance diagram for LogWidget:



Public Member Functions

- **LogWidget** (QWidget *parent=nullptr)
- void [log](#) (QtMsgType messageType, const QString &message)
Represent a message sent.

4.11.1 Detailed Description

Log all the messages sent.

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

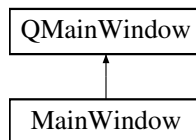
- /home/qinterfly/Library/Projects/QRodSystems/src/central/[logwidget.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/central/[logwidget.cpp](#)

4.12 MainWindow Class Reference

The main window of the program.

```
#include <mainwindow.h>
```

Inheritance diagram for 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 [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 [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 *event) 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 properties of selected objects.
- 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.
- 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**
- QSharedPointer< QSettings > **mpSettings**
- [DataObjectsManager](#) * **mpDataObjectsManager** = nullptr
- [QRS::Project](#) * **mpProject**
- QString **mLastPath**
- QList< QString > **mPathRecentProjects**

4.12.1 Detailed Description

The main window of the program.

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

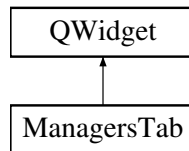
- /home/qinterfly/Library/Projects/QRodSystems/src/central/[mainwindow.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/central/[mainwindow.cpp](#)

4.13 ManagersTab Class Reference

A toolbar consisted of object designers.

```
#include <controltabs.h>
```

Inheritance diagram for ManagersTab:



Signals

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

Public Member Functions

- [ManagersTab](#) (QWidget *parent=nullptr)
Managers tab constructor.

4.13.1 Detailed Description

A toolbar consisted of object designers.

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

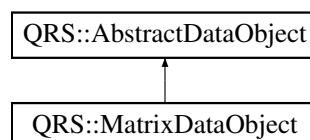
- /home/qinterfly/Library/Projects/QRodSystems/src/central/[controltabs.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/central/[controltabs.cpp](#)

4.14 QRS::MatrixDataObject Class Reference

Matrix data object.

```
#include <matrixdataobject.h>
```

Inheritance diagram for QRS::MatrixDataObject:



Public Member Functions

- [MatrixDataObject](#) (QString const &name)
Construct a matrix data object.
- [AbstractDataObject](#) * [clone](#) () const override
Clone a matrix data object.
- [DataItem](#) & [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

4.14.1 Detailed Description

Matrix data object.

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

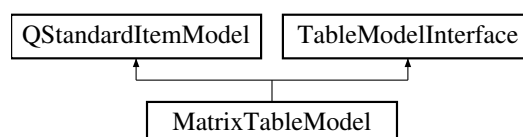
- /home/qinterfly/Library/Projects/QRodSystems/src/core/[matrixdataobject.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/core/[matrixdataobject.cpp](#)

4.15 MatrixTableModel Class Reference

Table model to represent a matrix data object.

```
#include <matrixtablemodel.h>
```

Inheritance diagram for MatrixTableModel:



Public Member Functions

- **MatrixTableModel** (QWidget *parent=nullptr)
- void **setDataObject** (QRS::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

- QRS::AbstractDataObject * **mpDataObject** = nullptr

Additional Inherited Members

4.15.1 Detailed Description

Table model to represent a matrix data object.

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

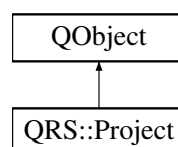
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/matrixtablemodel.h
- /home/qinterfly/Library/Projects/QRodSystems/src/managers/matrixtablemodel.cpp

4.16 QRS::Project Class Reference

Project class to interact with a created system of rods.

```
#include <project.h>
```

Inheritance diagram for QRS::Project:



Public Slots

- bool [save](#) (QString const &dir, QString const &fileName)
Save a project to a file.

Signals

- void **dataObjectAdded** (QRS::DataIDType id)
- void **dataObjectRemoved** (QRS::DataIDType id)
- void **allDataObjectsChanged** ()
- 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::shared_ptr< [AbstractDataObject](#) > [getDataObject](#) (DataIDType id)
Retrieve a data object by identifier.
- 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.

4.16.1 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](#)

4.17 QRS::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**

4.17.1 Detailed Description

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

Proxy class to acquire a row by index.

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

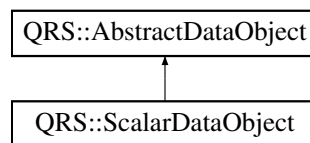
- </home/qinterfly/Library/Projects/QRodSystems/src/core/array.h>

4.18 QRS::ScalarDataObject Class Reference

Scalar data object.

```
#include <scalardataobject.h>
```

Inheritance diagram for QRS::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

4.18.1 Detailed Description

Scalar data object.

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

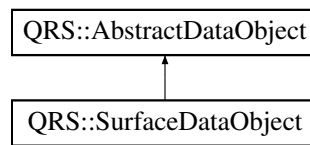
- /home/qinterfly/Library/Projects/QRodSystems/src/core/[scalardataobject.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/core/[scalardataobject.cpp](#)

4.19 QRS::SurfaceDataObject Class Reference

Surface data object.

```
#include <surfacedataobject.h>
```

Inheritance diagram for QRS::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.
- 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

4.19.1 Detailed Description

Surface data object.

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

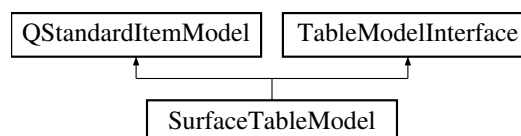
- /home/qinterfly/Library/Projects/QRodSystems/src/core/[surfacedataobject.h](#)
- /home/qinterfly/Library/Projects/QRodSystems/src/core/[surfacedataobject.cpp](#)

4.20 SurfaceTableModel Class Reference

Table model to represent a surface data object.

```
#include <surfacetablemodel.h>
```

Inheritance diagram for SurfaceTableModel:



Public Member Functions

- **SurfaceTableModel** (QWidget *parent=nullptr)
- void **setDataObject** ([QRS::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

- [QRS::SurfaceDataObject](#) * **mpDataObject** = nullptr

Additional Inherited Members

4.20.1 Detailed Description

Table model to represent a surface data object.

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

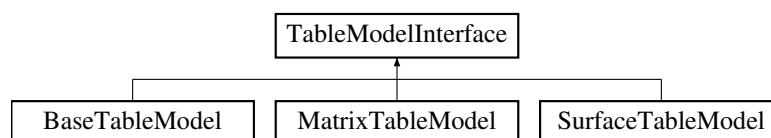
- [/home/qinterfly/Library/Projects/QRodSystems/src/managers/surfacetablemodel.h](#)
- [/home/qinterfly/Library/Projects/QRodSystems/src/managers/surfacetablemodel.cpp](#)

4.21 TableModelInterface Class Reference

User interface to add and remove items.

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

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

4.21.1 Detailed Description

User interface to add and remove items.

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

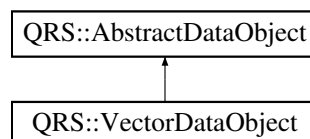
- `/home/qinterfly/Library/Projects/QRodSystems/src/managers/tablemodelinterface.h`
- `/home/qinterfly/Library/Projects/QRodSystems/src/managers/tablemodelinterface.cpp`

4.22 QRS::VectorDataObject Class Reference

Vector data object.

```
#include <vectordataobject.h>
```

Inheritance diagram for `QRS::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

4.22.1 Detailed Description

Vector data object.

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

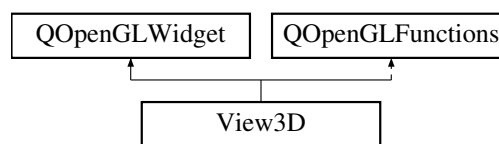
- </home/qinterfly/Library/Projects/QRodSystems/src/core/vectordataobject.h>
- </home/qinterfly/Library/Projects/QRodSystems/src/core/vectordataobject.cpp>

4.23 View3D Class Reference

A widget to represent the resulted rod system.

```
#include <view3d.h>
```

Inheritance diagram for 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**

4.23.1 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 [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/QRodSystems/src/central/logwidget.h File Reference

Declaration of the [LogWidget](#) class.

```
#include <QTableWidget>
```

Classes

- class [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/QRodSystems/src/central/mainwindow.cpp File Reference

Implementation of the [MainWindow](#) class.

```
#include <QDesktopWidget>
#include <QToolBar>
#include <QTableWidget>
#include <QTreeView>
#include <QFileSystemModel>
#include <QTextEdit>
#include <QVBoxLayout>
#include <QSettings>
#include <QMessageBox>
#include <QFileDialog>
#include <QLabel>
#include "DockManager.h"
#include "DockWidget.h"
#include "ads_globals.h"
#include "mainwindow.h"
#include "ui_mainwindow.h"
#include "controltabs.h"
#include "view3d.h"
#include "logwidget.h"
#include "../managers/dataobjectsmanager.h"
#include "uiconstants.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 [MainWindow](#)
The main window of the program.

Functions

- void [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 **UiConstants::Settings::skGeometry** = "geometry"
- const QString **UiConstants::Settings::skState** = "state"
- const QString **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::AbstractDataObject](#)
Data object which is designed in the way to be represented in a table easily.

Typedefs

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

Functions

- QDataStream & [QRS::operator<<](#) (QDataStream &stream, AbstractDataObject const &obj)
Print a data object to a stream.
- QDataStream & [QRS::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::Array< T >](#)
Numerical array class.
- struct [QRS::Array< T >::Row< U >](#)
Proxy class to acquire a row by index.

Typedefs

- using [QRS::IndexType](#) = unsigned int

Functions

- template<typename K >
[QDebug QRS::operator<<](#) (QDebug stream, Array< K > &array)
Print all array values using the matrix format.
- template<typename K >
[QDataStream & QRS::operator<<](#) (QDataStream &stream, Array< K > const &array)
Write an array to a stream.
- template<typename K >
[QDataStream & QRS::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::DataValueType** = double
- using **QRS::DataKeyType** = double
- using **QRS::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/QRodSystems/src/core/hierarchynode.h File Reference

Declaration of the HierarchyNode class.

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

Classes

- class [QRS::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/QRodSystems/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::HierarchyTree](#)
Hierarchy of data objects (n-array tree)

Functions

- QDebug [QRS::operator<<](#) (QDebug stream, HierarchyTree &tree)
Print a tree structure.
- QDataStream & [QRS::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/QRodSystems/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/QRodSystems/src/core/matrixdataobject.h File Reference

Declaration of the MatrixDataObject class.

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

Classes

- class [QRS::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 [QRS::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 [QRS::Project](#) class.

Author

Pavel Lakiza

Date

May 2021

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

Declaration of the [QRS::Project](#) class.

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

Classes

- class [QRS::Project](#)
Project class to interact with a created system of rods.

Typedefs

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

5.20.1 Detailed Description

Declaration of the [QRS::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::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::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< QRS::DataObjectType, QSharedPointer< QFile > > [Utilities::File::getDataObjectFile](#) (QString const &path, QString const &fileName)
Retrieve a pair consisted of a data object file and its type.
- QString [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/QRodSystems/src/core/vectordataobject.h File Reference

Declaration of the VectorDataObject class.

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

Classes

- class [QRS::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/basetablemodel.cpp File Reference

Implementation of the [BaseTableModel](#) class.

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

5.30.1 Detailed Description

Implementation of the [BaseTableModel](#) class.

Author

Pavel Lakiza

Date

March 2021

5.31 /home/qinterfly/Library/Projects/QRod↵ Systems/src/managers/basetablemodel.h File Reference

Declaration of the [BaseTableModel](#) class.

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

Classes

- class [BaseTableModel](#)
Table model to represent either a scalar or vector data object.

5.31.1 Detailed Description

Declaration of the [BaseTableModel](#) class.

Author

Pavel Lakiza

Date

March 2021

5.32 /home/qinterfly/Library/Projects/QRod↵ Systems/src/managers/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.

5.32.1 Detailed Description

Definition of the [DataObjectsHierarchyItem](#) class.

Author

Pavel Lakiza

Date

May 2021

5.33 /home/qinterfly/Library/Projects/QRod↵ Systems/src/managers/dataobjectshierarchyitem.h File Reference

Declaration of the [DataObjectsHierarchyItem](#) class.

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

Classes

- class [DataObjectsHierarchyItem](#)
Item to represent a hierarchy of data objects.

Typedefs

- using **mapDataObjects** = std::unordered_map< QRS::DataIDType, [QRS::AbstractDataObject](#) * >

5.33.1 Detailed Description

Declaration of the [DataObjectsHierarchyItem](#) class.

Author

Pavel Lakiza

Date

May 2021

5.34 /home/qinterfly/Library/Projects/QRod↵ Systems/src/managers/dataobjectshierarchymodel.cpp File Reference

Definition of the [DataObjectsHierarchyModel](#) class.

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

5.34.1 Detailed Description

Definition of the [DataObjectsHierarchyModel](#) class.

Author

Pavel Lakiza

Date

May 2021

5.35 /home/qinterfly/Library/Projects/QRod↵ Systems/src/managers/dataobjectshierarchymodel.h File Reference

Declaration of the [DataObjectsHierarchyModel](#) class.

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

Classes

- class [DataObjectsHierarchyModel](#)
Tree model to represent and modify a hierarchy of data objects.

Typedefs

- using **mapDataObjects** = std::unordered_map< QRS::DataIDType, [QRS::AbstractDataObject](#) * >

5.35.1 Detailed Description

Declaration of the [DataObjectsHierarchyModel](#) class.

Author

Pavel Lakiza

Date

May 2021

5.36 /home/qinterfly/Library/Projects/QRodSystems/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 "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 "basetablemodel.h"
#include "matrixtablemodel.h"
#include "surfacetablemodel.h"
#include "doublespinboxitemdelegate.h"
#include "dataobjectshierarchymodel.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"

5.36.1 Detailed Description

Implementation of the [DataObjectsManager](#) class.

Author

Pavel Lakiza

Date

March 2021

5.37 /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 [DataObjectsManager](#)
Manager to create objects of different types: scalars, vectors, matroces and surfaces.

Typedefs

- using **mapDataObjects** = std::unordered_map< QRS::DataIDType, [QRS::AbstractDataObject](#) * >

5.37.1 Detailed Description

Declaration of the [DataObjectsManager](#) class.

Author

Pavel Lakiza

Date

March 2021

5.38 /home/qinterfly/Library/Projects/QRodSystems/src/managers/doublespinboxitemdelegate.cpp File Reference

Implementation of the [DoubleSpinBoxItemDelegate](#) class.

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

5.38.1 Detailed Description

Implementation of the [DoubleSpinBoxItemDelegate](#) class.

Author

Pavel Lakiza

Date

March 2021

5.39 /home/qinterfly/Library/Projects/QRodSystems/src/managers/doublespinboxitemdelegate.h File Reference

Declaration of the [DoubleSpinBoxItemDelegate](#) class.

```
#include <QStyledItemDelegate>
```

Classes

- class [DoubleSpinBoxItemDelegate](#)
Class to specify how table values can be edited.

5.39.1 Detailed Description

Declaration of the [DoubleSpinBoxItemDelegate](#) class.

Author

Pavel Lakiza

Date

March 2021

5.40 [/home/qinterfly/Library/Projects/QRod](#) Systems/src/managers/hierachyitem.cpp File Reference

Definition of the [HierarchyItem](#) class.

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

5.40.1 Detailed Description

Definition of the [HierarchyItem](#) class.

Author

Pavel Lakiza

Date

May 2021

5.41 [/home/qinterfly/Library/Projects/QRod](#) Systems/src/managers/hierachyitem.h File Reference

Declaration of the [HierarchyItem](#) class.

```
#include <QStandardItem>
```

Classes

- class [HierarchyItem](#)
Item to represent a hierarchy of elements of the same type.

Enumerations

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

5.41.1 Detailed Description

Declaration of the [HierarchyItem](#) class.

Author

Pavel Lakiza

Date

May 2021

5.42 /home/qinterfly/Library/Projects/QRod↵ Systems/src/managers/matrixtablemodel.cpp File Reference

Implementation of the [MatrixTableModel](#) class.

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

5.42.1 Detailed Description

Implementation of the [MatrixTableModel](#) class.

Author

Pavel Lakiza

Date

March 2021

5.43 /home/qinterfly/Library/Projects/QRod↵ Systems/src/managers/matrixtablemodel.h File Reference

Declaration of the [MatrixTableModel](#) class.

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

Classes

- class [MatrixTableModel](#)
Table model to represent a matrix data object.

5.43.1 Detailed Description

Declaration of the [MatrixTableModel](#) class.

Author

Pavel Lakiza

Date

March 2021

5.44 [/home/qinterfly/Library/Projects/QRod](#) Systems/src/managers/surfacetablemodel.cpp File Reference

Implementation of the [SurfaceTableModel](#) class.

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

5.44.1 Detailed Description

Implementation of the [SurfaceTableModel](#) class.

Author

Pavel Lakiza

Date

March 2021

5.45 [/home/qinterfly/Library/Projects/QRod](#) Systems/src/managers/surfacetablemodel.h File Reference

Declaration of the [SurfaceTableModel](#) class.

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


Classes

- class [SurfaceTableModel](#)

Table model to represent a surface data object.

5.45.1 Detailed Description

Declaration of the [SurfaceTableModel](#) class.

Author

Pavel Lakiza

Date

March 2021

5.46 /home/qinterfly/Library/Projects/QRodSystems/src/managers/tablemodelinterface.cpp File Reference

Implementation of static functions of [TableModelInterface](#).

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

5.46.1 Detailed Description

Implementation of static functions of [TableModelInterface](#).

Author

Pavel Lakiza

Date

May 2021

5.47 /home/qinterfly/Library/Projects/QRodSystems/src/managers/tablemodelinterface.h File Reference

Declaration of the [TableModelInterface](#).

```
#include <QItemSelection>
```

Classes

- class [TableModelInterface](#)

User interface to add and remove items.

5.47.1 Detailed Description

Declaration of the [TableModelInterface](#).

Author

Pavel Lakiza

Date

May 2021

5.48 /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"
```

5.48.1 Detailed Description

Implementation of the [View3D](#) class.

Author

Pavel Lakiza

Date

March 2021

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

Declaration of the [View3D](#) class.

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

Classes

- class [View3D](#)

A widget to represent the resulted rod system.

5.49.1 Detailed Description

Declaration of the [View3D](#) class.

Author

Pavel Lakiza

Date

March 2021

