

QRodSystems

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# Chapter 1

## Hierarchical Index

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# Class Index

### 2.1 Class List

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## Chapter 4

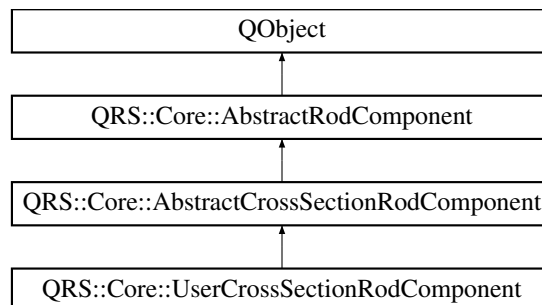
# Class Documentation

### 4.1 QRS::Core::AbstractCrossSectionRodComponent Class Reference

General cross section of a rod.

```
#include <abstractcrosssectionrodcomponent.h>
```

Inheritance diagram for QRS::Core::AbstractCrossSectionRodComponent:



#### Public Types

- enum **SectionType** { **kUserDefined** }

#### Public Member Functions

- **AbstractCrossSectionRodComponent** (SectionType sectionType, QString const &name)
- virtual [~AbstractCrossSectionRodComponent](#) ()=0  
*Decrease a number of instances while being destroyed.*
- void [serialize](#) (QDataStream &stream) const override  
*Serialize a cross section.*
- void [deserialize](#) (QDataStream &stream, DataObjectGetter const &getDataObject) override  
*Partly deserialize an abstract rod component.*
- SectionType **sectionType** () const

## Static Public Member Functions

- static quint32 **numberInstances** ()

## Protected Member Functions

- void [copyIntegratedProperties](#) ([AbstractCrossSectionRodComponent](#) const \*pCrossSection)  
*Copy integrated properties of a cross section.*

## Protected Attributes

- SectionType const **mSectionType**
- QPointer< [ScalarDataObject](#) const > **mpArea**
- QPointer< [ScalarDataObject](#) const > **mpInertiaMomentTorsional**
- QPointer< [ScalarDataObject](#) const > **mpInertiaMomentX**
- QPointer< [ScalarDataObject](#) const > **mpInertiaMomentY**
- QPointer< [ScalarDataObject](#) const > **mpInertiaProductXY**
- QPointer< [ScalarDataObject](#) const > **mpCenterCoordinateX**
- QPointer< [ScalarDataObject](#) const > **mpCenterCoordinateY**

## Static Protected Attributes

- static quint32 **smNumInstances** = 0

### 4.1.1 Detailed Description

General cross section of a rod.

### 4.1.2 Member Function Documentation

#### 4.1.2.1 deserialize()

```
void AbstractCrossSectionRodComponent::deserialize (
    QDataStream & stream,
    DataObjectGetter const & getDataObject ) [override], [virtual]
```

Partly deserialize an abstract rod component.

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

Implements [QRS::Core::AbstractRodComponent](#).

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

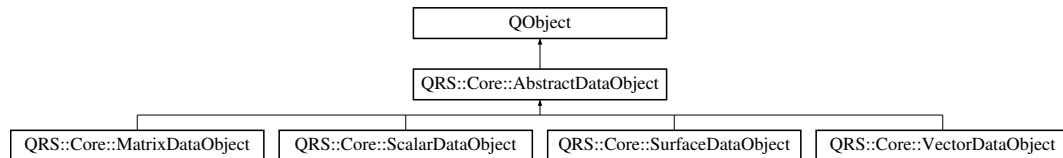
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[abstractcrosssectionrodcomponent.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[abstractcrosssectionrodcomponent.cpp](#)

## 4.2 QRS::Core::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::Core::AbstractDataObject:



### Public Types

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

### Public Member Functions

- [AbstractDataObject](#) (ObjectType 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, IndexType iRow=0, IndexType iColumn=0)  
*Set an array value with the specified indices.*
- quint32 **numberOfItems** () const
- DataHolder const & **getItems** ()
- DataIDType **id** () const
- ObjectType **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 DataIDType **maxObjectID** ()
- static void **setMaxObjectID** (DataIDType iMaxObjectID)

## Protected Attributes

- const ObjectType **mType**
- QString **mName**
- DataIDType **mID**
- DataHolder **mItems**

## Static Private Attributes

- static DataIDType **smMaxObjectID** = 0

## Friends

- QDataStream & [operator<<](#) (QDataStream &stream, [AbstractDataObject](#) const &obj)  
*Print a data object to a stream.*

### 4.2.1 Detailed Description

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

### 4.2.2 Member Function Documentation

#### 4.2.2.1 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](#).

#### 4.2.2.2 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:

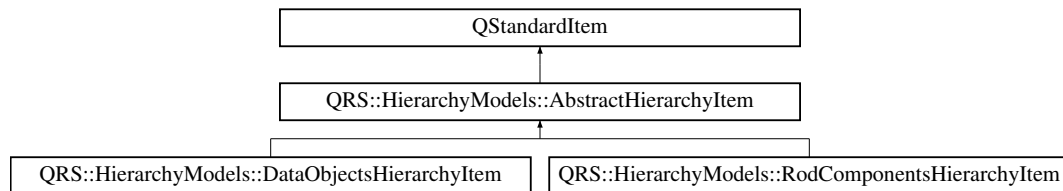
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[abstractdataobject.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[abstractdataobject.cpp](#)

## 4.3 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 Types

- enum **ItemType** { **kDataObjects** = QStandardItem::UserType , **kRodComponents** }

### 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**

#### 4.3.1 Detailed Description

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

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

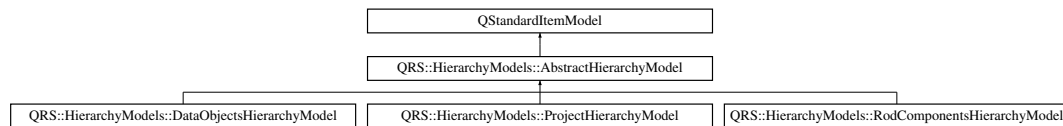
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[abstracthierarchyitem.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[abstracthierarchyitem.cpp](#)

## 4.4 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 **mimeType** () const override  
*Retrieve the mime types.*
- QMimeData \* **mimeType** (const QModelIndexList &indices) const override  
*Encode each item according to a given list of indices.*
- bool **dropMimeType** (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.*
- void **updateContentExpanded** ()



### 4.4.1 Detailed Description

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

### 4.4.2 Member Function Documentation

#### 4.4.2.1 updateContentExpanded()

```
void AbstractHierarchyModel::updateContentExpanded ( ) [private]
```

Since items are destroyed whenever the content is updated, an expanded state of each directory is saved and then set again.

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

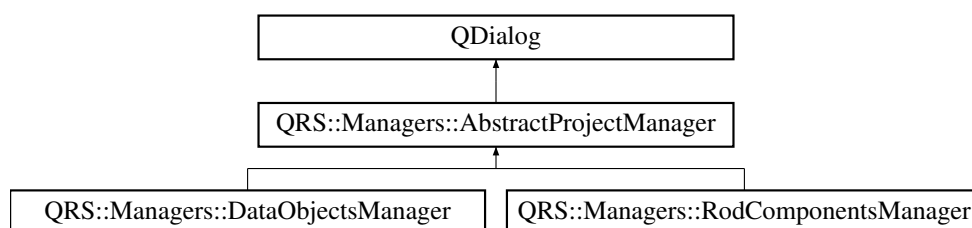
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[abstrachhierchymodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[abstrachhierchymodel.cpp](#)

## 4.5 QRS::Managers::AbstractProjectManager Class Reference

Abstract manager to create objects of different types.

```
#include <abstractprojectmanager.h>
```

Inheritance diagram for QRS::Managers::AbstractProjectManager:



### Public Types

- enum **ManagerType** { **kDataObjects** , **kRodComponents** , **kRodConstructor** }

### Public Slots

- virtual void **apply** ()=0

## Signals

- void **closed** (QRS::Managers::AbstractProjectManager::ManagerType type)

## Public Member Functions

- **AbstractProjectManager** (QString &lastPath, QSettings &settings, ManagerType type, QString groupName, QWidget \*parent=nullptr)
- void **saveSettings** ()  
*Save settings to a file.*
- void **restoreSettings** ()  
*Restore settings from a file.*

## Protected Member Functions

- void **closeEvent** (QCloseEvent \*pEvent) override  
*Save settings and delete handling widgets before closing the window.*
- void **setToolBarShortcutHints** (QToolBar \*pToolBar)  
*Helper function to add a shortcut hint to all actions which a toolbar contains.*

## Protected Attributes

- ads::CDockManager \* **mpDockManager** = nullptr
- QString & **mLastPath**

## Private Attributes

- QSettings & **mSettings**
- ManagerType const **mType**
- QString const **mGroupName**

### 4.5.1 Detailed Description

Abstract manager to create objects of different types.

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

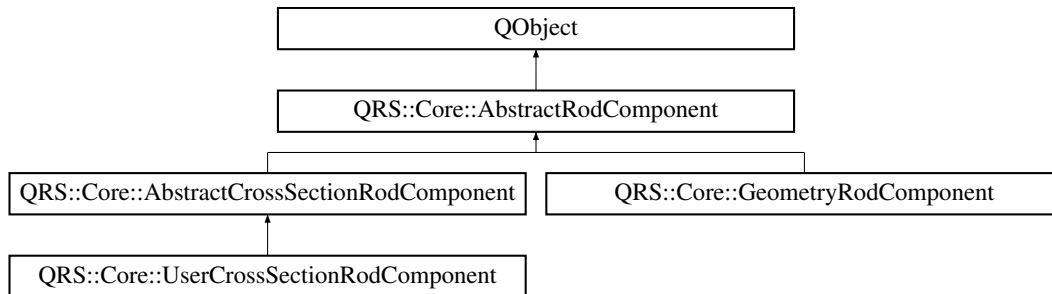
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[abstractprojectmanager.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[abstractprojectmanager.cpp](#)

## 4.6 QRS::Core::AbstractRodComponent Class Reference

Component of the rod structure which characterizes one of its properties.

```
#include <abstractrodcomponent.h>
```

Inheritance diagram for QRS::Core::AbstractRodComponent:



### Public Types

- enum **ComponentType** { **kGeometry** , **kCrossSection** }

### Public Member Functions

- **AbstractRodComponent** (ComponentType componentType, QString name)
- virtual [AbstractRodComponent](#) \* **clone** () const =0
- virtual bool **isDataComplete** () const =0
- DataIDType **id** () const
- ComponentType **componentType** () const
- QString const & **name** () const
- void **setName** (QString const &name)
- virtual void **serialize** (QDataStream &stream) const =0
- virtual void **deserialize** (QDataStream &stream, DataObjectGetter const &getDataObject)=0

### Static Public Member Functions

- static DataIDType **maxComponentID** ()
- static void **setMaxComponentID** (DataIDType iMaxComponentID)

### Protected Member Functions

- void [writeDataObjectPointer](#) (QDataStream &stream, [AbstractDataObject](#) const \*pDataObject) const  
*Helper function to write the identifier of a data object.*
- [AbstractDataObject](#) const \* [readDataObjectPointer](#) (QDataStream &stream, DataObjectGetter const &get←DataObject) const  
*Helper function to retrieve the pointer to the data object by its identifier.*

## Protected Attributes

- ComponentType const **mComponentType**
- QString **mName**
- DataIDType **mID**

## Static Private Attributes

- static DataIDType **smMaxComponentID** = 0

## Friends

- QDataStream & [operator<<](#) (QDataStream &stream, [AbstractRodComponent](#) const &component)  
*Print a rod component to a stream.*

### 4.6.1 Detailed Description

Component of the rod structure which characterizes one of its properties.

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

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

## 4.7 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)
- [Row](#)< T > **operator[]** (IndexType iRow) const
- [Array](#) & **operator=** ([Array](#)< T > const &another)  
*Assignment operator.*

## 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.*

### 4.7.1 Detailed Description

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

Numerical array class.

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

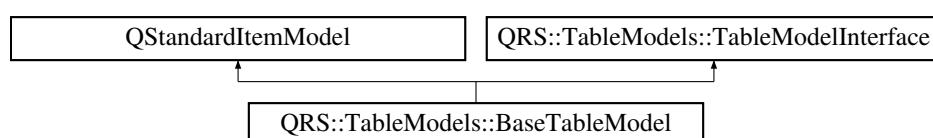
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.cpp](#)

## 4.8 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

### 4.8.1 Detailed Description

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

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

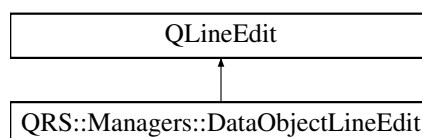
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/[basetablemodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/[basetablemodel.cpp](#)

## 4.9 QRS::Managers::DataObjectLineEdit Class Reference

Line edit widget to hold a pointer to a data object.

```
#include <dataobjectlineedit.h>
```

Inheritance diagram for QRS::Managers::DataObjectLineEdit:



## Signals

- void **dataObjectSelected** ([Core::AbstractDataObject](#) const \*pDataObject)

## Public Member Functions

- **DataObjectLineEdit** ([Core::AbstractDataObject](#) const \*pDataObject, [Core::AbstractDataObject::ObjectType](#) type, [QString](#) const &dropFormat, [QWidget](#) \*parent=nullptr)

## Private Slots

- void [showContextMenu](#) (const [QPoint](#) &point)  
*Show a menu to modify data.*
- void [resetDataObjectPointer](#) ()  
*Erase the address of the data object.*

## Private Member Functions

- void [dragEnterEvent](#) ([QDragEnterEvent](#) \*pEvent) override  
*Check if the type of the dropped item is correct.*
- void [dropEvent](#) ([QDropEvent](#) \*pEvent) override  
*Process dropping of the approved item.*
- void [keyPressEvent](#) ([QKeyEvent](#) \*pEvent) override  
*Erase the data object address.*

## Private Attributes

- [Core::AbstractDataObject](#) const \* **mpDataObject**
- [Core::AbstractDataObject::ObjectType](#) **mType**
- [QString](#) **mDropFormat**

### 4.9.1 Detailed Description

Line edit widget to hold a pointer to a data object.

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

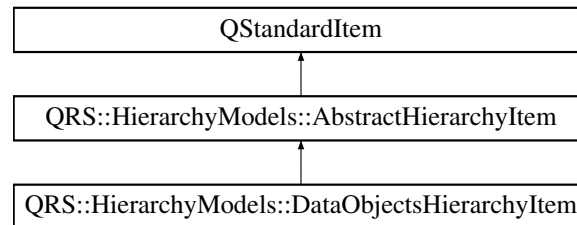
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[dataobjectlineedit.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[dataobjectlineedit.cpp](#)

## 4.10 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](#) ([Core::DataObjects](#) &dataObjects, [Core::HierarchyTree](#) &hierarchyDataObjects, [QString](#) const &text="Root", [QIcon](#) const &icon=[QIcon](#)())  
*Create the representative 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
- [Core::AbstractDataObject](#) const \* **getDataObject** () const

### Private Member Functions

- void **appendItems** ([Core::DataObjects](#) &dataObjects, [Core::HierarchyNode](#) \*pNode)  
*Create items based on the position in the tree structure.*

### Private Attributes

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

### Friends

- class **DataObjectsHierarchyModel**
- class **PropertiesModels::DataObjectsPropertiesModel**

### Additional Inherited Members

#### 4.10.1 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/Current/QRodSystems/src/models/hierarchy/[dataobjectshierarchyitem.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[dataobjectshierarchyitem.cpp](#)

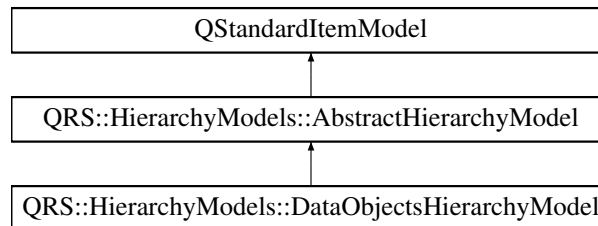


## 4.11 QRS::HierarchyModels::DataObjectsHierarchyModel Class Reference

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

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

Inheritance diagram for QRS::HierarchyModels::DataObjectsHierarchyModel:



### Public Slots

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

### Signals

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

### Public Member Functions

- **DataObjectsHierarchyModel** (Core::DataObjects &dataObjects, [Core::HierarchyTree](#) &hierarchyData, 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 objects to represent.*
- void [selectItem](#) (int iRow)  
*Select an item by row index.*

### Private Slots

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

## Private Attributes

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

## Additional Inherited Members

### 4.11.1 Detailed Description

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

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

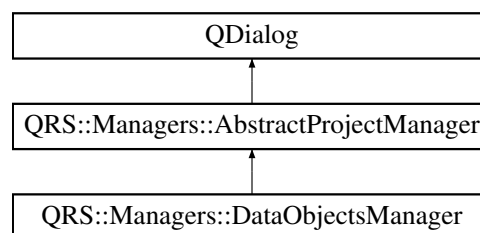
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchymodel.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchymodel.cpp

## 4.12 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](#) () override  
*Apply all the changes made by user.*
- Core::AbstractDataObject \* [addScalar](#) ()  
*Add a scalar object.*
- Core::AbstractDataObject \* [addVector](#) ()  
*Add a vector object.*
- Core::AbstractDataObject \* [addMatrix](#) ()  
*Add a matrix object.*
- Core::AbstractDataObject \* [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 [removeSelectedItemAfterSelected](#) ()  
*Remove a selected leading item.*
- void [importDataObjects](#) ()  
*Import data objects from a file.*

## Signals

- void **dataObjectsModified** (Core::DataObjects const &dataObjects, [Core::HierarchyTree](#) const &hierarchy↔DataObjects)

## Public Member Functions

- **DataObjectsManager** (Core::DataObjects &&dataObjects, [Core::HierarchyTree](#) &&hierarchyDataObjects, QString &lastPath, QSettings &settings, QWidget \*parent=nullptr)
- void [selectDataObject](#) (int iRow)  
*Select a data object by row index.*
- Core::DataObjects 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 \* [createHierarchyWidget](#) ()  
*Create an object to represent a hierarchy of data objects.*
- QLayout \* [createDialogControls](#) ()  
*Create dialog controls.*
- 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.*
- void [representDataObject](#) (Core::DataIDType id)  
*Represent a selected data object according to its type.*
- void [clearDataObjectRepresentation](#) ()  
*Clear a visual data of a data object.*

## Private Attributes

- QTreeView \* **mpTreeDataObjects**
- QTreeView \* **mpDataTable**
- [DoubleSpinBoxItemDelegate](#) \* **mplItemDelegate** = nullptr
- Core::DataObjects **mDataObjects**
- [Core::HierarchyTree](#) **mHierarchyDataObjects**
- [TableModels::TableModelInterface](#) \* **mpTableModelInterface** = nullptr
- [TableModels::BaseTableModel](#) \* **mpBaseTableModel**
- [TableModels::MatrixTableModel](#) \* **mpMatrixTableModel**
- [TableModels::SurfaceTableModel](#) \* **mpSurfaceTableModel**
- [HierarchyModels::DataObjectsHierarchyModel](#) \* **mpTreeDataObjectsModel**

## Additional Inherited Members

### 4.12.1 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:

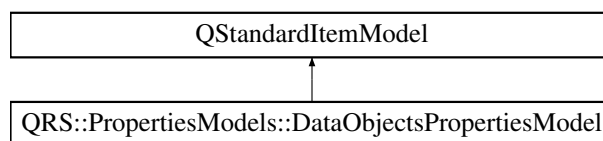
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.cpp](#)

## 4.13 QRS::PropertiesModels::DataObjectsPropertiesModel Class Reference

Model to represent properties of selected data objects.

```
#include <dataobjectspropertiesmodel.h>
```

Inheritance diagram for QRS::PropertiesModels::DataObjectsPropertiesModel:



## Public Types

- enum **PropertyType** {  
**kName** , **kType** , **kNumberItems** , **kNumberEntities** ,  
**kID** , **kNumberChildren** }

## Signals

- void **propertyChanged** (bool flag)

## Public Member Functions

- **DataObjectsPropertiesModel** (QTableView \*pView, QVector< [HierarchyModels::AbstractHierarchyItem](#) \* > items)

## Private Slots

- void [modifyProperty](#) (QStandardItem \*pChangedProperty)  
*Modify the selected property of all items.*

## Private Member Functions

- void [setDirectoryAttributes](#) ()  
*Set directory characteristic attributes.*
- void [setObjectAttributes](#) ()  
*Set objects characteristic attributes.*
- QList< QStandardItem \* > [preparePropertyRow](#) (PropertyType type, QString const &title, QVariant const &value, bool isValueEditable) const  
*Prepare a row to insert into the table.*

## Private Attributes

- QVector< [HierarchyModels::DataObjectsHierarchyItem](#) \* > **mItems**

### 4.13.1 Detailed Description

Model to represent properties of selected data objects.

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

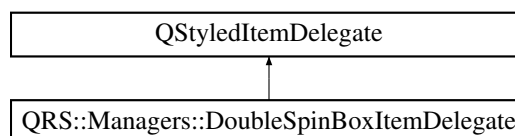
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/properties/dataobjectspropertiesmodel.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/properties/dataobjectspropertiesmodel.cpp](#)

## 4.14 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.*

### 4.14.1 Detailed Description

Class to specify how table values can be edited.

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

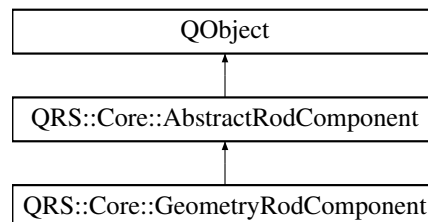
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.cpp](#)

## 4.15 QRS::Core::GeometryRodComponent Class Reference

Geometrical configuration of a rod.

```
#include <geometryrodcomponent.h>
```

Inheritance diagram for QRS::Core::GeometryRodComponent:



### Public Member Functions

- **GeometryRodComponent** (QString const &name)
- **~GeometryRodComponent** ()  
*Decrease a number of instances while being destroyed.*
- **AbstractRodComponent \* clone** () const override  
*Clone a geometrical rod component.*
- bool **isDataComplete** () const override
- void **setRadiusVector** (VectorDataObject const \*pRadiusVector)
- void **setRotationMatrix** (MatrixDataObject const \*pRotationMatrix)
- VectorDataObject const \* **radiusVector** () const
- MatrixDataObject const \* **rotationMatrix** () const
- void **serialize** (QDataStream &stream) const override  
*Serialize all properties of a geometrical component.*
- void **deserialize** (QDataStream &stream, DataObjectGetter const &getDataObject) override  
*Deserialize a geometrical component.*

### Static Public Member Functions

- static quint32 **numberInstances** ()

## Private Attributes

- QPointer< [VectorDataObject](#) const > **mpRadiusVector**
- QPointer< [MatrixDataObject](#) const > **mpRotationMatrix**

## Static Private Attributes

- static quint32 **smNumInstances** = 0

## Additional Inherited Members

### 4.15.1 Detailed Description

Geometrical configuration of a rod.

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

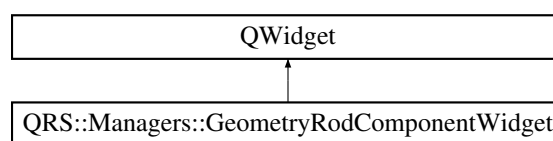
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/geometryrodcomponent.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/geometryrodcomponent.cpp](#)

## 4.16 QRS::Managers::GeometryRodComponentWidget Class Reference

Widget to construct a geometrical component of a rod.

```
#include <geometryrodcomponentwidget.h>
```

Inheritance diagram for QRS::Managers::GeometryRodComponentWidget:



## Signals

- void **modified** (bool flag=true)

## Public Member Functions

- **GeometryRodComponentWidget** ([Core::GeometryRodComponent](#) &geometryRodComponent, QWidget \*parent=nullptr)

## Private Slots

- void [setRadiusVector](#) ([Core::AbstractDataObject](#) const \*pDataObject)  
*Set a radius vector.*
- void [setRotationMatrix](#) ([Core::AbstractDataObject](#) const \*pDataObject)  
*Set a rotation matrix.*

## Private Member Functions

- void [createContent](#) ()  
*Create all the widgets.*

## Private Attributes

- [Core::GeometryRodComponent](#) & [mGeometryRodComponent](#)

### 4.16.1 Detailed Description

Widget to construct a geometrical component of a rod.

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

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

## 4.17 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.*
- quint32 [numberChildren](#) () const  
*Retrieve a number of children of the current node.*

## 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 contains a given node as a child.*
- quint32 [countNodes](#) ([HierarchyNode](#) \*pNode, quint32 &numNodes) const  
*Count all children and siblings of a given node.*

## Private Attributes

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

## Friends

- class [HierarchyTree](#)

### 4.17.1 Detailed Description

Hierarchy representative.

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

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

## 4.18 QRS::Core::HierarchyTree Class Reference

Hierarchy of data objects (n-array tree)

```
#include <hierarchytree.h>
```

### Public Member Functions

- [HierarchyTree](#) ()  
*Base tree constructor.*
- [HierarchyTree](#) ([HierarchyTree](#) &another)  
*Copy constructor.*
- [HierarchyTree](#) ([HierarchyTree](#) &&another)  
*Move 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.*
- quint32 [size](#) () const  
*Get a number of nodes.*

## Private Member Functions

- [HierarchyNode](#) \* [copyNode](#) ([HierarchyNode](#) \*pBaseNode, quint32 relativeLevel) const  
*Copy a node.*
- void [removeNodeSiblings](#) ([HierarchyNode](#) \*pNode)  
*Remove all subnodes.*
- void [printNode](#) (quint32 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.*

## 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.*

### 4.18.1 Detailed Description

Hierarchy of data objects (n-array tree)

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

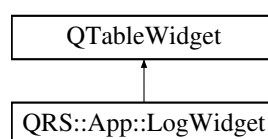
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[hierarchytree.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[hierarchytree.cpp](#)

## 4.19 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.*

### 4.19.1 Detailed Description

Log all the messages sent.

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

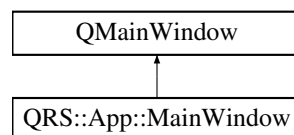
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/[logwidget.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/[logwidget.cpp](#)

## 4.20 QRS::App::MainWindow Class Reference

The main window of the program.

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

Inheritance diagram for QRS::App::MainWindow:



## Public Member Functions

- **MainWidget** (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 [createRodComponentsManager](#) ()  
*Show a manager to set rod components based on the created data objects.*
- void [createRodConstructorManager](#) ()  
*Show a manager to assemble a rod by using rod components.*
- 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 \* [createCodeWidget](#) ()  
*Create a widget enables to code.*
- 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.*
- 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::ManagersFactory](#) \* **mpManagersFactory** = nullptr
- [Core::Project](#) \* **mpProject**
- QSharedPointer< QSettings > **mpSettings**
- QString **mLastPath**
- QList< QString > **mPathRecentProjects**

### 4.20.1 Detailed Description

The main window of the program.

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

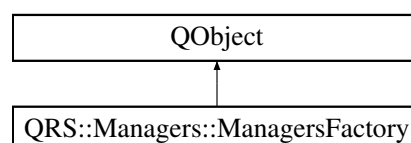
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/[mainwindow.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/[mainwindow.cpp](#)

## 4.21 QRS::Managers::ManagersFactory Class Reference

Factory to create managers which utilize and modify project data.

```
#include <managersfactory.h>
```

Inheritance diagram for QRS::Managers::ManagersFactory:



## Public Member Functions

- **ManagersFactory** ([Core::Project](#) &project, QString &lastPath, QSettings &settings, QWidget \*parent)
- bool [createManager](#) (AbstractProjectManager::ManagerType type)  
*Create a manager according to a given type.*
- bool [deleteManager](#) (AbstractProjectManager::ManagerType type)  
*Destroy a manager by given type.*
- [AbstractProjectManager](#) \* [manager](#) (AbstractProjectManager::ManagerType type)  
*Retrieve a manager of a given type.*

## Private Attributes

- [Core::Project](#) & **mProject**
- QString & **mLastPath**
- QSettings & **mSettings**
- QWidget \* **mpParent**
- std::unordered\_map< AbstractProjectManager::ManagerType, [AbstractProjectManager](#) \* > **mManagers**

### 4.21.1 Detailed Description

Factory to create managers which utilize and modify project data.

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

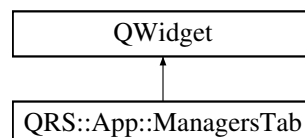
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[managersfactory.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[managersfactory.cpp](#)

## 4.22 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.*

### 4.22.1 Detailed Description

A toolbar consisted of object designers.

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

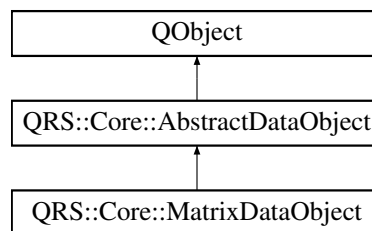
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/[controltabs.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/[controltabs.cpp](#)

## 4.23 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.*
- [~MatrixDataObject](#) ()  
*Decrease a number of instances while being destroyed.*
- [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 quint32 [numberInstances](#) ()



## Static Private Attributes

- static quint32 **smNumInstances** = 0

## Additional Inherited Members

### 4.23.1 Detailed Description

Matrix data object.

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

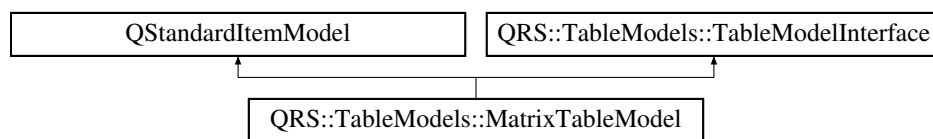
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[matrixdataobject.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[matrixdataobject.cpp](#)

## 4.24 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

### 4.24.1 Detailed Description

Table model to represent a matrix data object.

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

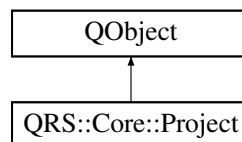
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/matrixtablemodel.h`
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/matrixtablemodel.cpp`

## 4.25 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.*
- `void setModified (bool modifiedState=true)`  
*Set a modification state.*
- `void setDataObjects (DataObjects const &dataObjects, HierarchyTree const &hierarchyDataObjects)`  
*Substitute current data objects with new ones.*
- `void setRodComponents (RodComponents const &rodComponents, HierarchyTree const &hierarchyRodComponents)`  
*Substitute current rod components with new ones.*

## Signals

- `void dataObjectsChanged ()`
- `void rodComponentsChanged ()`
- `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
- [AbstractDataObject](#) \* **addDataObject** (AbstractDataObject::ObjectType type)  
*Create a data object with the specified type.*
- DataObjects [cloneDataObjects](#) () const  
*Clone data objects.*
- [HierarchyTree](#) **cloneHierarchyDataObjects** () const
- DataIDType **numberRodComponents** () const
- [AbstractRodComponent](#) \* **addGeometry** ()  
*Create a geometrical rod component.*
- [AbstractRodComponent](#) \* **addCrossSection** (AbstractCrossSectionRodComponent::SectionType section↔Type)  
*Create a cross section.*
- RodComponents [cloneRodComponents](#) () const  
*Clone rod components.*
- [HierarchyTree](#) **cloneHierarchyRodComponents** () const
- 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 Member Functions

- void [emplaceRodComponent](#) ([AbstractRodComponent](#) \*pRodComponent)  
*Emplace a rod component into a project.*
- template<typename T >  
void [clearDataMap](#) (std::unordered\_map< DataIDType, T \* > &dataMap)  
*Helper function to clear a map consisted of data pointers.*

## 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.*

- RodComponents [mRodComponents](#)

*Rod components.*

- [HierarchyTree mHierarchyRodComponents](#)

*Hierarchy of rod components.*

## Static Private Attributes

- static const QString [skProjectExtension](#) = ".qrs"

*File extensionn.*

## Friends

- class **QRS::HierarchyModels::ProjectHierarchyModel**
- class **QRS::Managers::ManagersFactory**

### 4.25.1 Detailed Description

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

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

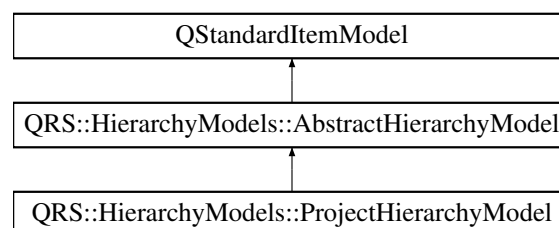
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[project.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[project-base.cpp](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[project-io.cpp](#)

## 4.26 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 Member Functions

- [DataObjectsHierarchyItem](#) \* **retrieveDataObjectsItem** ()  
*Retrieve a representative of data objects.*
- [RodComponentsHierarchyItem](#) \* **retrieveRodComponentsItem** ()  
*Retrieve a representative of rod components.*

## Private Attributes

- [Core::Project](#) \* **mpProject** = nullptr

## Additional Inherited Members

### 4.26.1 Detailed Description

Project hierarchy representative.

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

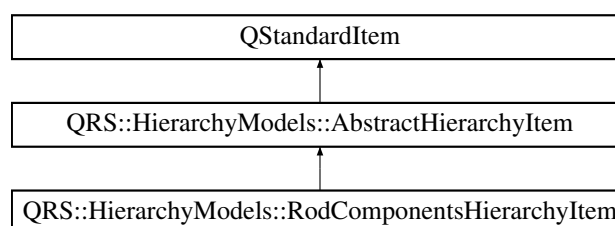
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[projecthierarchymodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[projecthierarchymodel.cpp](#)

## 4.27 QRS::HierarchyModels::RodComponentsHierarchyItem Class Reference

Item to represent a hierarchy of rod components.

```
#include <rodcomponentshierarchyitem.h>
```

Inheritance diagram for QRS::HierarchyModels::RodComponentsHierarchyItem:



## Public Member Functions

- [RodComponentsHierarchyItem](#) (Core::RodComponents &rodComponents, [Core::HierarchyTree](#) &hierarchy↔ RodComponents, QString const &text="Root", QIcon const &icon=QIcon())  
*Create the representative of the structure of rod components.*
- [RodComponentsHierarchyItem](#) ([Core::HierarchyNode](#) \*pNode, [Core::AbstractRodComponent](#) \*pRod↔ Component)  
*Construct an item to represent a rod component.*
- [RodComponentsHierarchyItem](#) ([Core::HierarchyNode](#) \*pNode)  
*Construct an item to represent a directory.*
- int **type** () const override

## Private Member Functions

- void [appendItems](#) (Core::RodComponents &rodComponents, [Core::HierarchyNode](#) \*pNode)  
*Create items based on the position in the tree structure.*

## Private Attributes

- [Core::AbstractRodComponent](#) \* **mpRodComponent** = nullptr

## Friends

- class **RodComponentsHierarchyModel**

## Additional Inherited Members

### 4.27.1 Detailed Description

Item to represent a hierarchy of rod components.

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

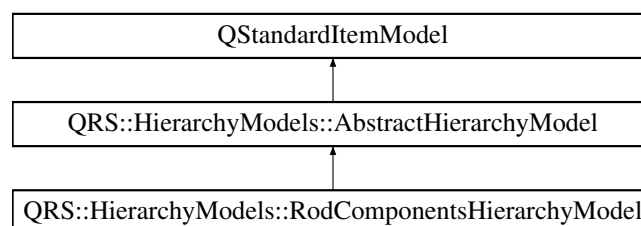
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[rodcomponentshierarchyitem.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[rodcomponentshierarchyitem.cpp](#)

## 4.28 QRS::HierarchyModels::RodComponentsHierarchyModel Class Reference

Tree model to represent and modify a hierarchy of rod components.

```
#include <rodcomponentshierarchymodel.h>
```

Inheritance diagram for QRS::HierarchyModels::RodComponentsHierarchyModel:



## Public Slots

- void [retrieveSelectedItem](#) ()  
*Retrieve a selected rod component.*
- void [removeSelectedItems](#) ()  
*Remove rod components under selection.*

## Signals

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

## Public Member Functions

- **RodComponentsHierarchyModel** (Core::RodComponents &rodComponents, [Core::HierarchyTree](#) &hierarchyRodComponents, 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 objects to represent.*
- void [selectItem](#) (int iRow)  
*Select an item by row index.*

## Private Slots

- void [renameItem](#) (QStandardItem \*pStandardItem)  
*Rename a rod component after editing.*

## Private Attributes

- Core::RodComponents & **mRodComponents**
- [Core::HierarchyTree](#) & **mHierarchyRodComponents**

## Additional Inherited Members

### 4.28.1 Detailed Description

Tree model to represent and modify a hierarchy of rod components.

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

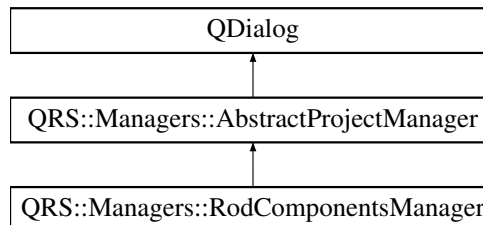
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[rodcomponentshierarchymodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[rodcomponentshierarchymodel.cpp](#)

## 4.29 QRS::Managers::RodComponentsManager Class Reference

Manager to create rod components, such as a geometry, cross section and force.

```
#include <rodcomponentsmanager.h>
```

Inheritance diagram for QRS::Managers::RodComponentsManager:



### Public Slots

- void [apply](#) () override  
*Apply all the changes made by user.*
- [Core::AbstractRodComponent](#) \* [addGeometry](#) ()  
*Add a geometrical component.*
- [Core::AbstractRodComponent](#) \* [addCrossSection](#) ([Core::AbstractCrossSectionRodComponent::SectionType](#) sectionType)  
*Add a cross section.*

### Signals

- void **rodComponentsModified** ([Core::RodComponents](#) const &rodComponents, [Core::HierarchyTree](#) const &hierarchyRodComponents)

### Public Member Functions

- **RodComponentsManager** ([Core::DataObjects](#) &dataObjects, [Core::HierarchyTree](#) &hierarchyDataObjects, [Core::RodComponents](#) &&rodComponents, [Core::HierarchyTree](#) &&hierarchyRodComponents, [QString](#) &lastPath, [QSettings](#) &settings, [QWidget](#) \*parent=nullptr)
- void [selectRodComponent](#) (int iRow)  
*Select a rod component by row index.*
- void [updateDataObjects](#) ()  
*Update the representation of data objects.*



## Private Member Functions

- void [createContent](#) ()  
*Create all the widgets.*
- QLayout \* [createDialogControls](#) ()  
*Create dialog controls.*
- ads::CDockWidget \* [createHierarchyRodComponentsWidget](#) ()  
*Create a widget to show a hierarchy of rod components.*
- ads::CDockWidget \* [createConstructorDockWidget](#) ()  
*Create a dock widget to contain constructors of rod components.*
- ads::CDockWidget \* [createHierarchyDataObjectsWidget](#) ()  
*Create a widget to show a hierarchy of data objects.*
- void [emplaceRodComponent](#) (Core::AbstractRodComponent \*pRodComponent)  
*Helper function to insert a rod component into the manager.*
- void [representRodComponent](#) (Core::DataIDType id)  
*Represent a selected rod component according to its type.*
- void [clearRodComponentRepresentation](#) ()  
*Delete a widget to represent properties of a rod component.*
- QToolBar \* [createMainToolBar](#) ()  
*Create a menu to choose types of components to construct.*
- QWidget \* [makeGeometryToolBar](#) ()  
*Create a toolbar to create geometrical components.*
- QWidget \* [makeCrossSectionsToolBar](#) ()  
*Create a toolbar to construct cross sections.*
- QWidget \* [makeBoundaryConditionsToolBar](#) ()  
*Create a toolbar to construct boundary conditions.*
- QWidget \* [makeLoadingToolBar](#) ()  
*Create a toolbar to construct loading.*
- QWidget \* [makeMaterialToolBar](#) ()  
*Create a toolbar to construct materials.*
- QWidget \* [makeModificationToolBar](#) ()  
*Create a toolbar to modify rod components.*

## Private Attributes

- ads::CDockWidget \* **mpComponentDockWidget**
- QTreeView \* **mpTreeRodComponents**
- Core::DataObjects & **mDataObjects**
- [Core::HierarchyTree](#) & **mHierarchyDataObjects**
- Core::RodComponents **mRodComponents**
- [Core::HierarchyTree](#) **mHierarchyRodComponents**
- [HierarchyModels::DataObjectsHierarchyModel](#) \* **mpTreeDataObjectsModel**
- [HierarchyModels::RodComponentsHierarchyModel](#) \* **mpTreeRodComponentsModel**

## Additional Inherited Members

### 4.29.1 Detailed Description

Manager to create rod components, such as a geometry, cross section and force.

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

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

## 4.30 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)
- T const & **operator[]** (IndexType iCol) const

### Public Attributes

- T \* **pRow**

#### 4.30.1 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:

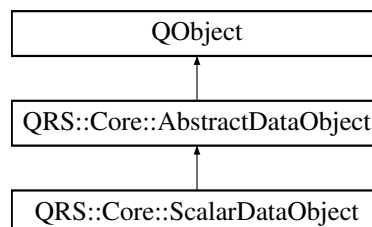
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.h

## 4.31 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.*
- [~ScalarDataObject](#) ()  
*Decrease a number of instances while being destroyed.*
- [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 quint32 [numberInstances](#) ()

## Static Private Attributes

- static quint32 [smNumInstances](#) = 0

## Additional Inherited Members

### 4.31.1 Detailed Description

Scalar data object.

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

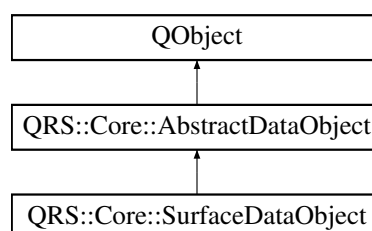
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[scalardataobject.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[scalardataobject.cpp](#)

## 4.32 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.*
- [~SurfaceDataObject](#) ()  
*Decrease a number of instances while being destroyed.*
- [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.*
- quint32 [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 quint32 [numberInstances](#) ()

## Private Attributes

- [DataHolder](#) [mLeadingItems](#)

## Static Private Attributes

- static quint32 [smNumInstances](#) = 0

## Additional Inherited Members

### 4.32.1 Detailed Description

Surface data object.

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

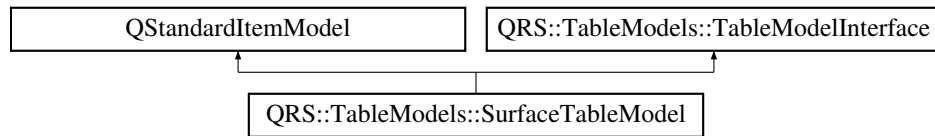
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/surfacedataobject.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/surfacedataobject.cpp](#)

## 4.33 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

#### 4.33.1 Detailed Description

Table model to represent a surface data object.

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

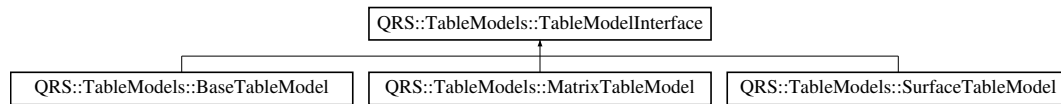
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/[surfacetablemodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/[surfacetablemodel.cpp](#)

## 4.34 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 > const &array, quint32 iRow)  
*Helper function to copy a row from an array.*
- static QList< QStandardItem \* > **prepareRow** (double const &key, Core::Array< double > const &array, quint32 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 > const &array, quint32 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.*

#### 4.34.1 Detailed Description

User interface to add and remove items.

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

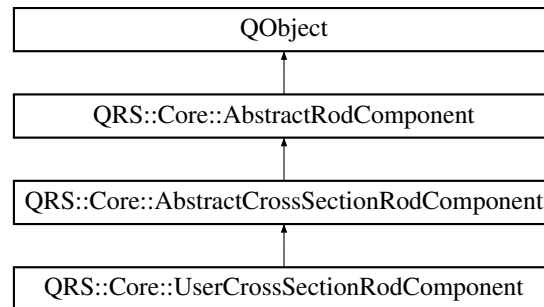
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/[tablemodelinterface.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/[tablemodelinterface.cpp](#)

## 4.35 QRS::Core::UserCrossSectionRodComponent Class Reference

Cross section which properties are defined by user.

```
#include <usercrosssectionrodcomponent.h>
```

Inheritance diagram for QRS::Core::UserCrossSectionRodComponent:



### Public Member Functions

- **UserCrossSectionRodComponent** (QString const &name)
- [AbstractRodComponent](#) \* [clone](#) () const override  
*Clone a user-defined cross section.*
- bool [isDataComplete](#) () const override  
*Check if specified data is complete.*
- [ScalarDataObject](#) const \* **area** () const
- [ScalarDataObject](#) const \* **inertiaMomentTorsional** () const
- [ScalarDataObject](#) const \* **inertiaMomentX** () const
- [ScalarDataObject](#) const \* **inertiaMomentY** () const
- [ScalarDataObject](#) const \* **inertiaMomentProductXY** () const
- [ScalarDataObject](#) const \* **centerCoordinateX** () const
- [ScalarDataObject](#) const \* **centerCoordinateY** () const
- void **setArea** ([ScalarDataObject](#) const \*pArea)
- void **setInertiaMomentTorsional** ([ScalarDataObject](#) const \*pInertiaMomentTorsional)
- void **setInertiaMomentX** ([ScalarDataObject](#) const \*pInertiaMomentX)
- void **setInertiaMomentY** ([ScalarDataObject](#) const \*pInertiaMomentY)
- void **setInertiaProductXY** ([ScalarDataObject](#) const \*pInertiaProductXY)
- void **setCenterCoordinateX** ([ScalarDataObject](#) const \*pCenterCoordinateX)
- void **setCenterCoordinateY** ([ScalarDataObject](#) const \*pCenterCoordinateY)

### Additional Inherited Members

#### 4.35.1 Detailed Description

Cross section which properties are defined by user.

#### 4.35.2 Member Function Documentation

#### 4.35.2.1 isDataComplete()

```
bool UserCrossSectionRodComponent::isDataComplete ( ) const [override], [virtual]
```

Check if specified data is complete.

Some of properties may be of zero values to achieve infinite stiffness

Implements [QRS::Core::AbstractRodComponent](#).

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

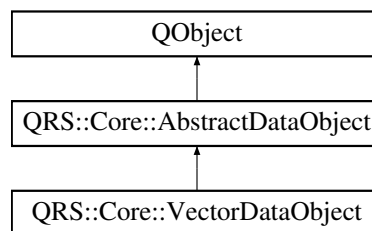
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/usercrosssectionrodcomponent.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/usercrosssectionrodcomponent.cpp](#)

## 4.36 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.*
- [~VectorDataObject](#) ()  
*Decrease a number of instances while being destroyed.*
- [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 quint32 [numberInstances](#) ()



## Static Private Attributes

- static quint32 **smNumInstances** = 0

## Additional Inherited Members

### 4.36.1 Detailed Description

Vector data object.

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

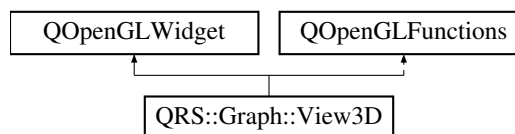
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/core/vectordataobject.h>
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/core/vectordataobject.cpp>

## 4.37 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**

### 4.37.1 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/Current/QRodSystems/src/render/view3d.h>
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/render/view3d.cpp>



## Chapter 5

# File Documentation

### 5.1 /home/qinterfly/Library/Projects/Current/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/Current/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/Current/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/Current/QRodSystems/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/Current/QRodSystems/src/central/mainwindow.cpp File Reference

Implementation of the MainWindow class.

```
#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/hierarchy/projecthierarchymodel.h"
#include "models/properties/dataobjectspropertiesmodel.h"
#include "managers/managersfactory.h"
#include "render/view3d.h"
```

### 5.5.1 Detailed Description

Implementation of the MainWindow class.

Author

Pavel Lakiza

Date

May 2021

## 5.6 /home/qinterfly/Library/Projects/Current/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/Current/QRodSystems/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/Current/QRodSystems/src/core/abstractcrosssectionrodcomponent.cpp File Reference

Definition of the AbstractCrossSectionRodComponent class.

```
#include "abstractcrosssectionrodcomponent.h"  
#include "core/scalardataobject.h"
```

### 5.8.1 Detailed Description

Definition of the AbstractCrossSectionRodComponent class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.9 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/core/abstractcrosssectionrodcomponent.h File Reference

Declaration of the AbstractCrossSectionRodComponent class.

```
#include <QPointer>
#include "abstractrodcomponent.h"
```

### Classes

- class [QRS::Core::AbstractCrossSectionRodComponent](#)  
*General cross section of a rod.*

#### 5.9.1 Detailed Description

Declaration of the AbstractCrossSectionRodComponent class.

Author

Pavel Lakiza

Date

June 2021

## 5.10 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/core/abstractdataobject.cpp File Reference

Implementation of the AbstractDataObject class.

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

#### 5.10.1 Detailed Description

Implementation of the AbstractDataObject class.

Author

Pavel Lakiza

Date

April 2021



## 5.11 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractdataobject.h File Reference

Declaration of the AbstractDataObject class.

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

### Classes

- class [QRS::Core::AbstractDataObject](#)  
*Data object which is designed 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.*

#### 5.11.1 Detailed Description

Declaration of the AbstractDataObject class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.12 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractrodcomponent.cpp File Reference

Definition of the AbstractRodComponent class.

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

### 5.12.1 Detailed Description

Definition of the AbstractRodComponent class.

Author

Pavel Lakiza

Date

June 2021

## 5.13 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/core/abstractrodcomponent.h File Reference

Declaration of the AbstractRodComponent class.

```
#include <QObject>
#include <QString>
#include <QDataStream>
#include "aliasdata.h"
```

### Classes

- class [QRS::Core::AbstractRodComponent](#)  
*Component of the rod structure which characterizes one of its properties.*

### Typedefs

- using **QRS::Core::DataObjectGetter** = std::function< AbstractDataObject const \*(DataIDType id)>

### Functions

- QDataStream & [QRS::Core::operator<<](#) (QDataStream &stream, AbstractRodComponent const &component)  
*Print a rod component to a stream.*

### 5.13.1 Detailed Description

Declaration of the AbstractRodComponent class.

Author

Pavel Lakiza

Date

June 2021

## 5.14 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/aliasdata.h File Reference

Specification of data types used in a project.

```
#include <QtGlobal>
```

### Typedefs

- using **QRS::Core::DataValueType** = double
- using **QRS::Core::DataKeyType** = double
- using **QRS::Core::DataIDType** = quint64

#### 5.14.1 Detailed Description

Specification of data types used in a project.

##### Author

Pavel Lakiza

##### Date

May 2021

## 5.15 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/aliasdataset.h File Reference

Specification of types of datasets used in a project.

```
#include <unordered_map>
#include "aliasdata.h"
```

### Typedefs

- using **QRS::Core::DataObjects** = std::unordered\_map< DataIDType, AbstractDataObject \* >
- using **QRS::Core::RodComponents** = std::unordered\_map< DataIDType, AbstractRodComponent \* >

#### 5.15.1 Detailed Description

Specification of types of datasets used in a project.

##### Author

Pavel Lakiza

##### Date

June 2021

## 5.16 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/src/core/array.cpp File Reference

Implementation of the Array class.

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

### 5.16.1 Detailed Description

Implementation of the Array class.

Author

Pavel Lakiza

Date

March 2021

## 5.17 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/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](#) = quint32

### 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.*

### 5.17.1 Detailed Description

Declaration of the Array class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.18 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/geometryrodcomponent.cpp File Reference

Definition of the GeometryRodComponent class.

```
#include "geometryrodcomponent.h"
#include "vectordataobject.h"
#include "matrixdataobject.h"
```

### 5.18.1 Detailed Description

Definition of the GeometryRodComponent class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.19 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/geometryrodcomponent.h File Reference

Declaration of the GeometryRodComponent class.

```
#include <QPointer>
#include "abstractrodcomponent.h"
```

### Classes

- class [QRS::Core::GeometryRodComponent](#)  
*Geometrical configuration of a rod.*

### 5.19.1 Detailed Description

Declaration of the GeometryRodComponent class.

Author

Pavel Lakiza

Date

June 2021

## 5.20 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/core/hierarchynode.cpp File Reference

Implementation of the HierarchyNode class.

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

### 5.20.1 Detailed Description

Implementation of the HierarchyNode class.

Author

Pavel Lakiza

Date

May 2021

## 5.21 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/core/hierarchynode.h File Reference

Declaration of the HierarchyNode class.

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

### Classes

- class [QRS::Core::HierarchyNode](#)  
*Hierarchy representative.*

### 5.21.1 Detailed Description

Declaration of the HierarchyNode class.

Author

Pavel Lakiza

Date

May 2021

## 5.22 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/hierarchytree.cpp File Reference

Implementation of the HierarchyTree class.

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

### 5.22.1 Detailed Description

Implementation of the HierarchyTree class.

Author

Pavel Lakiza

Date

June 2021

## 5.23 /home/qinterfly/Library/Projects/Current/QRodSystems/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-array 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.*

### 5.23.1 Detailed Description

Declaration of the HierarchyTree class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.24 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/core/matrixdataobject.cpp File Reference

Implementation of the MatrixDataObject class.

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

## Variables

- const IndexType **skNumElements** = 3

### 5.24.1 Detailed Description

Implementation of the MatrixDataObject class.

#### Author

Pavel Lakiza

#### Date

June 2021



## 5.25 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/matrixdataobject.h File Reference

Declaration of the MatrixDataObject class.

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

### Classes

- class [QRS::Core::MatrixDataObject](#)  
*Matrix data object.*

#### 5.25.1 Detailed Description

Declaration of the MatrixDataObject class.

##### Author

Pavel Lakiza

##### Date

April 2021

## 5.26 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project-base.cpp File Reference

Implementation of the Project class.

```
#include <QRandomGenerator>
#include "project.h"
#include "scalardataobject.h"
#include "vectordataobject.h"
#include "matrixdataobject.h"
#include "surfacedataobject.h"
#include "geometryrodcomponent.h"
#include "usercrosssectionrodcomponent.h"
```

### Functions

- [AbstractDataObject](#) \* [createDataObject](#) (AbstractDataObject::ObjectType type)  
*Helper function to create DataObject instance by a type and name.*
- [AbstractDataObject](#) const \* [substituteDataObject](#) (DataObjects const &dataObjects, [AbstractDataObject](#) const \*pDataObject)  
*Substitute a data object with its updated version.*

### 5.26.1 Detailed Description

Implementation of the Project class.

Author

Pavel Lakiza

Date

June 2021

Implementation of the methods to operate with data objects, components and rods

## 5.27 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/core/project-io.cpp File Reference

Implementation of the Project class.

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

### Functions

- void [readDataObjects](#) (QDataStream &inputStream, DataObjects &dataObjects)  
*Helper function to read a set of data objects from a stream.*
- void [readRodComponents](#) (QDataStream &inputStream, DataObjects const &dataObjects, RodComponents &rodComponents)  
*Helper function to read rod components from a stream.*
- void [readHierarchyTree](#) (QDataStream &inputStream, [HierarchyTree](#) &hierarchy)  
*Helper function to read a hierarchial tree from a stream.*

### 5.27.1 Detailed Description

Implementation of the Project class.

Author

Pavel Lakiza

Date

June 2021

Implementation of the methods to operate with input/output streams

## 5.28 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project.h File Reference

Declaration of the Project class.

```
#include <QObject>
#include "aliasdataset.h"
#include "array.h"
#include "hierarchytree.h"
#include "abstractdataobject.h"
#include "abstractrodcomponent.h"
#include "abstractcrosssectionrodcomponent.h"
```

### Classes

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

#### 5.28.1 Detailed Description

Declaration of the Project class.

Author

Pavel Lakiza

Date

June 2021

## 5.29 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/scalardataobject.cpp File Reference

Implementation of the ScalarDataObject class.

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

#### 5.29.1 Detailed Description

Implementation of the ScalarDataObject class.

Author

Pavel Lakiza

Date

June 2021

## 5.30 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/core/scalardataobject.h File Reference

Declaration of the ScalarDataObject class.

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

### Classes

- class [QRS::Core::ScalarDataObject](#)  
*Scalar data object.*

#### 5.30.1 Detailed Description

Declaration of the ScalarDataObject class.

Author

Pavel Lakiza

Date

April 2021

## 5.31 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/core/surfacedataobject.cpp File Reference

Implementation of the SurfaceDataObject class.

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

#### 5.31.1 Detailed Description

Implementation of the SurfaceDataObject class.

Author

Pavel Lakiza

Date

June 2021

## 5.32 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/core/surfacedataobject.h File Reference

Declaration of the SurfaceDataObject class.

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

### Classes

- class [QRS::Core::SurfaceDataObject](#)  
*Surface data object.*

#### 5.32.1 Detailed Description

Declaration of the SurfaceDataObject class.

##### Author

Pavel Lakiza

##### Date

April 2021

## 5.33 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/core/usercrosssectionrodcomponent.cpp File Reference

Definition of the UserCrossSectionRodComponent class.

```
#include "usercrosssectionrodcomponent.h"
```

#### 5.33.1 Detailed Description

Definition of the UserCrossSectionRodComponent class.

##### Author

Pavel Lakiza

##### Date

June 2021

## 5.34 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/core/usercrosssectionrodcomponent.h File Reference

Declaration of the UserCrossSectionRodComponent class.

```
#include "abstractcrosssectionrodcomponent.h"  
#include "core/scalardataobject.h"
```

### Classes

- class [QRS::Core::UserCrossSectionRodComponent](#)  
*Cross section which properties are defined by user.*

#### 5.34.1 Detailed Description

Declaration of the UserCrossSectionRodComponent class.

##### Author

Pavel Lakiza

##### Date

June 2021

## 5.35 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/core/utilities.cpp File Reference

Implementation of utilities.

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

#### 5.35.1 Detailed Description

Implementation of utilities.

##### Author

Pavel Lakiza

##### Date

May 2021

## 5.36 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/utilities.h File Reference

Declaration of utilities.

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

### Functions

- QPair< Core::AbstractDataObject::ObjectType, 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.*

#### 5.36.1 Detailed Description

Declaration of utilities.

Author

Pavel Lakiza

Date

May 2021

## 5.37 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/vectordataobject.cpp File Reference

Implementation of the VectorDataObject class.

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

### Variables

- const IndexType **skNumElements** = 3

#### 5.37.1 Detailed Description

Implementation of the VectorDataObject class.

Author

Pavel Lakiza

Date

June 2021

## 5.38 /home/qinterfly/Library/Projects/Current/QRod↔ Systems/src/core/vectordataobject.h File Reference

Declaration of the VectorDataObject class.

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

### Classes

- class [QRS::Core::VectorDataObject](#)  
*Vector data object.*

### 5.38.1 Detailed Description

Declaration of the VectorDataObject class.

#### Author

Pavel Lakiza

#### Date

April 2021

## 5.39 /home/qinterfly/Library/Projects/Current/QRod↔ Systems/src/main/main.cpp File Reference

The startup function.

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

### Functions

- int [main](#) (int argc, char \*argv[])  
*Entry point.*



### 5.39.1 Detailed Description

The startup function.

Author

Pavel Lakiza

Date

May 2021

## 5.40 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/abstractprojectmanager.cpp File Reference

Definition of the AbstractProjectManager class.

```
#include <QMessageBox>
#include <QSettings>
#include <QToolBar>
#include "abstractprojectmanager.h"
#include "central/uiconstants.h"
#include "core/project.h"
#include "DockManager.h"
```

### 5.40.1 Detailed Description

Definition of the AbstractProjectManager class.

Author

Pavel Lakiza

Date

May 2021

## 5.41 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/abstractprojectmanager.h File Reference

Declaration of the AbstractProjectManager class.

```
#include <QDialog>
```

## Classes

- class [QRS::Managers::AbstractProjectManager](#)  
*Abstract manager to create objects of different types.*

### 5.41.1 Detailed Description

Declaration of the AbstractProjectManager class.

#### Author

Pavel Lakiza

#### Date

May 2021

## 5.42 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/managers/dataobjectlineedit.cpp File Reference

Definition of the DataPointerLineEdit class.

```
#include <QMimeData>
#include <QDragEnterEvent>
#include <QMenu>
#include "dataobjectlineedit.h"
#include "models/hierarchy/dataobjectshierarchyitem.h"
```

### 5.42.1 Detailed Description

Definition of the DataPointerLineEdit class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.43 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/managers/dataobjectlineedit.h File Reference

Declaration of the DataPointerLineEdit class.

```
#include <QLineEdit>
#include "core/abstractdataobject.h"
```

## Classes

- class [QRS::Managers::DataObjectLineEdit](#)  
*Line edit widget to hold a pointer to a data object.*

### 5.43.1 Detailed Description

Declaration of the DataPointerLineEdit class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.44 /home/qinterfly/Library/Projects/Current/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 <QShortcut>
#include <QFileDialog>
#include "DockManager.h"
#include "DockWidget.h"
#include "DockAreaWidget.h"
#include "dataobjectsmanager.h"
#include "central/uiconstants.h"
#include "core/scalardataobject.h"
#include "core/vectordataobject.h"
#include "core/matrixdataobject.h"
#include "core/surfacedataobject.h"
#include "core/utilities.h"
#include "models/table/basetablemodel.h"
#include "models/table/matrixtablemodel.h"
#include "models/table/surfacetablemodel.h"
#include "models/hierarchy/dataobjectshierarchy.h"
#include "doublespinboxitemdelegate.h"
```

## Functions

- void **setToolBarShortcutHints** (QToolBar \*pToolBar)
- QIcon **getDataObjectIcon** (AbstractDataObject::ObjectType type)  
*Helper function to assign an appropriate data object icon.*

### 5.44.1 Detailed Description

Implementation of the DataObjectsManager class.

Author

Pavel Lakiza

Date

June 2021

## 5.45 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/managers/dataobjectsmanager.h File Reference

Declaration of the DataObjectsManager class.

```
#include <unordered_map>
#include "abstractprojectmanager.h"
#include "core/aliasdata.h"
#include "core/aliasdataset.h"
#include "core/hierarchytree.h"
```

### Classes

- class [QRS::Managers::DataObjectsManager](#)  
*Manager to create objects of different types: scalars, vectors, matroces and surfaces.*

### 5.45.1 Detailed Description

Declaration of the DataObjectsManager class.

Author

Pavel Lakiza

Date

June 2021

## 5.46 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/managers/doublespinboxitemdelegate.cpp File Reference

Implementation of the DoubleSpinBoxItemDelegate class.

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

### 5.46.1 Detailed Description

Implementation of the DoubleSpinBoxItemDelegate class.

Author

Pavel Lakiza

Date

March 2021

## 5.47 /home/qinterfly/Library/Projects/Current/QRodSystems/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.*

### 5.47.1 Detailed Description

Declaration of the DoubleSpinBoxItemDelegate class.

Author

Pavel Lakiza

Date

March 2021

## 5.48 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/geometryrodcomponentwidget.cpp File Reference

Definiton of the GeometryComponentWidget class.

```
#include <QGridLayout>
#include <QSpacerItem>
#include <QLabel>
#include "geometryrodcomponentwidget.h"
#include "dataobjectlineedit.h"
#include "core/vectordataobject.h"
#include "core/matrixdataobject.h"
#include "core/geometryrodcomponent.h"
```

## Functions

- `template<typename T >`  
`QComboBox * createObjectsComboBox (auto const &objects, T const *pCurrentObject)`

### 5.48.1 Detailed Description

Definiton of the `GeometryComponentWidget` class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.49 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/managers/geometryrodcomponentwidget.h File Reference

Declaration of the `GeometryComponentWidget` class.

```
#include <QWidget>
```

## Classes

- class [QRS::Managers::GeometryRodComponentWidget](#)  
*Widget to construct a geometrical component of a rod.*

### 5.49.1 Detailed Description

Declaration of the `GeometryComponentWidget` class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.50 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/managers/managersfactory.cpp File Reference

Definition of the ManagersFactory class.

```
#include <QApplication>
#include <QDesktopWidget>
#include "managersfactory.h"
#include "core/project.h"
#include "managers/dataobjectsmanager.h"
#include "managers/rodcomponentsmanager.h"
```

### Functions

- void [moveToCenter](#) (QWidget \*pWidget)  
*Helper function to situate widgets at the center of their parent widgets.*

#### 5.50.1 Detailed Description

Definition of the ManagersFactory class.

Author

Pavel Lakiza

Date

June 2021

## 5.51 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/managers/managersfactory.h File Reference

Declaration of the ManagersFactory class.

```
#include <QObject>
#include "abstractprojectmanager.h"
```

### Classes

- class [QRS::Managers::ManagersFactory](#)  
*Factory to create managers which utilize and modify project data.*

### 5.51.1 Detailed Description

Declaration of the ManagersFactory class.

Author

Pavel Lakiza

Date

June 2021

## 5.52 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/managers/rodcomponentsmanager.cpp File Reference

Definition of the RodComponentsManager class.

```
#include <QVBoxLayout>
#include <QPushButton>
#include <QTreeView>
#include <QToolBar>
#include <QLabel>
#include "DockManager.h"
#include "DockWidget.h"
#include "DockAreaWidget.h"
#include "rodcomponentsmanager.h"
#include "core/vectordataobject.h"
#include "core/matrixdataobject.h"
#include "core/geometryrodcomponent.h"
#include "core/usercrosssectionrodcomponent.h"
#include "managers/geometryrodcomponentwidget.h"
#include "models/hierarchy/dataobjectshierarchy.h"
#include "models/hierarchy/rodcomponentshierarchy.h"
```

### Functions

- QWidget \* [addToolBarHeader](#) (QToolBar \*pToolBar, QString const &name)  
*Helper function to add the header to a toolbar.*

### Variables

- QSize const **skToolBarIconSize** = QSize(27, 27)

### 5.52.1 Detailed Description

Definition of the RodComponentsManager class.

Author

Pavel Lakiza

Date

May 2021



## 5.53 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/rodcomponentsmanager.h File Reference

Declaration of the RodComponentsManager class.

```
#include "managers/abstractprojectmanager.h"
#include "core/aliasdataset.h"
#include "core/hierarchytree.h"
#include "core/abstractcrosssectionrodcomponent.h"
```

### Classes

- class [QRS::Managers::RodComponentsManager](#)  
*Manager to create rod components, such as a geometry, cross section and force.*

#### 5.53.1 Detailed Description

Declaration of the RodComponentsManager class.

##### Author

Pavel Lakiza

##### Date

March 2021

## 5.54 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstrachierarchyitem.cpp File Reference

Definition of the AbstractHierarchyItem class.

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

#### 5.54.1 Detailed Description

Definition of the AbstractHierarchyItem class.

##### Author

Pavel Lakiza

##### Date

May 2021

## 5.55 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/hierarchy/abstrachierarchyitem.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.*

#### 5.55.1 Detailed Description

Declaration of the AbstractHierarchyItem class.

Author

Pavel Lakiza

Date

May 2021

## 5.56 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/hierarchy/abstrachierarchymodel.cpp File Reference

Definition of the AbstractHierarchyModel class.

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

#### 5.56.1 Detailed Description

Definition of the AbstractHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

## 5.57 /home/qinterfly/Library/Projects/Current/QRod

### Systems/src/models/hierarchy/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 >

#### 5.57.1 Detailed Description

Declaration of the AbstractHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

## 5.58 /home/qinterfly/Library/Projects/Current/QRod

### Systems/src/models/hierarchy/dataobjectshierarchyitem.cpp File Reference

Definition of the DataObjectsHierarchyItem class.

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

#### Functions

- QIcon [getDataObjectIcon](#) (AbstractDataObject::ObjectType type)  
*Helper function to assign an appropriate data object icon.*

### 5.58.1 Detailed Description

Definition of the DataObjectsHierarchyItem class.

#### Author

Pavel Lakiza

#### Date

May 2021

## 5.59 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/hierarchy/dataobjectshierarchyitem.h File Reference

Declaration of the DataObjectsHierarchyItem class.

```
#include "models/hierarchy/abstrachierarchyitem.h"
#include "core/aliasdataset.h"
```

### Classes

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

### 5.59.1 Detailed Description

Declaration of the DataObjectsHierarchyItem class.

#### Author

Pavel Lakiza

#### Date

May 2021

## 5.60 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/hierarchy/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"
```

**5.60.1 Detailed Description**

Definition of the DataObjectsHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

May 2021

## **5.61 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/models/hierarchy/dataobjectshierarchymodel.h File Reference**

Declaration of the DataObjectsHierarchyModel class.

```
#include "models/hierarchy/abstrachierarchymodel.h"
#include "core/aliasdataset.h"
```

**Classes**

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

**5.61.1 Detailed Description**

Declaration of the DataObjectsHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

May 2021

## **5.62 /home/qinterfly/Library/Projects/Current/QRod↵ Systems/src/models/hierarchy/projecthierarchymodel.cpp File Reference**

Definition of the ProjectHierarchyModel class.

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

### 5.62.1 Detailed Description

Definition of the ProjectHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

## 5.63 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/hierarchy/projecthierarchymodel.h File Reference

Declaration of the ProjectHierarchyModel class.

```
#include "models/hierarchy/abstrachhierarchymodel.h"  
#include "core/aliasdata.h"  
#include "core/project.h"
```

### Classes

- class [QRS::HierarchyModels::ProjectHierarchyModel](#)  
*Project hierarchy representative.*

### 5.63.1 Detailed Description

Declaration of the ProjectHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

## 5.64 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/hierarchy/rodcomponentshierarchyitem.cpp File Reference

Definition of the RodComponentsHierarchyItem class.

```
#include "rodcomponentshierarchyitem.h"  
#include "core/abstractrodcomponent.h"  
#include "core/abstractcrosssectionrodcomponent.h"  
#include "core/hierarchytree.h"
```

## Functions

- QIcon [getRodComponentIcon](#) ([AbstractRodComponent](#) const \*pRodComponent)  
*Helper function to assign an appropriate rod component icon.*

### 5.64.1 Detailed Description

Definition of the RodComponentsHierarchyItem class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.65 /home/qinterfly/Library/Projects/Current/QRod↔ Systems/src/models/hierarchy/rodcomponentshierarchyitem.h File Reference

Declaration of the RodComponentsHierarchyItem class.

```
#include "models/hierarchy/abstrachierarchyitem.h"  
#include "core/aliasdataset.h"
```

## Classes

- class [QRS::HierarchyModels::RodComponentsHierarchyItem](#)  
*Item to represent a hierarchy of rod components.*

### 5.65.1 Detailed Description

Declaration of the RodComponentsHierarchyItem class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.66 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/hierarchy/rodcomponentshierarchymodel.cpp File Reference

Definition of the RodComponentsHierarchyModel class.

```
#include <QTreeView>
#include <QMimeData>
#include "rodcomponentshierarchymodel.h"
#include "rodcomponentshierarchyitem.h"
#include "core/abstractrodcomponent.h"
#include "core/hierarchytree.h"
```

### 5.66.1 Detailed Description

Definition of the RodComponentsHierarchyModel class.

Author

Pavel Lakiza

Date

June 2021

## 5.67 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/hierarchy/rodcomponentshierarchymodel.h File Reference

Declaration of the RodComponentsHierarchyModel class.

```
#include "models/hierarchy/abstrachhierarchymodel.h"
#include "core/aliasdataset.h"
```

### Classes

- class [QRS::HierarchyModels::RodComponentsHierarchyModel](#)  
*Tree model to represent and modify a hierarchy of rod components.*

### 5.67.1 Detailed Description

Declaration of the RodComponentsHierarchyModel class.

Author

Pavel Lakiza

Date

June 2021



## 5.68 /home/qinterfly/Library/Projects/Current/QRod↔ Systems/src/models/properties/dataobjectspropertiesmodel.cpp File Reference

Definition of the DataObjectsPropertiesModel class.

```
#include <QTableView>
#include "dataobjectspropertiesmodel.h"
#include "core/abstractdataobject.h"
#include "core/surfacedataobject.h"
#include "core/hierarchy/hierarchyitem.h"
#include "models/hierarchy/abstracthierarchyitem.h"
#include "models/hierarchy/dataobjectshierarchyitem.h"
```

### 5.68.1 Detailed Description

Definition of the DataObjectsPropertiesModel class.

#### Author

Pavel Lakiza

#### Date

May 2021

## 5.69 /home/qinterfly/Library/Projects/Current/QRod↔ Systems/src/models/properties/dataobjectspropertiesmodel.h File Reference

Declaration of the DataObjectsPropertiesModel class.

```
#include <QStandardItemModel>
```

### Classes

- class [QRS::PropertiesModels::DataObjectsPropertiesModel](#)  
*Model to represent properties of selected data objects.*

### 5.69.1 Detailed Description

Declaration of the DataObjectsPropertiesModel class.

#### Author

Pavel Lakiza

#### Date

May 2021

## 5.70 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/table/basetablemodel.cpp File Reference

Implementation of the BaseTableModel class.

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

### 5.70.1 Detailed Description

Implementation of the BaseTableModel class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.71 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/table/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.*

### 5.71.1 Detailed Description

Declaration of the BaseTableModel class.

#### Author

Pavel Lakiza

#### Date

March 2021

## 5.72 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/matrixtablemodel.cpp File Reference

Implementation of the MatrixTableModel class.

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

### 5.72.1 Detailed Description

Implementation of the MatrixTableModel class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.73 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/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.*

### 5.73.1 Detailed Description

Declaration of the MatrixTableModel class.

#### Author

Pavel Lakiza

#### Date

March 2021

## 5.74 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/table/surfacetablemodel.cpp File Reference

Implementation of the SurfaceTableModel class.

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

### 5.74.1 Detailed Description

Implementation of the SurfaceTableModel class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.75 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/models/table/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.*

### 5.75.1 Detailed Description

Declaration of the SurfaceTableModel class.

#### Author

Pavel Lakiza

#### Date

March 2021

## 5.76 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/tablemodelinterface.cpp File Reference

Implementation of static functions of TableModelInterface.

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

### 5.76.1 Detailed Description

Implementation of static functions of TableModelInterface.

Author

Pavel Lakiza

Date

June 2021

## 5.77 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/tablemodelinterface.h File Reference

Declaration of the TableModelInterface.

```
#include <QItemSelection>
```

### Classes

- class [QRS::TableModels::TableModelInterface](#)  
*User interface to add and remove items.*

### 5.77.1 Detailed Description

Declaration of the TableModelInterface.

Author

Pavel Lakiza

Date

June 2021

## 5.78 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/src/render/view3d.cpp File Reference

Implementation of the View3D class.

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

### 5.78.1 Detailed Description

Implementation of the View3D class.

#### Author

Pavel Lakiza

#### Date

March 2021

## 5.79 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/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.*

### 5.79.1 Detailed Description

Declaration of the View3D class.

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