# QRodSystems

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# Chapter 1

# Hierarchical Index

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# Chapter 3

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# Chapter 4

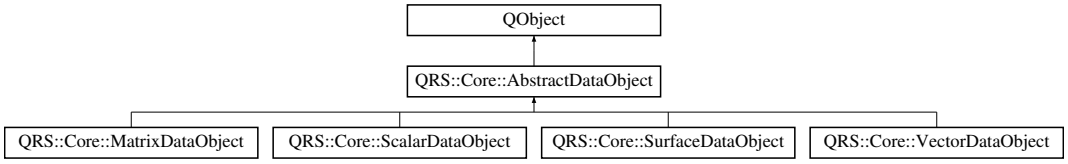
# Class Documentation

## 4.1 QRS::Core::AbstractDataObject Class Reference

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

`#include <abstractdataobject.h>`

Inheritance diagram for QRS::Core::AbstractDataObject:




### Public 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 **numberItems** () 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.*

## 4.1.1 Detailed Description

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

## 4.1.2 Member Function Documentation

#### 4.1.2.1 deserialize()

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

Partly deserialize an abstract data object.

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

Reimplemented in QRS::Core::SurfaceDataObject.

#### 4.1.2.2 getAvailableItemKey()

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

Check if a given key is unique

**Returns**

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

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

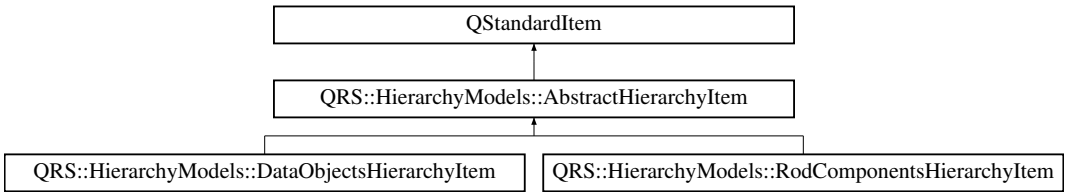
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractdataobject.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractdataobject.cpp

## 4.2 QRS::HierarchyModels::AbstractHierarchyItem Class Reference

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

`#include <abstracthierarchyitem.h>`

Inheritance diagram for QRS::HierarchyModels::AbstractHierarchyItem:




### Public 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**

### 4.2.1 Detailed Description

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

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

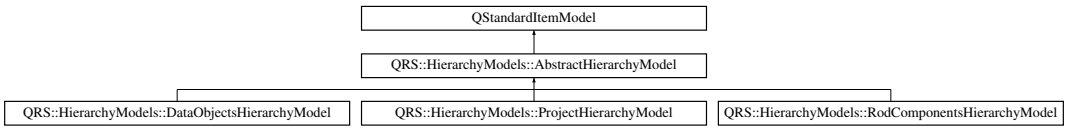
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchyitem.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchyitem.cpp

## 4.3 QRS::HierarchyModels::AbstractHierarchyModel Class Reference

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

`#include <abstracthierarchymodel.h>`

Inheritance diagram for QRS::HierarchyModels::AbstractHierarchyModel:




### Signals

- void **dataModified** (bool flag)

### Public Member Functions

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

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

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

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

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

  *Process the drop action.*

### Protected Attributes

- QString const **mkMimeType**

### 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 ()

### 4.3.1 Detailed Description

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

### 4.3.2 Member Function Documentation

#### 4.3.2.1 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:

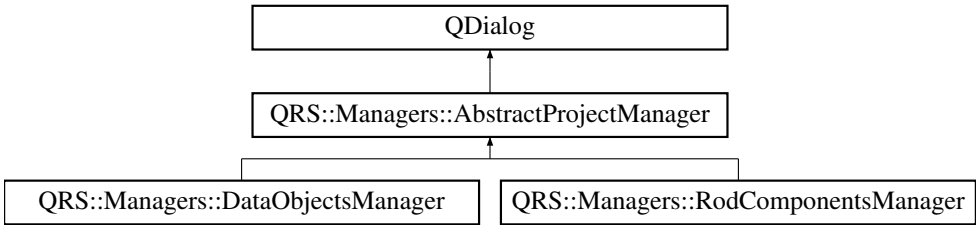
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchymodel.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchymodel.cpp

## 4.4 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**

### 4.4.1 Detailed Description

Abstract manager to create objects of different types.

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

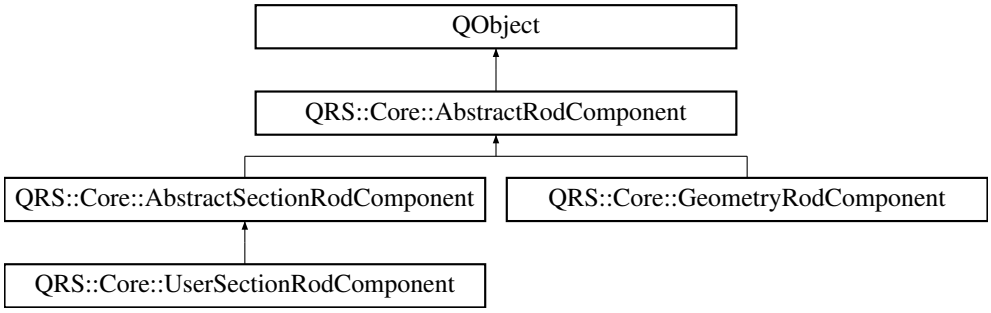
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/abstractprojectmanager.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/abstractprojectmanager.cpp

# 4.5 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** , **kSection** }

## 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.*

### 4.5.1 Detailed Description

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

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

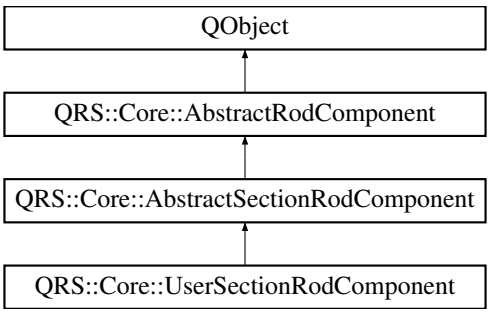
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractrodcomponent.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractrodcomponent.cpp

## 4.6 QRS::Core::AbstractSectionRodComponent Class Reference

General cross section of a rod.

`#include <abstractsectionrodcomponent.h>`

Inheritance diagram for QRS::Core::AbstractSectionRodComponent:




### Public Types

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

## Public Member Functions

- **AbstractSectionRodComponent** (SectionType sectionType, QString const &name)
- virtual ~AbstractSectionRodComponent ()=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 (AbstractSectionRodComponent const *pSection)

  *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

### 4.6.1 Detailed Description

General cross section of a rod.

### 4.6.2 Member Function Documentation

#### 4.6.2.1 deserialize()

```
void AbstractSectionRodComponent::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/abstractsectionrodcomponent.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractsectionrodcomponent.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:

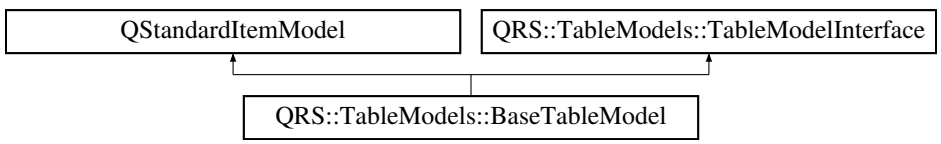
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.cpp

## 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:

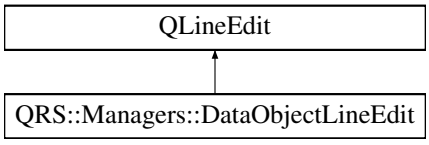
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/basetablemodel.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/basetablemodel.cpp

## 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 &mimeType, 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 const **mkMimeType**

### 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:

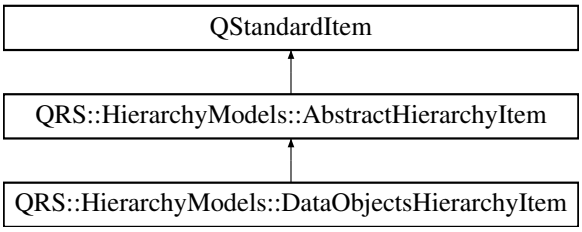
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectlineedit.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectlineedit.cpp

## 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:

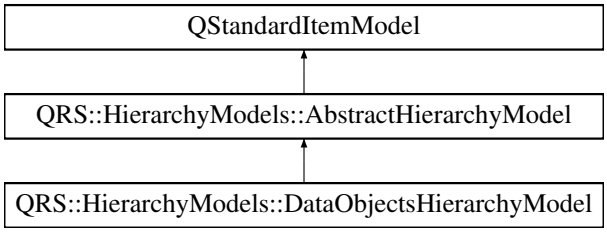
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchyitem.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchyitem.cpp

# 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↩Objects, QString const &mimeType, QTreeView *pView=nullptr)
- void updateContent () override

  *Update all the content.*
- void clearContent () override

  *Clear all the items.*
- bool isEmpty () const

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

  *Select an item by row index.*

## Private Slots

- void 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:

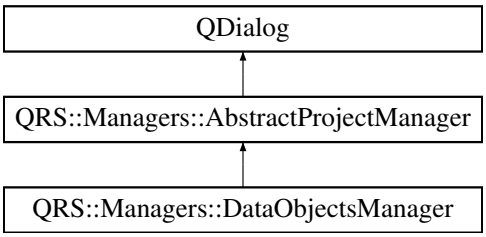
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchymodel.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchymodel.cpp

## 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 removeSelectedLeadingItem ()

  *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 * **mpItemDelegate** = 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:

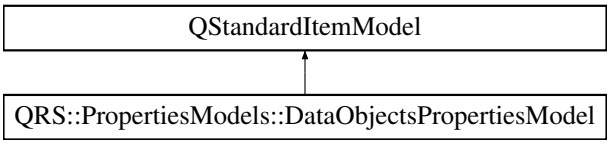
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.cpp

## 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 * > prepareProperty Row (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:

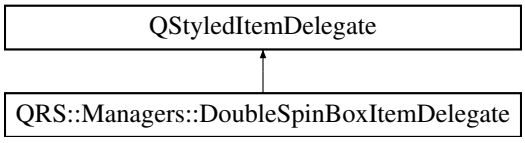
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/properties/dataobjectspropertiesmodel.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/properties/dataobjectspropertiesmodel.cpp

## 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:

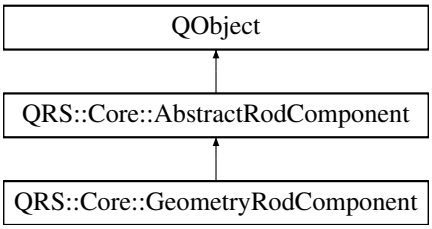
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.cpp

## 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:

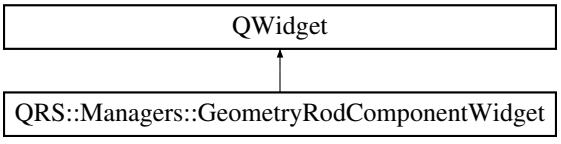
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/geometryrodcomponent.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/geometryrodcomponent.cpp

## 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, QString const &mimeType, 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

- QString const **mkMimeType**
- 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 containes 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-aray 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 &new↩ Value)
  *Change the value of a node.*
- HierarchyNode * **root** ()
- HierarchyTree clone () const
  *Clone a tree.*
- HierarchyNode * findNode (HierarchyNode *pBaseNode, HierarchyNode::NodeType type, QVariant const &value) const
  *Find a node by type and value.*
- 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-aray tree)

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

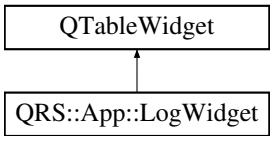
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/hierarchytree.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/hierarchytree.cpp

## 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:

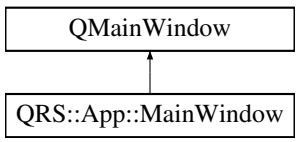
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/logwidget.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/logwidget.cpp

## 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

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

  *Open the specific project.*
- bool saveProject ()

  *Save the current project.*

### Static Public Attributes

- static LogWidget * **pLogger** = nullptr

## Private Slots

- void createProject ()

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

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

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

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

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

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

  *Save the current window settings.*
- void restoreSettings ()

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

  *Show a manager for designing data objects.*
- void 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 properies of selected objercts.*
- void setProjectTitle ()

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

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

*Add the current project to the recent ones.*

- void specifyMenuConnections ()

  *Set signals and slots for menu actions.*

- void specifyProjectConnections ()

  *Set signals and slots for a project.*

- bool saveProjectChangesDialog ()

  *Save project changes.*

- bool saveProjectHelper (QString const &filePath)

  *Helper method to perform saving of the current project.*

### Private Attributes

- Ui::MainWindow * **mpUi**
- ads::CDockManager * **mpDockManager**
- QLabel * **mpStatusLabel**
- QTableView * **mpPropertiesWidget**
- HierarchyModels::ProjectHierarchyModel * **mpProjectHierarchyModel** = nullptr
- Managers::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:

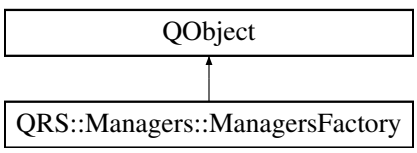
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/mainwindow.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/mainwindow.cpp

## 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:

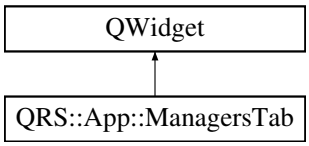
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/managersfactory.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/managersfactory.cpp

## 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:

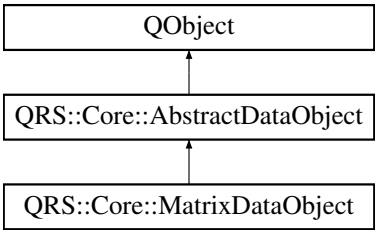
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/controltabs.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/controltabs.cpp

## 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:

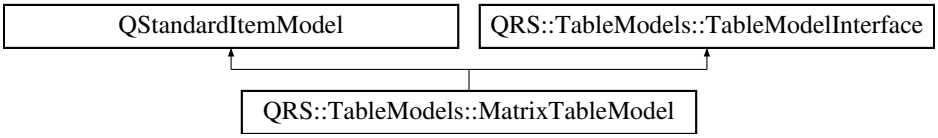
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/matrixdataobject.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/matrixdataobject.cpp

## 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:

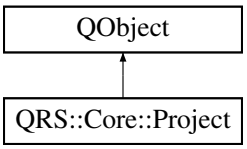
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/matrixtablemodel.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/matrixtablemodel.cpp

## 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 &hierarchyRod↩ Components)

  *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 (AbstractSectionRodComponent::SectionType sectionType)

  *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:

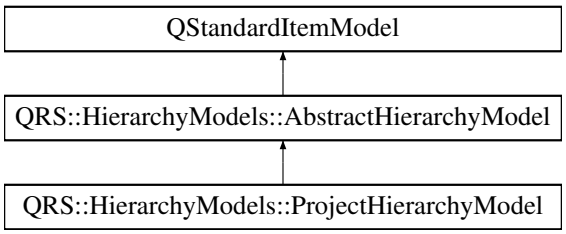
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project-base.cpp
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project-io.cpp

## 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** (QString const &mimeType, 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:

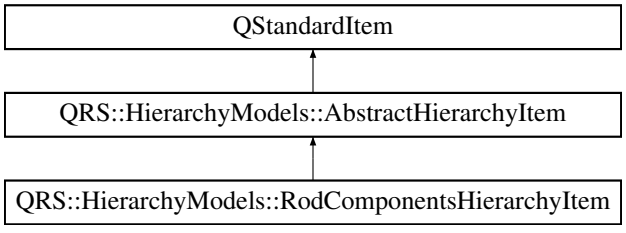
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/projecthierarchymodel.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/projecthierarchymodel.cpp

## 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:

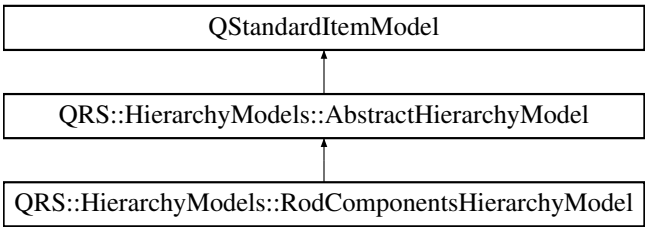
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchyitem.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchyitem.cpp

## 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, QString const &mimeType, QTreeView *pView=nullptr)
- void updateContent () override

  *Update all the content.*
- void clearContent () override

  *Clear all the items.*
- bool isEmpty () const

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

  *Select an item by row index.*

## Private Slots

- void 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:

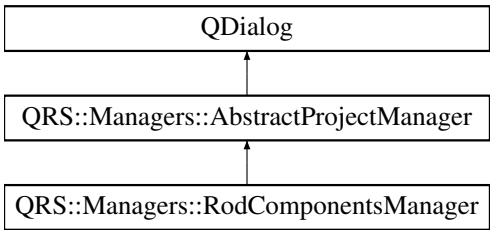
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchymodel.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchymodel.cpp

## 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 * addSection (Core::AbstractSectionRodComponent::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 &hiearchyDataObjects, 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 * makeSectionsToolBar ()

  *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:

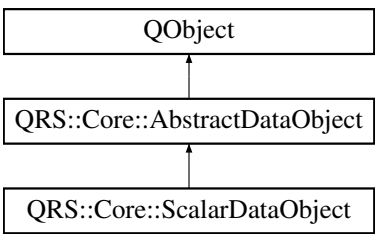
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.h

## 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:

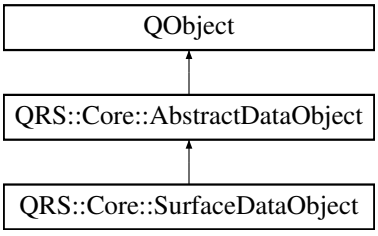
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/scalardataobject.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/scalardataobject.cpp

## 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:

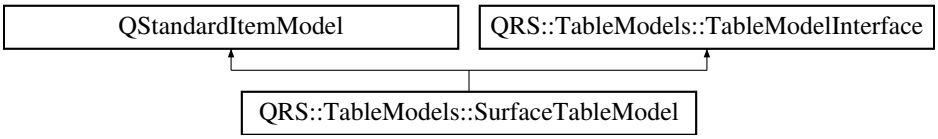
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/surfacedataobject.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/surfacedataobject.cpp

# 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:

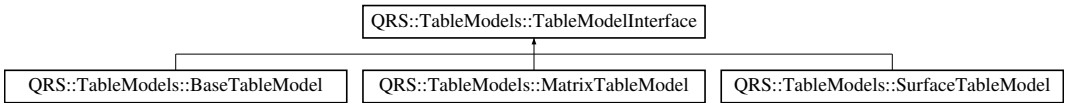
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/surfacetablemodel.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/surfacetablemodel.cpp

## 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 modfifed.*

### 4.34.1 Detailed Description

User interface to add and remove items.

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

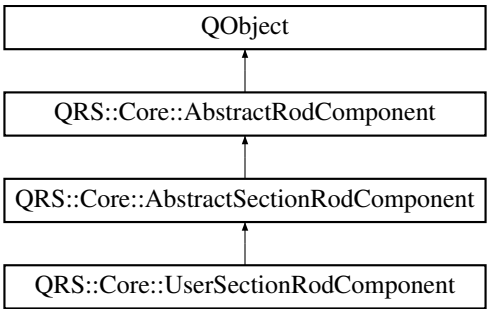
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/tablemodelinterface.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/tablemodelinterface.cpp

# 4.35 QRS::Core::UserSectionRodComponent Class Reference

Section which properties are defined by user.

`#include <usersectionrodcomponent.h>`

Inheritance diagram for QRS::Core::UserSectionRodComponent:




## Public Member Functions

- **UserSectionRodComponent** (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 * **inertiaProductXY** () 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

Section which properties are defined by user.

### 4.35.2 Member Function Documentation

#### 4.35.2.1 isDataComplete()

```
bool UserSectionRodComponent::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:

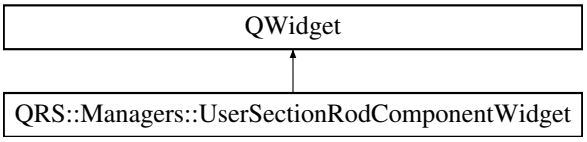
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/usersectionrodcomponent.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/usersectionrodcomponent.cpp

## 4.36 QRS::Managers::UserSectionRodComponentWidget Class Reference

Widget to construct a user-defined section of a rod.

```
#include <usersectionrodcomponentwidget.h>
```

Inheritance diagram for QRS::Managers::UserSectionRodComponentWidget:




### Signals

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

### Public Member Functions

- **UserSectionRodComponentWidget** (Core::UserSectionRodComponent &userSectionRodComponent, QString const &mimeType, QWidget *parent=nullptr)

### Private Member Functions

- void createContent ()
  *Create all the content.*
- QLayout * createAreaLayout ()
  *Create an area layout.*
- QWidget * createInertiaMomentsGroup ()
  *Create a group consisted of widgets to set moments of inertia.*
- QWidget * createCenterCoordinatesGroup ()
  *Create a group consisted of widgets to set coordinates of the center.*
- void setArea (Core::AbstractDataObject const *pDataObject)
  *Set an area.*
- void setInertiaMomentTorsional (Core::AbstractDataObject const *pDataObject)
  *Set a torsional moment of inertia.*
- void setInertiaMomentX (Core::AbstractDataObject const *pDataObject)
  *Set a moment of inertia about the X axis.*
- void setInertiaMomentY (Core::AbstractDataObject const *pDataObject)
  *Set a moment of inertia about the Y axis.*
- void setInertiaProductXY (Core::AbstractDataObject const *pDataObject)
  *Set a product of inertia.*
- void setCenterCoordinateX (Core::AbstractDataObject const *pDataObject)
  *Set coordinate of the center along the X axis.*
- void setCenterCoordinateY (Core::AbstractDataObject const *pDataObject)
  *Set coordinate of the center along the Y axis.*

### Private Attributes

- QString const **mkMimeType**
- Core::UserSectionRodComponent & **mUserSectionRodComponent**

### 4.36.1 Detailed Description

Widget to construct a user-defined section of a rod.

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

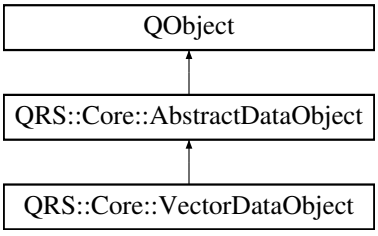
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/usersectionrodcomponentwidget.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/usersectionrodcomponentwidget.cpp

## 4.37 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

#### 4.37.1 Detailed Description

Vector data object.

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

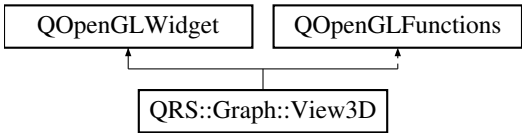
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/vectordataobject.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/vectordataobject.cpp

## 4.38 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**

### 4.38.1 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/QRod↩ Systems/src/central/logwidget.h File Reference

Declaration of the LogWidget class.

```
#include <QTableWidget>
```

### Classes

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

### 5.4.1 Detailed Description

Declaration of the LogWidget class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.5 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/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/QRod↩ Systems/src/central/uiconstants.h File Reference

Common graphical constants shared between several windows.

```
#include <QString>
```

### Variables

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

### 5.7.1 Detailed Description

Common graphical constants shared between several windows.

**Author**

Pavel Lakiza

**Date**

April 2021

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

Implementation of the AbstractDataObject class.

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

### 5.8.1 Detailed Description

Implementation of the AbstractDataObject class.

**Author**

Pavel Lakiza

**Date**

April 2021

## 5.9 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/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 designied in the way to be represented in a table easily.*

### Typedefs

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

### Functions

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

  *Print a data object to a stream.*

### 5.9.1 Detailed Description

Declaration of the AbstractDataObject class.

**Author**

Pavel Lakiza

**Date**

June 2021

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

Definition of the AbstractRodComponent class.

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

### 5.10.1 Detailed Description

Definition of the AbstractRodComponent class.

**Author**

Pavel Lakiza

**Date**

June 2021

## 5.11 /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.*

### 5.11.1 Detailed Description

Declaration of the AbstractRodComponent class.

**Author**

Pavel Lakiza

**Date**

June 2021

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

Definition of the AbstractSectionRodComponent class.

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

### 5.12.1 Detailed Description

Definition of the AbstractSectionRodComponent class.

**Author**

Pavel Lakiza

**Date**

June 2021

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

Declaration of the AbstractSectionRodComponent class.

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

### Classes

- class QRS::Core::AbstractSectionRodComponent

  *General cross section of a rod.*

### 5.13.1 Detailed Description

Declaration of the AbstractSectionRodComponent class.

**Author**

Pavel Lakiza

**Date**

June 2021

## 5.14 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/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/QRod↩ Systems/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/QRod↩ Systems/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/QRod↩ Systems/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/QRod↩ Systems/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/QRod↩ Systems/src/core/hierarchytree.h File Reference

Declaration of the HierarchyTree class.

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

### Classes

- class QRS::Core::HierarchyTree

  *Hierarchy of data objects (n-aray tree)*

### Functions

- QDebug QRS::Core::operator<< (QDebug stream, HierarchyTree &tree)

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

  *Write a tree structure to a stream.*

#### 5.23.1 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/QRod↩ Systems/src/core/matrixdataobject.h File Reference

Declaration of the MatrixDataObject class.

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

### Classes

- class QRS::Core::MatrixDataObject

  *Matrix data object.*

### 5.25.1 Detailed Description

Declaration of the MatrixDataObject class.

**Author**

Pavel Lakiza

**Date**

April 2021

## 5.26 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/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 "usersectionrodcomponent.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 "usersectionrodcomponent.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/QRod↩ Systems/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 "abstractsectionrodcomponent.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/QRod↩ Systems/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/usersectionrodcomponent.cpp File Reference

Definition of the UserSectionRodComponent class.

```
#include "usersectionrodcomponent.h"
```

### 5.33.1 Detailed Description

Definition of the UserSectionRodComponent class.

**Author**

Pavel Lakiza

**Date**

June 2021

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

Declaration of the UserSectionRodComponent class.

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

### Classes

- class QRS::Core::UserSectionRodComponent
  *Section which properties are defined by user.*

### 5.34.1 Detailed Description

Declaration of the UserSectionRodComponent 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/QRod↩ Systems/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/QRod↩ Systems/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/QRod↩ Systems/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 "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/QRod↩ Systems/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/QRod↩ Systems/src/managers/dataobjectsmanager.cpp File Reference

Implementation of the DataObjectsManager class.

```
#include <QTreeView>
#include <QSettings>
#include <QHBoxLayout>
#include <QToolBar>
#include <QListWidget>
#include <QTextEdit>
#include <QPushButton>
#include <QSpacerItem>
#include <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/dataobjectshierarchymodel.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"
```

### 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/QRodSystems/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/usersectionrodcomponent.h"
#include "managers/geometryrodcomponentwidget.h"
#include "managers/usersectionrodcomponentwidget.h"
#include "models/hierarchy/dataobjectshierarchymodel.h"
#include "models/hierarchy/rodcomponentshierarchymodel.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)
- QString const **skDataObjectsMimeType** = "rodcomponentsmanager/dataobjectshierarchy"

### 5.52.1 Detailed Description

Definition of the RodComponentsManager class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.53 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/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/abstractsectionrodcomponent.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/QRod↩ Systems/src/managers/usersectionrodcomponentwidget.cpp File Reference

Definition of the UserSectionRodComponentWidget class.

```
#include <QVBoxLayout>
#include <QGroupBox>
#include <QLabel>
#include "usersectionrodcomponentwidget.h"
#include "core/usersectionrodcomponent.h"
#include "dataobjectlineedit.h"
```

### 5.54.1 Detailed Description

Definition of the UserSectionRodComponentWidget class.

**Author**

Pavel Lakiza

**Date**

June 2021

## 5.55 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/src/managers/usersectionrodcomponentwidget.h File Reference

Declaration of the UserSectionRodComponentWidget class.

```
#include <QWidget>
```

### Classes

- class QRS::Managers::UserSectionRodComponentWidget

  *Widget to construct a user-defined section of a rod.*

### 5.55.1 Detailed Description

Declaration of the UserSectionRodComponentWidget class.

**Author**

Pavel Lakiza

**Date**

June 2021

## 5.56 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/src/models/hierarchy/abstracthierarchyitem.cpp File Reference

Definition of the AbstractHierarchyItem class.

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

### 5.56.1 Detailed Description

Definition of the AbstractHierarchyItem class.

**Author**

Pavel Lakiza

**Date**

May 2021

# 5.57 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/src/models/hierarchy/abstracthierarchyitem.h File Reference

Declaration of the AbstractHierarchyItem class.

```
#include <QStandardItem>
```

## Classes

- class QRS::HierarchyModels::AbstractHierarchyItem

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

### 5.57.1 Detailed Description

Declaration of the AbstractHierarchyItem class.

**Author**

Pavel Lakiza

**Date**

May 2021

# 5.58 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/src/models/hierarchy/abstracthierarchymodel.cpp File Reference

Definition of the AbstractHierarchyModel class.

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

### 5.58.1 Detailed Description

Definition of the AbstractHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.59 /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 >

### 5.59.1 Detailed Description

Declaration of the AbstractHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.60 /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.*

### 5.60.1 Detailed Description

Definition of the DataObjectsHierarchyItem class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.61 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/src/models/hierarchy/dataobjectshierarchyitem.h File Reference

Declaration of the DataObjectsHierarchyItem class.

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

### Classes

- class QRS::HierarchyModels::DataObjectsHierarchyItem
  *Item to represent a hierarchy of data objects.*

### 5.61.1 Detailed Description

Declaration of the DataObjectsHierarchyItem class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.62 /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"
```

### 5.62.1 Detailed Description

Definition of the DataObjectsHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.63 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/src/models/hierarchy/dataobjectshierarchymodel.h File Reference

Declaration of the DataObjectsHierarchyModel class.

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

### Classes

- class QRS::HierarchyModels::DataObjectsHierarchyModel
  *Tree model to represent and modify a hierarchy of data objects.*

### 5.63.1 Detailed Description

Declaration of the DataObjectsHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.64 /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"
```

### 5.64.1 Detailed Description

Definition of the ProjectHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

May 2021

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

Declaration of the ProjectHierarchyModel class.

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

### Classes

- class QRS::HierarchyModels::ProjectHierarchyModel

  *Project hierarchy representative.*

### 5.65.1 Detailed Description

Declaration of the ProjectHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.66 /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/abstractsectionrodcomponent.h"
#include "core/hierarchytree.h"
```

### Functions

- QIcon getRodComponentIcon (AbstractRodComponent const *pRodComponent)

  *Helper function to assign an appropriate rod component icon.*

### 5.66.1 Detailed Description

Definition of the RodComponentsHierarchyItem class.

**Author**

Pavel Lakiza

**Date**

June 2021

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

Declaration of the RodComponentsHierarchyItem class.

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

### Classes

- class QRS::HierarchyModels::RodComponentsHierarchyItem

  *Item to represent a hierarchy of rod components.*

### 5.67.1 Detailed Description

Declaration of the RodComponentsHierarchyItem class.

**Author**

Pavel Lakiza

**Date**

June 2021

# 5.68 /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"
```

## 5.68.1 Detailed Description

Definition of the RodComponentsHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

June 2021

# 5.69 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/src/models/hierarchy/rodcomponentshierarchymodel.h File Reference

Declaration of the RodComponentsHierarchyModel class.

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

## Classes

- class QRS::HierarchyModels::RodComponentsHierarchyModel

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

## 5.69.1 Detailed Description

Declaration of the RodComponentsHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

June 2021

## 5.70 /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/hierarchynode.h"
#include "models/hierarchy/abstracthierarchymodel.h"
#include "models/hierarchy/dataobjectshierarchyitem.h"
```

### 5.70.1 Detailed Description

Definition of the DataObjectsPropertiesModel class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.71 /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.*

### 5.71.1 Detailed Description

Declaration of the DataObjectsPropertiesModel class.

**Author**

Pavel Lakiza

**Date**

May 2021

## 5.72 /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"
```

### 5.72.1 Detailed Description

Implementation of the BaseTableModel class.

**Author**

Pavel Lakiza

**Date**

June 2021

## 5.73 /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.*

### 5.73.1 Detailed Description

Declaration of the BaseTableModel class.

**Author**

Pavel Lakiza

**Date**

March 2021

## 5.74 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/src/models/table/matrixtablemodel.cpp File Reference

Implementation of the MatrixTableModel class.

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

### 5.74.1 Detailed Description

Implementation of the MatrixTableModel class.

**Author**

Pavel Lakiza

**Date**

June 2021

## 5.75 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/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.*

### 5.75.1 Detailed Description

Declaration of the MatrixTableModel class.

**Author**

Pavel Lakiza

**Date**

March 2021

# 5.76 /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"
```

## 5.76.1 Detailed Description

Implementation of the SurfaceTableModel class.

**Author**

Pavel Lakiza

**Date**

June 2021

# 5.77 /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.*

## 5.77.1 Detailed Description

Declaration of the SurfaceTableModel class.

**Author**

Pavel Lakiza

**Date**

March 2021

## 5.78 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/src/models/table/tablemodelinterface.cpp File Reference

Implementation of static functions of TableModelInterface.

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

### 5.78.1 Detailed Description

Implementation of static functions of TableModelInterface.

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**Date**

June 2021

## 5.79 /home/qinterfly/Library/Projects/Current/QRod↩ Systems/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.*

### 5.79.1 Detailed Description

Declaration of the TableModelInterface.

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**Date**

June 2021

## 5.80 /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"
```

### 5.80.1 Detailed Description

Implementation of the View3D class.

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**Date**

March 2021

## 5.81 /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.*

### 5.81.1 Detailed Description

Declaration of the View3D class.

**Author**

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**Date**

March 2021