

QRodSystems

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<b>1 Hierarchical Index</b>	<b>1</b>
1.1 Class Hierarchy	1
<b>2 Class Index</b>	<b>3</b>
2.1 Class List	3
<b>3 File Index</b>	<b>5</b>
3.1 File List	5
<b>4 Class Documentation</b>	<b>9</b>
4.1 QRS::Core::AbstractDataObject Class Reference	9
4.1.1 Detailed Description	10
4.1.2 Member Function Documentation	10
4.1.2.1 deserialize()	10
4.1.2.2 getAvailableItemKey()	11
4.2 QRS::HierarchyModels::AbstractHierarchyItem Class Reference	11
4.2.1 Detailed Description	12
4.3 QRS::HierarchyModels::AbstractHierarchyModel Class Reference	12
4.3.1 Detailed Description	13
4.3.2 Member Function Documentation	13
4.3.2.1 updateContentExpanded()	13
4.4 QRS::Managers::AbstractManager Class Reference	13
4.4.1 Detailed Description	14
4.5 QRS::Core::AbstractRodComponent Class Reference	15
4.5.1 Detailed Description	16
4.6 QRS::Managers::AbstractRodComponentWidget Class Reference	16
4.6.1 Detailed Description	17
4.7 QRS::Core::AbstractSectionRodComponent Class Reference	17
4.7.1 Detailed Description	18
4.7.2 Member Function Documentation	18
4.7.2.1 deserialize()	18
4.8 QRS::Core::Array< T > Class Template Reference	19
4.8.1 Detailed Description	20
4.9 QRS::TableModels::BaseTableModel Class Reference	20
4.9.1 Detailed Description	21
4.10 QRS::Managers::DataObjectLineEdit Class Reference	21
4.10.1 Detailed Description	22
4.11 QRS::HierarchyModels::DataObjectsHierarchyItem Class Reference	22
4.11.1 Detailed Description	23
4.12 QRS::HierarchyModels::DataObjectsHierarchyModel Class Reference	23
4.12.1 Detailed Description	24
4.13 QRS::Managers::DataObjectsManager Class Reference	25
4.13.1 Detailed Description	26

4.14 QRS::PropertiesModels::DataObjectsPropertiesModel Class Reference	27
4.14.1 Detailed Description	28
4.15 QRS::Managers::DoubleSpinBoxItemDelegate Class Reference	28
4.15.1 Detailed Description	28
4.16 QRS::Core::GeometryRodComponent Class Reference	29
4.16.1 Detailed Description	30
4.17 QRS::Managers::GeometryRodComponentWidget Class Reference	30
4.17.1 Detailed Description	31
4.18 QRS::Core::HierarchyNode Class Reference	31
4.18.1 Detailed Description	32
4.19 QRS::Core::HierarchyTree Class Reference	32
4.19.1 Detailed Description	34
4.20 QRS::Core::LoadRodComponent Class Reference	34
4.20.1 Detailed Description	36
4.21 QRS::Managers::LoadRodComponentWidget Class Reference	36
4.21.1 Detailed Description	37
4.22 QRS::App::LogWidget Class Reference	37
4.22.1 Detailed Description	37
4.23 QRS::App::MainWindow Class Reference	38
4.23.1 Detailed Description	39
4.24 QRS::Managers::ManagersFactory Class Reference	40
4.24.1 Detailed Description	40
4.25 QRS::App::ManagersTab Class Reference	41
4.25.1 Detailed Description	41
4.26 QRS::Core::MaterialRodComponent Class Reference	41
4.26.1 Detailed Description	42
4.27 QRS::Managers::MaterialRodComponentWidget Class Reference	43
4.27.1 Detailed Description	43
4.28 QRS::Core::MatrixDataObject Class Reference	44
4.28.1 Detailed Description	44
4.29 QRS::TableModels::MatrixTableModel Class Reference	45
4.29.1 Detailed Description	45
4.30 QRS::Core::Project Class Reference	46
4.30.1 Detailed Description	48
4.31 QRS::HierarchyModels::ProjectHierarchyModel Class Reference	48
4.31.1 Detailed Description	49
4.32 QRS::HierarchyModels::RodComponentsHierarchyItem Class Reference	49
4.32.1 Detailed Description	50
4.33 QRS::HierarchyModels::RodComponentsHierarchyModel Class Reference	50
4.33.1 Detailed Description	51
4.34 QRS::Managers::RodComponentsManager Class Reference	51
4.34.1 Detailed Description	53

4.35 QRS::Core::Array< T >::Row< U > Struct Template Reference . . . . .	53
4.35.1 Detailed Description . . . . .	54
4.36 QRS::Core::ScalarDataObject Class Reference . . . . .	54
4.36.1 Detailed Description . . . . .	55
4.37 QRS::Core::SurfaceDataObject Class Reference . . . . .	55
4.37.1 Detailed Description . . . . .	56
4.38 QRS::TableModels::SurfaceTableModel Class Reference . . . . .	56
4.38.1 Detailed Description . . . . .	57
4.39 QRS::TableModels::TableModelInterface Class Reference . . . . .	57
4.39.1 Detailed Description . . . . .	58
4.40 QRS::Core::UserSectionRodComponent Class Reference . . . . .	58
4.40.1 Detailed Description . . . . .	59
4.40.2 Member Function Documentation . . . . .	59
4.40.2.1 isDataComplete() . . . . .	59
4.41 QRS::Managers::UserSectionRodComponentWidget Class Reference . . . . .	60
4.41.1 Detailed Description . . . . .	60
4.42 QRS::Core::VectorDataObject Class Reference . . . . .	61
4.42.1 Detailed Description . . . . .	61
4.43 QRS::Graph::View3D Class Reference . . . . .	62
4.43.1 Detailed Description . . . . .	62
<b>5 File Documentation . . . . .</b>	<b>63</b>
5.1 /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/controltabs.cpp File Reference . . . . .	63
5.1.1 Detailed Description . . . . .	63
5.2 /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/controltabs.h File Reference . . . . .	63
5.2.1 Detailed Description . . . . .	64
5.3 /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/logwidget.cpp File Reference . . . . .	64
5.3.1 Detailed Description . . . . .	64
5.4 /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/logwidget.h File Reference . . . . .	65
5.4.1 Detailed Description . . . . .	65
5.5 /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/mainwindow.cpp File Reference . . . . .	65
5.5.1 Detailed Description . . . . .	66
5.6 /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/mainwindow.h File Reference . . . . .	66
5.6.1 Detailed Description . . . . .	66
5.7 /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/uiconstants.h File Reference . . . . .	67
5.7.1 Detailed Description . . . . .	67
5.8 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractdataobject.cpp File Reference . . . . .	67
5.8.1 Detailed Description . . . . .	67
5.9 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractdataobject.h File Reference . . . . .	68
5.9.1 Detailed Description . . . . .	68
5.10 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractrodcomponent.cpp File Reference . . . . .	68
5.10.1 Detailed Description . . . . .	69

5.11	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractrodcomponent.h File Reference	69
5.11.1	Detailed Description	69
5.12	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractsectionrodcomponent.cpp File Reference	70
5.12.1	Detailed Description	70
5.13	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/abstractsectionrodcomponent.h File Reference	70
5.13.1	Detailed Description	70
5.14	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/aliasdata.h File Reference	71
5.14.1	Detailed Description	71
5.15	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/aliasdataset.h File Reference	71
5.15.1	Detailed Description	71
5.16	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.cpp File Reference	72
5.16.1	Detailed Description	72
5.17	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.h File Reference	72
5.17.1	Detailed Description	73
5.18	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/geometryrodcomponent.cpp File Reference	73
5.18.1	Detailed Description	73
5.19	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/geometryrodcomponent.h File Reference	73
5.19.1	Detailed Description	74
5.20	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/hierarchyndnode.cpp File Reference	74
5.20.1	Detailed Description	74
5.21	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/hierarchyndnode.h File Reference	74
5.21.1	Detailed Description	75
5.22	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/hierarchytree.cpp File Reference	75
5.22.1	Detailed Description	75
5.23	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/hierarchytree.h File Reference	75
5.23.1	Detailed Description	76
5.24	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/loadrodcomponent.cpp File Reference	76
5.24.1	Detailed Description	76
5.25	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/loadrodcomponent.h File Reference	76
5.25.1	Detailed Description	77
5.26	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/materialrodcomponent.cpp File Reference	77
5.26.1	Detailed Description	77
5.27	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/materialrodcomponent.h File Reference	77
5.27.1	Detailed Description	78
5.28	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/matrixdataobject.cpp File Reference	78
5.28.1	Detailed Description	78
5.29	/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/matrixdataobject.h File Reference	78

5.29.1 Detailed Description . . . . .	79
5.30 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project-base.cpp File Reference . .	79
5.30.1 Detailed Description . . . . .	79
5.31 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project-io.cpp File Reference . . . .	80
5.31.1 Detailed Description . . . . .	80
5.32 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project.h File Reference . . . . .	81
5.32.1 Detailed Description . . . . .	81
5.33 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/scalardataobject.cpp File Reference	81
5.33.1 Detailed Description . . . . .	81
5.34 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/scalardataobject.h File Reference .	82
5.34.1 Detailed Description . . . . .	82
5.35 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/surfacedataobject.cpp File Reference	82
5.35.1 Detailed Description . . . . .	82
5.36 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/surfacedataobject.h File Reference	83
5.36.1 Detailed Description . . . . .	83
5.37 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/usersectionrodcomponent.cpp File Reference . . . . .	83
5.37.1 Detailed Description . . . . .	83
5.38 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/usersectionrodcomponent.h File Reference . . . . .	84
5.38.1 Detailed Description . . . . .	84
5.39 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/utilities.cpp File Reference . . . . .	84
5.39.1 Detailed Description . . . . .	84
5.40 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/utilities.h File Reference . . . . .	85
5.40.1 Detailed Description . . . . .	85
5.41 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/vectordataobject.cpp File Reference	85
5.41.1 Detailed Description . . . . .	85
5.42 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/vectordataobject.h File Reference .	86
5.42.1 Detailed Description . . . . .	86
5.43 /home/qinterfly/Library/Projects/Current/QRodSystems/src/main/main.cpp File Reference . . . . .	86
5.43.1 Detailed Description . . . . .	87
5.44 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/abstractmanager.cpp File Ref- erence . . . . .	87
5.44.1 Detailed Description . . . . .	87
5.45 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/abstractmanager.h File Refer- ence . . . . .	87
5.45.1 Detailed Description . . . . .	88
5.46 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/abstractrodcomponentwidget.cpp File Reference . . . . .	88
5.46.1 Detailed Description . . . . .	88
5.47 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/abstractrodcomponentwidget.h File Reference . . . . .	88
5.47.1 Detailed Description . . . . .	89

5.48	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectlineedit.cpp	File Reference	89
5.48.1	Detailed Description		89
5.49	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectlineedit.h	File Reference	89
5.49.1	Detailed Description		90
5.50	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.cpp	File Reference	90
5.50.1	Detailed Description		91
5.51	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.h	File Reference	91
5.51.1	Detailed Description		91
5.52	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.cpp	File Reference	91
5.52.1	Detailed Description		92
5.53	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.h	File Reference	92
5.53.1	Detailed Description		92
5.54	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/geometryrodcomponentwidget.cpp	File Reference	92
5.54.1	Detailed Description		93
5.55	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/geometryrodcomponentwidget.h	File Reference	93
5.55.1	Detailed Description		93
5.56	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/loadrodcomponentwidget.cpp	File Reference	93
5.56.1	Detailed Description		94
5.57	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/loadrodcomponentwidget.h	File Reference	94
5.57.1	Detailed Description		94
5.58	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/managersfactory.cpp	File Reference	94
5.58.1	Detailed Description		95
5.59	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/managersfactory.h	File Reference	95
5.59.1	Detailed Description		95
5.60	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/materialrodcomponentwidget.cpp	File Reference	96
5.60.1	Detailed Description		96
5.61	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/materialrodcomponentwidget.h	File Reference	96
5.61.1	Detailed Description		96
5.62	/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/rodcomponentsmanager.cpp	File Reference	97
5.62.1	Detailed Description		97



5.63 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/rodcomponentsmanager.h File Reference . . . . .	98
5.63.1 Detailed Description . . . . .	98
5.64 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/usersectionrodcomponentwidget.cpp File Reference . . . . .	98
5.64.1 Detailed Description . . . . .	98
5.65 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/usersectionrodcomponentwidget.h File Reference . . . . .	99
5.65.1 Detailed Description . . . . .	99
5.66 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchyitem.cpp File Reference . . . . .	99
5.66.1 Detailed Description . . . . .	99
5.67 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchyitem.h File Reference . . . . .	100
5.67.1 Detailed Description . . . . .	100
5.68 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchymodel.cpp File Reference . . . . .	100
5.68.1 Detailed Description . . . . .	100
5.69 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchymodel.h File Reference . . . . .	101
5.69.1 Detailed Description . . . . .	101
5.70 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchyitem.cpp File Reference . . . . .	101
5.70.1 Detailed Description . . . . .	102
5.71 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchyitem.h File Reference . . . . .	102
5.71.1 Detailed Description . . . . .	102
5.72 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchymodel.cpp File Reference . . . . .	102
5.72.1 Detailed Description . . . . .	103
5.73 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchymodel.h File Reference . . . . .	103
5.73.1 Detailed Description . . . . .	103
5.74 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/projecthierarchymodel.cpp File Reference . . . . .	103
5.74.1 Detailed Description . . . . .	104
5.75 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/projecthierarchymodel.h File Reference . . . . .	104
5.75.1 Detailed Description . . . . .	104
5.76 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchyitem.cpp File Reference . . . . .	104
5.76.1 Detailed Description . . . . .	105
5.77 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchyitem.h File Reference . . . . .	105
5.77.1 Detailed Description . . . . .	105

5.78	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchymodel.cpp	
	File Reference	106
5.78.1	Detailed Description	106
5.79	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchymodel.h	
	File Reference	106
5.79.1	Detailed Description	106
5.80	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/properties/dataobjectspropertiesmodel.cpp	
	File Reference	107
5.80.1	Detailed Description	107
5.81	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/properties/dataobjectspropertiesmodel.h	
	File Reference	107
5.81.1	Detailed Description	107
5.82	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/basetablemodel.cpp	File Reference
	Reference	108
5.82.1	Detailed Description	108
5.83	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/basetablemodel.h	File Reference
	Reference	108
5.83.1	Detailed Description	108
5.84	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/matrixtablemodel.cpp	File Reference
	Reference	109
5.84.1	Detailed Description	109
5.85	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/matrixtablemodel.h	File Reference
	Reference	109
5.85.1	Detailed Description	109
5.86	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/surfacetablemodel.cpp	File Reference
	Reference	110
5.86.1	Detailed Description	110
5.87	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/surfacetablemodel.h	File Reference
	Reference	110
5.87.1	Detailed Description	110
5.88	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/tablemodelinterface.cpp	
	File Reference	111
5.88.1	Detailed Description	111
5.89	/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/tablemodelinterface.h	File Reference
	Reference	111
5.89.1	Detailed Description	111
5.90	/home/qinterfly/Library/Projects/Current/QRodSystems/src/render/view3d.cpp	File Reference
	Reference	112
5.90.1	Detailed Description	112
5.91	/home/qinterfly/Library/Projects/Current/QRodSystems/src/render/view3d.h	File Reference
	Reference	112
5.91.1	Detailed Description	112

# Chapter 1

## Hierarchical Index

### 1.1 Class Hierarchy

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

QRS::Core::Array< T > . . . . .	19
QRS::Core::HierarchyNode . . . . .	31
QRS::Core::HierarchyTree . . . . .	32
QDialog	
QRS::Managers::AbstractManager . . . . .	13
QRS::Managers::DataObjectsManager . . . . .	25
QRS::Managers::RodComponentsManager . . . . .	51
QLineEdit	
QRS::Managers::DataObjectLineEdit . . . . .	21
QMainWindow	
QRS::App::MainWindow . . . . .	38
QObject	
QRS::Core::AbstractDataObject . . . . .	9
QRS::Core::MatrixDataObject . . . . .	44
QRS::Core::ScalarDataObject . . . . .	54
QRS::Core::SurfaceDataObject . . . . .	55
QRS::Core::VectorDataObject . . . . .	61
QRS::Core::AbstractRodComponent . . . . .	15
QRS::Core::AbstractSectionRodComponent . . . . .	17
QRS::Core::UserSectionRodComponent . . . . .	58
QRS::Core::GeometryRodComponent . . . . .	29
QRS::Core::LoadRodComponent . . . . .	34
QRS::Core::MaterialRodComponent . . . . .	41
QRS::Core::Project . . . . .	46
QRS::Managers::ManagersFactory . . . . .	40
QOpenGLFunctions	
QRS::Graph::View3D . . . . .	62
QOpenGLWidget	
QRS::Graph::View3D . . . . .	62
QStandardItem	
QRS::HierarchyModels::AbstractHierarchyItem . . . . .	11
QRS::HierarchyModels::DataObjectsHierarchyItem . . . . .	22
QRS::HierarchyModels::RodComponentsHierarchyItem . . . . .	49
QStandardItemModel	
QRS::HierarchyModels::AbstractHierarchyModel . . . . .	12

QRS::HierarchyModels::DataObjectsHierarchyModel . . . . .	23
QRS::HierarchyModels::ProjectHierarchyModel . . . . .	48
QRS::HierarchyModels::RodComponentsHierarchyModel . . . . .	50
QRS::PropertiesModels::DataObjectsPropertiesModel . . . . .	27
QRS::TableModels::BaseTableModel . . . . .	20
QRS::TableModels::MatrixTableModel . . . . .	45
QRS::TableModels::SurfaceTableModel . . . . .	56
QStyledItemDelegate	
QRS::Managers::DoubleSpinBoxItemDelegate . . . . .	28
QTableWidget	
QRS::App::LogWidget . . . . .	37
QWidget	
QRS::App::ManagersTab . . . . .	41
QRS::Managers::AbstractRodComponentWidget . . . . .	16
QRS::Managers::GeometryRodComponentWidget . . . . .	30
QRS::Managers::LoadRodComponentWidget . . . . .	36
QRS::Managers::MaterialRodComponentWidget . . . . .	43
QRS::Managers::UserSectionRodComponentWidget . . . . .	60
QRS::Core::Array< T >::Row< U > . . . . .	53
QRS::TableModels::TableModelInterface . . . . .	57
QRS::TableModels::BaseTableModel . . . . .	20
QRS::TableModels::MatrixTableModel . . . . .	45
QRS::TableModels::SurfaceTableModel . . . . .	56

## Chapter 2

# Class Index

### 2.1 Class List

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

<a href="#">QRS::Core::AbstractDataObject</a>	9
Data object which is designed in the way to be represented in a table easily . . . . .	
<a href="#">QRS::HierarchyModels::AbstractHierarchyItem</a>	11
Item to represent a hierarchy of elements of the same type . . . . .	
<a href="#">QRS::HierarchyModels::AbstractHierarchyModel</a>	12
Hierarchy model which enables one to drag and drop elements of the same type . . . . .	
<a href="#">QRS::Managers::AbstractManager</a>	13
Abstract manager to create objects of different types . . . . .	
<a href="#">QRS::Core::AbstractRodComponent</a>	15
Component of the rod structure which characterizes one of its properties . . . . .	
<a href="#">QRS::Managers::AbstractRodComponentWidget</a>	16
Widget to construct rod components of different types . . . . .	
<a href="#">QRS::Core::AbstractSectionRodComponent</a>	17
General cross section of a rod . . . . .	
<a href="#">QRS::Core::Array&lt; T &gt;</a>	19
Numerical array class . . . . .	
<a href="#">QRS::TableModels::BaseTableModel</a>	20
Table model to represent either a scalar or vector data object . . . . .	
<a href="#">QRS::Managers::DataObjectLineEdit</a>	21
Line edit widget to hold a pointer to a data object . . . . .	
<a href="#">QRS::HierarchyModels::DataObjectsHierarchyItem</a>	22
Item to represent a hierarchy of data objects . . . . .	
<a href="#">QRS::HierarchyModels::DataObjectsHierarchyModel</a>	23
Tree model to represent and modify a hierarchy of data objects . . . . .	
<a href="#">QRS::Managers::DataObjectsManager</a>	25
Manager to create objects of different types: scalars, vectors, matroces and surfaces . . . . .	
<a href="#">QRS::PropertiesModels::DataObjectsPropertiesModel</a>	27
Model to represent properties of selected data objects . . . . .	
<a href="#">QRS::Managers::DoubleSpinBoxItemDelegate</a>	28
Class to specify how table values can be edited . . . . .	
<a href="#">QRS::Core::GeometryRodComponent</a>	29
Geometrical configuration of a rod . . . . .	
<a href="#">QRS::Managers::GeometryRodComponentWidget</a>	30
Widget to construct a geometrical rod component . . . . .	
<a href="#">QRS::Core::HierarchyNode</a>	31
Hierarchy representative . . . . .	

<a href="#">QRS::Core::HierarchyTree</a>	
Hierarchy of data objects (n-array tree)	32
<a href="#">QRS::Core::LoadRodComponent</a>	
Load applied to a rod	34
<a href="#">QRS::Managers::LoadRodComponentWidget</a>	
Widget to construct a load applied to a rod	36
<a href="#">QRS::App::LogWidget</a>	
Log all the messages sent	37
<a href="#">QRS::App::MainWindow</a>	
The main window of the program	38
<a href="#">QRS::Managers::ManagersFactory</a>	
Factory to create managers which utilize and modify project data	40
<a href="#">QRS::App::ManagersTab</a>	
A toolbar consisted of object designers	41
<a href="#">QRS::Core::MaterialRodComponent</a>	
Material properties of a rod	41
<a href="#">QRS::Managers::MaterialRodComponentWidget</a>	
Widget to construct a material rod component	43
<a href="#">QRS::Core::MatrixDataObject</a>	
Matrix data object	44
<a href="#">QRS::TableModels::MatrixTableModel</a>	
Table model to represent a matrix data object	45
<a href="#">QRS::Core::Project</a>	
Project class to interact with a created system of rods	46
<a href="#">QRS::HierarchyModels::ProjectHierarchyModel</a>	
Project hierarchy representative	48
<a href="#">QRS::HierarchyModels::RodComponentsHierarchyItem</a>	
Item to represent a hierarchy of rod components	49
<a href="#">QRS::HierarchyModels::RodComponentsHierarchyModel</a>	
Tree model to represent and modify a hierarchy of rod components	50
<a href="#">QRS::Managers::RodComponentsManager</a>	
Manager to create rod components, such as a geometry, cross section and force	51
<a href="#">QRS::Core::Array&lt; T &gt;::Row&lt; U &gt;</a>	
Proxy class to acquire a row by index	53
<a href="#">QRS::Core::ScalarDataObject</a>	
Scalar data object	54
<a href="#">QRS::Core::SurfaceDataObject</a>	
Surface data object	55
<a href="#">QRS::TableModels::SurfaceTableModel</a>	
Table model to represent a surface data object	56
<a href="#">QRS::TableModels::TableModelInterface</a>	
User interface to add and remove items	57
<a href="#">QRS::Core::UserSectionRodComponent</a>	
Section which properties are defined by user	58
<a href="#">QRS::Managers::UserSectionRodComponentWidget</a>	
Widget to construct a user-defined section of a rod	60
<a href="#">QRS::Core::VectorDataObject</a>	
Vector data object	61
<a href="#">QRS::Graph::View3D</a>	
A widget to represent the resulted rod system	62

## Chapter 3

# File Index

### 3.1 File List

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

/home/qinterfly/Library/Projects/Current/QRodSystems/src/central/ <a href="#">controltabs.cpp</a>	
Implementation of the ControlTabs class . . . . .	63
/home/qinterfly/Library/Projects/Current/QRodSystems/src/central/ <a href="#">controltabs.h</a>	
Declaration of the ControlTabs class . . . . .	63
/home/qinterfly/Library/Projects/Current/QRodSystems/src/central/ <a href="#">logwidget.cpp</a>	
Implementation of the LogWidget class . . . . .	64
/home/qinterfly/Library/Projects/Current/QRodSystems/src/central/ <a href="#">logwidget.h</a>	
Declaration of the LogWidget class . . . . .	65
/home/qinterfly/Library/Projects/Current/QRodSystems/src/central/ <a href="#">mainwindow.cpp</a>	
Implementation of the MainWindow class . . . . .	65
/home/qinterfly/Library/Projects/Current/QRodSystems/src/central/ <a href="#">mainwindow.h</a>	
Declaration of the MainWindow class . . . . .	66
/home/qinterfly/Library/Projects/Current/QRodSystems/src/central/ <a href="#">uiconstants.h</a>	
Common graphical constants shared between several windows . . . . .	67
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">abstractdataobject.cpp</a>	
Implementation of the AbstractDataObject class . . . . .	67
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">abstractdataobject.h</a>	
Declaration of the AbstractDataObject class . . . . .	68
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">abstractrodcomponent.cpp</a>	
Definition of the AbstractRodComponent class . . . . .	68
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">abstractrodcomponent.h</a>	
Declaration of the AbstractRodComponent class . . . . .	69
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">abstractsectionrodcomponent.cpp</a>	
Definition of the AbstractSectionRodComponent class . . . . .	70
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">abstractsectionrodcomponent.h</a>	
Declaration of the AbstractSectionRodComponent class . . . . .	70
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">aliasdata.h</a>	
Specification of data types used in a project . . . . .	71
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">aliasdataset.h</a>	
Specification of types of datasets used in a project . . . . .	71
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">array.cpp</a>	
Implementation of the Array class . . . . .	72
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">array.h</a>	
Declaration of the Array class . . . . .	72
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">geometryrodcomponent.cpp</a>	
Definition of the GeometryRodComponent class . . . . .	73

/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">geometryrodcomponent.h</a>	
Declaration of the GeometryRodComponent class . . . . .	73
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">hierarchyndoe.cpp</a>	
Implementation of the HierarchyNode class . . . . .	74
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">hierarchyndoe.h</a>	
Declaration of the HierarchyNode class . . . . .	74
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">hierarchytree.cpp</a>	
Implementation of the HierarchyTree class . . . . .	75
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">hierarchytree.h</a>	
Declaration of the HierarchyTree class . . . . .	75
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">loadrodcomponent.cpp</a>	
Definition of the LoadRodComponent class . . . . .	76
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">loadrodcomponent.h</a>	
Declaration of the LoadRodComponent class . . . . .	76
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">materialrodcomponent.cpp</a>	
Definition of the MaterialRodComponent class . . . . .	77
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">materialrodcomponent.h</a>	
Declaration of the MaterialRodComponent class . . . . .	77
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">matrixdataobject.cpp</a>	
Implementation of the MatrixDataObject class . . . . .	78
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">matrixdataobject.h</a>	
Declaration of the MatrixDataObject class . . . . .	78
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">project-base.cpp</a>	
Implementation of the Project class . . . . .	79
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">project-io.cpp</a>	
Implementation of the Project class . . . . .	80
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">project.h</a>	
Declaration of the Project class . . . . .	81
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">scalardataobject.cpp</a>	
Implementation of the ScalarDataObject class . . . . .	81
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">scalardataobject.h</a>	
Declaration of the ScalarDataObject class . . . . .	82
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">surfacedataobject.cpp</a>	
Implementation of the SurfaceDataObject class . . . . .	82
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">surfacedataobject.h</a>	
Declaration of the SurfaceDataObject class . . . . .	83
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">usersectionrodcomponent.cpp</a>	
Definition of the UserSectionRodComponent class . . . . .	83
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">usersectionrodcomponent.h</a>	
Declaration of the UserSectionRodComponent class . . . . .	84
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">utilities.cpp</a>	
Implementation of utilities . . . . .	84
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">utilities.h</a>	
Declaration of utilities . . . . .	85
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">vectordataobject.cpp</a>	
Implementation of the VectorDataObject class . . . . .	85
/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/ <a href="#">vectordataobject.h</a>	
Declaration of the VectorDataObject class . . . . .	86
/home/qinterfly/Library/Projects/Current/QRodSystems/src/main/ <a href="#">main.cpp</a>	
The startup function . . . . .	86
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/ <a href="#">abstractmanager.cpp</a>	
Definition of the AbstractManager class . . . . .	87
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/ <a href="#">abstractmanager.h</a>	
Declaration of the AbstractManager class . . . . .	87
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/ <a href="#">abstractrodcomponentwidget.cpp</a>	
Definition of the AbstractRodComponentWidget class . . . . .	88
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/ <a href="#">abstractrodcomponentwidget.h</a>	
Declaration of the AbstractRodComponentWidget class . . . . .	88



/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectlineedit.cpp	
Definition of the DataPointerLineEdit class . . . . .	89
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectlineedit.h	
Declaration of the DataPointerLineEdit class . . . . .	89
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.cpp	
Implementation of the DataObjectsManager class . . . . .	90
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.h	
Declaration of the DataObjectsManager class . . . . .	91
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.cpp	
Implementation of the DoubleSpinBoxItemDelegate class . . . . .	91
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.h	
Declaration of the DoubleSpinBoxItemDelegate class . . . . .	92
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/geometryrodcomponentwidget.cpp	
Definiton of the GeometryComponentWidget class . . . . .	92
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/geometryrodcomponentwidget.h	
Declaration of the GeometryComponentWidget class . . . . .	93
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/loadrodcomponentwidget.cpp	
Definition of the LoadRodComponentWidget class . . . . .	93
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/loadrodcomponentwidget.h	
Declaration of the LoadRodComponentWidget class . . . . .	94
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/managersfactory.cpp	
Definition of the ManagersFactory class . . . . .	94
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/managersfactory.h	
Declaration of the ManagersFactory class . . . . .	95
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/materialrodcomponentwidget.cpp	
Definition of the MaterialRodComponentWidget class . . . . .	96
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/materialrodcomponentwidget.h	
Declaration of the MaterialRodComponentWidget class . . . . .	96
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/rodcomponentsmanager.cpp	
Definition of the RodComponentsManager class . . . . .	97
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/rodcomponentsmanager.h	
Declaration of the RodComponentsManager class . . . . .	98
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/usersectionrodcomponentwidget.cpp	
Definition of the UserSectionRodComponentWidget class . . . . .	98
/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/usersectionrodcomponentwidget.h	
Declaration of the UserSectionRodComponentWidget class . . . . .	99
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchyitem.cpp	
Definition of the AbstractHierarchyItem class . . . . .	99
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchyitem.h	
Declaration of the AbstractHierarchyItem class . . . . .	100
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchymodel.cpp	
Definition of the AbstractHierarchyModel class . . . . .	100
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchymodel.h	
Declaration of the AbstractHierarchyModel class . . . . .	101
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchyitem.cpp	
Definition of the DataObjectsHierarchyItem class . . . . .	101
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchyitem.h	
Declaration of the DataObjectsHierarchyItem class . . . . .	102
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchymodel.cpp	
Definition of the DataObjectsHierarchyModel class . . . . .	102
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/dataobjectshierarchymodel.h	
Declaration of the DataObjectsHierarchyModel class . . . . .	103
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/projecthierarchymodel.cpp	
Definition of the ProjectHierarchyModel class . . . . .	103
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/projecthierarchymodel.h	
Declaration of the ProjectHierarchyModel class . . . . .	104
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchyitem.cpp	
Definition of the RodComponentsHierarchyItem class . . . . .	104

/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchyitem.h	
Declaration of the RodComponentsHierarchyItem class . . . . .	105
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchymodel.cpp	
Definition of the RodComponentsHierarchyModel class . . . . .	106
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/rodcomponentshierarchymodel.h	
Declaration of the RodComponentsHierarchyModel class . . . . .	106
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/properties/dataobjectspropertiesmodel.cpp	
Definition of the DataObjectsPropertiesModel class . . . . .	107
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/properties/dataobjectspropertiesmodel.h	
Declaration of the DataObjectsPropertiesModel class . . . . .	107
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/basetablemodel.cpp	
Implementation of the BaseTableModel class . . . . .	108
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/basetablemodel.h	
Declaration of the BaseTableModel class . . . . .	108
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/matrixtablemodel.cpp	
Implementation of the MatrixTableModel class . . . . .	109
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/matrixtablemodel.h	
Declaration of the MatrixTableModel class . . . . .	109
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/surfacetablemodel.cpp	
Implementation of the SurfaceTableModel class . . . . .	110
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/surfacetablemodel.h	
Declaration of the SurfaceTableModel class . . . . .	110
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/tablemodelinterface.cpp	
Implementation of static functions of TableModelInterface . . . . .	111
/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/tablemodelinterface.h	
Declaration of the TableModelInterface . . . . .	111
/home/qinterfly/Library/Projects/Current/QRodSystems/src/render/view3d.cpp	
Implementation of the View3D class . . . . .	112
/home/qinterfly/Library/Projects/Current/QRodSystems/src/render/view3d.h	
Declaration of the View3D class . . . . .	112

## Chapter 4

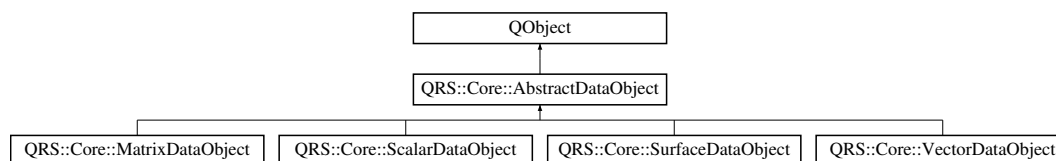
# Class Documentation

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

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

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

Inheritance diagram for QRS::Core::AbstractDataObject:



### Public Types

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

### Public Member Functions

- [AbstractDataObject](#) (ObjectType type, QString const &name)  
*Base constructor.*
- virtual [AbstractDataObject](#) \* **clone** () const =0
- virtual [DataItemType](#) & **addItem** (DataKeyType key)=0
- void [removeItem](#) (DataValueType key)  
*Remove an entity with the specified key.*
- bool [changeItemKey](#) (DataKeyType oldKey, DataKeyType newKey, DataHolder \*items=nullptr)  
*Modify a key existed.*
- DataValueType [getAvailableItemKey](#) (DataValueType key, DataHolder const \*items=nullptr) const
- bool [setArrayValue](#) (DataKeyType key, DataValueType newValue, IndexType iRow=0, IndexType iColumn=0)  
*Set an array value with the specified indices.*
- quint32 **numberOfItems** () const
- DataHolder const & **getItems** ()
- DataIDType **id** () const

- ObjectType **type** () const
- QString const & **name** () const
- void **setName** (QString const &name)
- virtual void **serialize** (QDataStream &stream) const  
*Serialize an abstract data object.*
- virtual void **deserialize** (QDataStream &stream)  
*Partly deserialize an abstract data object.*
- virtual void **import** (QTextStream &stream)=0

## Static Public Member Functions

- static DataIDType **maxObjectID** ()
- static void **setMaxObjectID** (DataIDType iMaxObjectID)

## Protected Attributes

- const ObjectType **mkType**
- 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 designed in the way to be represented in a table easily.

### 4.1.2 Member Function Documentation

#### 4.1.2.1 deserialize()

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

Partly deserialize an abstract data object.

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

Reimplemented in [QRS::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:

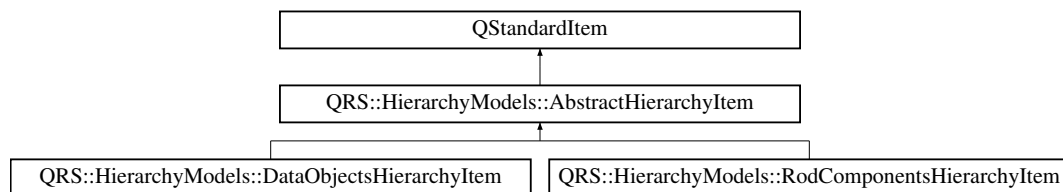
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[abstractdataobject.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[abstractdataobject.cpp](#)

## 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:

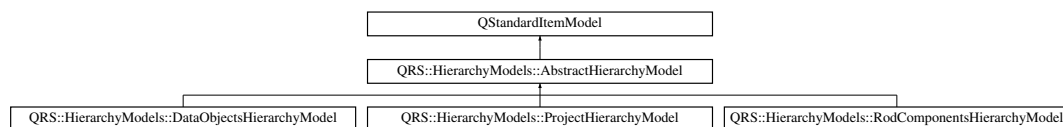
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchyitem.h`
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/abstracthierarchyitem.cpp`

## 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 `hierarchyChanged` ()  
*Emitted when hierarchical elements get renamed, moved or deleted.*

## 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 &indices) const override  
*Encode each item according to a given list of indices.*
- 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:

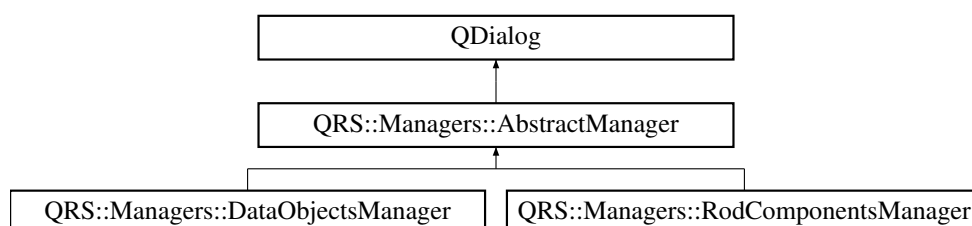
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[abstracthierarchymodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[abstracthierarchymodel.cpp](#)

## 4.4 QRS::Managers::AbstractManager Class Reference

Abstract manager to create objects of different types.

```
#include <abstractmanager.h>
```

Inheritance diagram for QRS::Managers::AbstractManager:



## Public Types

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

## Public Slots

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

## Signals

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

## Public Member Functions

- **AbstractManager** (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 **mkType**
- QString const **mkGroupName**

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

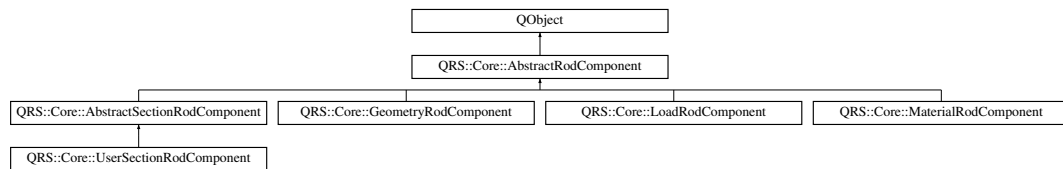


## 4.5 QRS::Core::AbstractRodComponent Class Reference

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** , **kMaterial** , **kLoad** }

### 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, DataObjects const &dataObjects)=0
- virtual void **resolveReferences** (DataObjects const &dataObjects)=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, DataObjects const &dataObjects) const  
*Helper function to retrieve the pointer to the data object by its identifier.*
- **AbstractDataObject** const \* **getDataObject** (DataObjects const &dataObjects, DataIDType id) const  
*Retrieve a data object from a set by id.*
- **AbstractDataObject** const \* **substituteDataObject** (DataObjects const &dataObjects, **AbstractDataObject** const \*pDataObject) const  
*Substitute a data object with its updated version.*

## Protected Attributes

- ComponentType const **mkComponentType**
- 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:

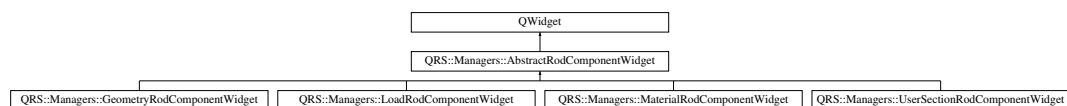
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[abstractrodcomponent.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[abstractrodcomponent.cpp](#)

## 4.6 QRS::Managers::AbstractRodComponentWidget Class Reference

Widget to construct rod components of different types.

```
#include <abstractrodcomponentwidget.h>
```

Inheritance diagram for QRS::Managers::AbstractRodComponentWidget:



## Signals

- void **modified** ()
- void **editDataObjectRequested** (Core::DataIDType id)

## Public Member Functions

- **AbstractRodComponentWidget** (QString const &mimeType, QWidget \*parent=nullptr)

## Protected Attributes

- QString const **mkMimeType**

### 4.6.1 Detailed Description

Widget to construct rod components of different types.

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

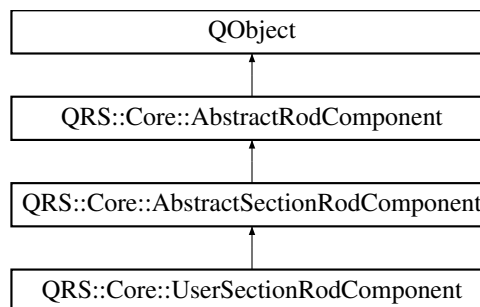
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[abstractrodcomponentwidget.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[abstractrodcomponentwidget.cpp](#)

## 4.7 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, DataObjects const &dataObjects) override  
*Partly deserialize an abstract rod component.*
- void [resolveReferences](#) (DataObjects const &dataObjects) override  
*Resolve references of a cross-section.*
- 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 **mkSectionType**
- QPointer< [ScalarDataObject](#) const > **mpArea**
- QPointer< [ScalarDataObject](#) const > **mpInertiaMomentTorsional**
- QPointer< [ScalarDataObject](#) const > **mpInertiaMomentX**
- QPointer< [ScalarDataObject](#) const > **mpInertiaMomentY**
- QPointer< [ScalarDataObject](#) const > **mpCenterCoordinateX**
- QPointer< [ScalarDataObject](#) const > **mpCenterCoordinateY**

## Static Protected Attributes

- static quint32 **smNumInstances** = 0

### 4.7.1 Detailed Description

General cross section of a rod.

### 4.7.2 Member Function Documentation

#### 4.7.2.1 deserialize()

```
void AbstractSectionRodComponent::deserialize (
    QDataStream & stream,
    DataObjects const & dataObjects ) [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](#)

## 4.8 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.*

### 4.8.1 Detailed Description

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

Numerical array class.

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

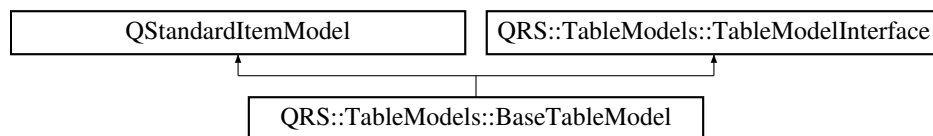
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.h
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.cpp

## 4.9 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 **removeSelectedItem** (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

### 4.9.1 Detailed Description

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

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

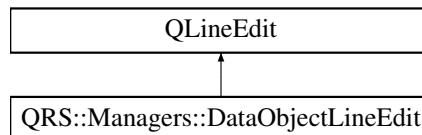
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/basetablemodel.h`
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/basetablemodel.cpp`

## 4.10 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 **selected** (`Core::AbstractDataObject` const \*pDataObject)
- void **editRequested** (`Core::DataIDType` id)

## 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 **reset** ()  
*Erase the address of the data object.*
- void **edit** ()  
*Try to edit a data object through managers.*

## 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.*
- void [mouseDoubleClickEvent](#) (QMouseEvent \*pEvent) override  
*Start the editing session when a double click event occurs.*

## Private Attributes

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

### 4.10.1 Detailed Description

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

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

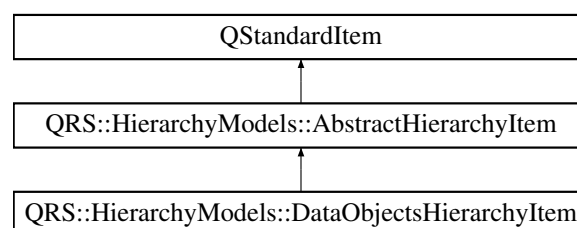
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectlineedit.h>
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectlineedit.cpp>

## 4.11 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

### 4.11.1 Detailed Description

Item to represent a hierarchy of data objects.

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

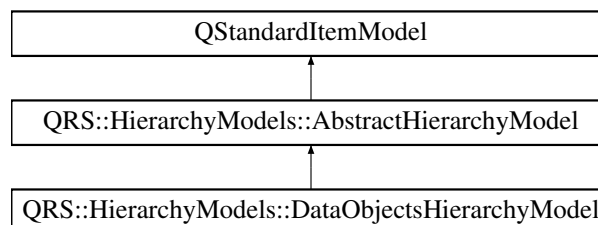
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[dataobjectshierarchyitem.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[dataobjectshierarchyitem.cpp](#)

## 4.12 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 objects to represent.*
- void [selectItem](#) (int iRow)  
*Select an item by row index.*
- void [selectItemByID](#) (Core::DataIDType id)  
*Select an item by type and identifier.*

## Private Slots

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

## Private Member Functions

- [DataObjectsHierarchyItem](#) \* [findItemByID](#) ([DataObjectsHierarchyItem](#) \*pltem, Core::DataIDType const &id)  
*Find an item by identifier.*
- void [selectItem](#) ([DataObjectsHierarchyItem](#) \*pltem)  
*Select a specified item.*

## Private Attributes

- Core::DataObjects & **mDataObjects**
- [Core::HierarchyTree](#) & **mHierarchyDataObjects**

## Additional Inherited Members

### 4.12.1 Detailed Description

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

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

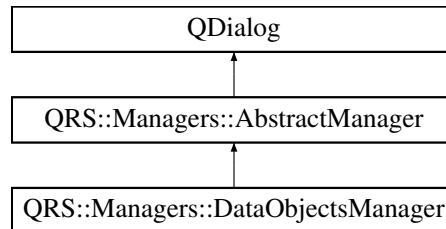
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[dataobjectshierarchymodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[dataobjectshierarchymodel.cpp](#)

## 4.13 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 **applied** (Core::DataObjects const &dataObjects, **Core::HierarchyTree** const &hierarchyDataObjects)

### 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.*
- void **selectDataObjectByID** (Core::DataIDType id)  
*Select a data object by identifier.*
- Core::DataObjects const & **getDataObjects** ()

## Private Member Functions

- void [createContent](#) ()  
*Create all the widgets.*
- ads::CDockWidget \* [createDataTableWidget](#) ()  
*Create a tabbed widget to interact with data tables.*
- ads::CDockWidget \* [createHierarchyWidget](#) ()  
*Create an object to represent a hierarchy of data objects.*
- QLayout \* [createDialogControls](#) ()  
*Create dialog controls.*
- void [emplaceDataObject](#) (Core::AbstractDataObject \*pDataObject)  
*Helper function to insert data objects into the manager.*
- bool [isDataTableModifiable](#) ()  
*Helper function to check if it is possible to interact with data object content.*
- void [importDataObject](#) (QString const &path, QString const &fileName)  
*Import a data object from a file.*
- void [representDataObject](#) (Core::DataIDType id)  
*Represent a selected data object according to its type.*
- void [clearDataObjectRepresentation](#) ()  
*Clear a visual data of a data object.*

## Private Attributes

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

## Additional Inherited Members

### 4.13.1 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:

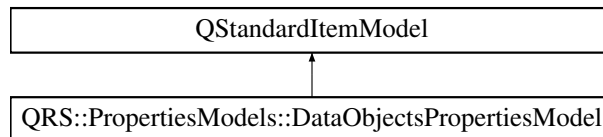
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.cpp](#)

## 4.14 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** ()

### Public Member Functions

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

### Private Slots

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

### Private Member Functions

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

### Private Attributes

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

### 4.14.1 Detailed Description

Model to represent properties of selected data objects.

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

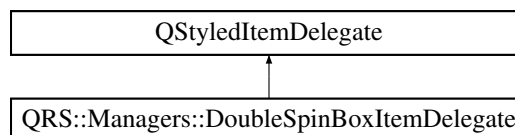
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/models/properties/dataobjectspropertiesmodel.h>
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/models/properties/dataobjectspropertiesmodel.cpp>

## 4.15 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.*

### 4.15.1 Detailed Description

Class to specify how table values can be edited.

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

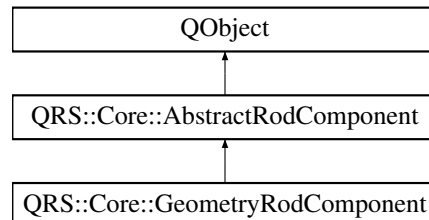
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.h>
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.cpp>

## 4.16 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  
*Check whether the component data is complete.*
- 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, DataObjects const &dataObjects) override  
*Deserialize a geometrical component.*
- void **resolveReferences** (DataObjects const &dataObjects) override  
*Resolve references of a geometrical rod 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

### 4.16.1 Detailed Description

Geometrical configuration of a rod.

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

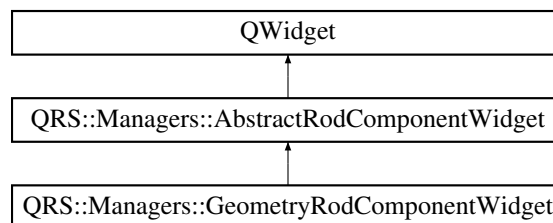
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/geometryrodcomponent.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/geometryrodcomponent.cpp](#)

## 4.17 QRS::Managers::GeometryRodComponentWidget Class Reference

Widget to construct a geometrical rod component.

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

Inheritance diagram for QRS::Managers::GeometryRodComponentWidget:



## 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

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



## Additional Inherited Members

### 4.17.1 Detailed Description

Widget to construct a geometrical rod component.

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](#)

## 4.18 QRS::Core::HierarchyNode Class Reference

Hierarchy representative.

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

### Public Types

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

### Public Member Functions

- [HierarchyNode](#) (NodeType type, QVariant value)  
*Node constructor.*
- void [appendChild](#) ([HierarchyNode](#) \*node)  
*Add a child node.*
- bool **hasParent** () const
- bool **hasChild** () const
- bool **hasNextSibling** () const
- [HierarchyNode](#) \* **parent** ()
- [HierarchyNode](#) \* **firstChild** ()
- [HierarchyNode](#) \* **nextSibling** ()
- NodeType **type** () const
- QVariant & **value** ()
- [HierarchyNode](#) \* [groupNodes](#) ([HierarchyNode](#) \*pChildNode)  
*Merge two nodes into one entity.*
- bool [setBefore](#) ([HierarchyNode](#) \*pSetNode)  
*Set a given node before the current one.*
- bool [setAfter](#) ([HierarchyNode](#) \*pSetNode)  
*Set a given node after the current one.*
- quint32 [numberChildren](#) () const  
*Retrieve a number of children of the current node.*

## Private Member Functions

- void `excludeNodeFromHierarchy` ()  
*Remove all links to the node.*
- bool `isSetAllowed` (`HierarchyNode` const \*pNode) const  
*Check whether it is possible to place a given item before or after the current one.*
- bool `isParentOf` (`HierarchyNode` const \*pNode) const  
*Check whether the current item contains a given node as a child.*
- quint32 `countNodes` (`HierarchyNode` \*pNode, quint32 &numNodes) const  
*Count all children and siblings of a given node.*

## Private Attributes

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

## Friends

- class `HierarchyTree`

### 4.18.1 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](#)

## 4.19 QRS::Core::HierarchyTree Class Reference

Hierarchy of data objects (n-array tree)

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

## Public Member Functions

- [HierarchyTree](#) ()  
*Base tree constructor.*
- [HierarchyTree](#) ([HierarchyTree](#) &another)  
*Copy constructor.*
- [HierarchyTree](#) ([HierarchyTree](#) &&another)  
*Move constructor.*
- [HierarchyTree](#) ([HierarchyNode](#) \*pRootNode)  
*Take the user defined node as the root.*
- [HierarchyTree](#) (QDataStream &stream, int numNodes)  
*Read a tree from a stream.*
- [HierarchyTree](#) & [operator=](#) ([HierarchyTree](#) const &another)  
*Copy assignment operator.*
- [HierarchyTree](#) & [operator=](#) ([HierarchyTree](#) &&another)  
*Move assignment operator.*
- [~HierarchyTree](#) ()  
*Tree destructor.*
- void [clear](#) ()  
*Delete all nodes except the root node.*
- void [appendNode](#) ([HierarchyNode](#) \*pNode)  
*Append a node to the root node.*
- bool [removeNode](#) ([HierarchyNode::NodeType](#) type, QVariant const &value)  
*Remove a node by type and value.*
- void [removeNode](#) ([HierarchyNode](#) \*pNode)  
*Remove a node and all its subnodes.*
- void [changeNodeValue](#) ([HierarchyNode::NodeType](#) type, QVariant const &oldValue, QVariant const &newValue)  
*Change the value of a node.*
- [HierarchyNode](#) \* [root](#) ()
- [HierarchyTree](#) [clone](#) () const  
*Clone a tree.*
- [HierarchyNode](#) \* [findNode](#) ([HierarchyNode](#) \*pBaseNode, [HierarchyNode::NodeType](#) type, QVariant const &value) const  
*Find a node by type and value.*
- quint32 [size](#) () const  
*Get a number of nodes.*

## Private Member Functions

- [HierarchyNode](#) \* [copyNode](#) ([HierarchyNode](#) \*pBaseNode, quint32 relativeLevel) const  
*Copy a node.*
- void [removeNodeSiblings](#) ([HierarchyNode](#) \*pNode)  
*Remove all subnodes.*
- void [printNode](#) (quint32 level, [HierarchyNode](#) \*pNode, QDebug stream) const  
*Print a current node and all its subnodes.*
- void [writeNode](#) ([HierarchyNode](#) \*pNode, QDataStream &stream) const  
*Print a current node and all its subnodes.*

## Private Attributes

- `HierarchyNode * mpRootNode = nullptr`

## Friends

- `QDebug operator<< (QDebug stream, HierarchyTree &tree)`  
*Print a tree structure.*
- `QDataStream & operator<< (QDataStream &stream, HierarchyTree const &tree)`  
*Write a tree structure to a stream.*

### 4.19.1 Detailed Description

Hierarchy of data objects (n-array tree)

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

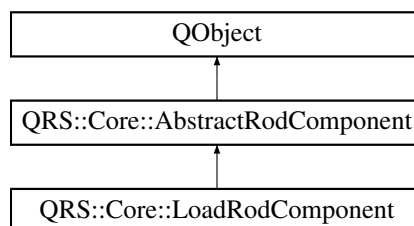
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/hierarchytree.h`
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/hierarchytree.cpp`

## 4.20 QRS::Core::LoadRodComponent Class Reference

Load applied to a rod.

```
#include <loadrodcomponent.h>
```

Inheritance diagram for QRS::Core::LoadRodComponent:



## Public Types

- `enum LoadType {`  
`kNone , kForcedDisplacements , kForcedRotations , kPointForce ,`  
`kPointMoment , kPointMass , kPointInertiaMoment , kPointLinearDamper ,`  
`kPointRotationalDamper , kDistributedForce , kDistributedMoment , kAerodynamicFlow ,`  
`kAcceleration , kInnerLiquidFlow , kDisplacementDamping , kRotationDamping }`

## Public Member Functions

- **LoadRodComponent** (QString const &name)
- **~LoadRodComponent** ()  
*Decrease a number of instances while being destroyed.*
- **AbstractRodComponent \* clone** () const override  
*Clone a rod load.*
- **bool isDataComplete** () const override  
*Check whether the component data is complete.*
- **void serialize** (QDataStream &stream) const override  
*Serialize all properties of a rod load.*
- **void deserialize** (QDataStream &stream, DataObjects const &dataObjects) override  
*Deserialize a rod load.*
- **void resolveReferences** (DataObjects const &dataObjects) override  
*Resolve references of a rod load.*
- **LoadType loadType** () const
- **VectorDataObject const \* directionVector** () const
- **ScalarDataObject const \* loadGraph** () const
- **ScalarDataObject const \* timeCoefficient** () const
- **VectorDataObject const \* timeRotationVector** () const
- **DataValueType multiplier** () const
- **void setType** (LoadType type)
- **void setDirectionVector** (VectorDataObject const \*pDirectionVector)
- **void setLoadGraph** (ScalarDataObject const \*pLoadGraph)
- **void setTimeCoefficient** (ScalarDataObject const \*pTimeCoefficient)
- **void setTimeRotationVector** (VectorDataObject const \*pTimeRotationVector)
- **void setMultiplier** (DataValueType value)

## Static Public Member Functions

- **static quint32 numberInstances** ()

## Private Attributes

- **LoadType mLoadType** = kNone
- **QPointer< VectorDataObject const > mpDirectionVector**
- **QPointer< ScalarDataObject const > mpLoadGraph**
- **QPointer< ScalarDataObject const > mpTimeCoefficient**
- **QPointer< VectorDataObject const > mpTimeRotationVector**
- **DataValueType mMultiplier** = 1.0

## Static Private Attributes

- **static quint32 smNumInstances** = 0

## Additional Inherited Members

### 4.20.1 Detailed Description

Load applied to a rod.

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

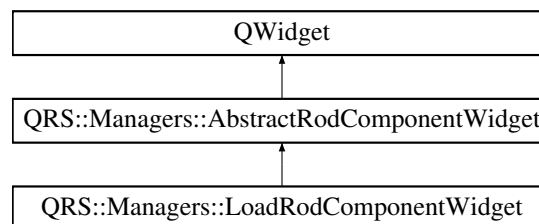
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/loadrodcomponent.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/loadrodcomponent.cpp](#)

## 4.21 QRS::Managers::LoadRodComponentWidget Class Reference

Widget to construct a load applied to a rod.

```
#include <loadrodcomponentwidget.h>
```

Inheritance diagram for QRS::Managers::LoadRodComponentWidget:



## Public Member Functions

- **LoadRodComponentWidget** ([Core::LoadRodComponent](#) &loadRodComponent, QString const &mime←  
Type, QWidget \*parent=nullptr)

## Private Member Functions

- void [createContent](#) ()  
*Create all the widgets.*
- QComboBox \* [createLoadTypeComboBox](#) ()  
*Create a combobox to specify a type of load.*
- QLayout \* [createBaseLayout](#) ()  
*Create a layout consisted of widgets to set loading parameters.*
- QWidget \* [createTimeGroup](#) ()  
*Create a group of widgets which depend on time.*
- template<typename T >  
void [setProperty](#) ([Core::AbstractDataObject](#) const \*pDataObject, auto setFun)  
*Set a property of a rod load.*

## Private Attributes

- [Core::LoadRodComponent](#) & `mLoadRodComponent`

## Additional Inherited Members

### 4.21.1 Detailed Description

Widget to construct a load applied to a rod.

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

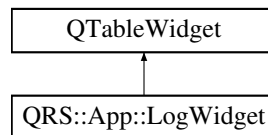
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/loadrodcomponentwidget.h>
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/loadrodcomponentwidget.cpp>

## 4.22 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.*

### 4.22.1 Detailed Description

Log all the messages sent.

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

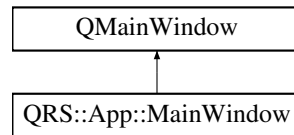
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/central/logwidget.h>
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/central/logwidget.cpp>

## 4.23 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 [setModified](#) (bool flag)  
*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 obercts.*
- 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**

### 4.23.1 Detailed Description

The main window of the program.

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

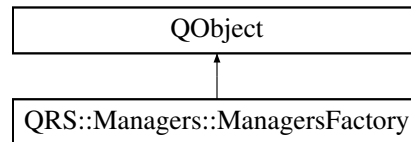
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/[mainwindow.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/[mainwindow.cpp](#)

## 4.24 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](#) (AbstractManager::ManagerType type)  
*Create a manager according to a given type.*
- bool [deleteManager](#) (AbstractManager::ManagerType type)  
*Destroy a manager by given type.*
- [AbstractManager](#) \* [manager](#) (AbstractManager::ManagerType type)  
*Retrieve a manager of a given type.*

### Private Member Functions

- void [specifyConnections](#) ([DataObjectsManager](#) \*pManager)  
*Specify connections of the manager of data objects.*
- void [specifyConnections](#) ([RodComponentsManager](#) \*pManager)  
*Specify connections of the manager of rod components.*

### Private Attributes

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

#### 4.24.1 Detailed Description

Factory to create managers which utilize and modify project data.

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

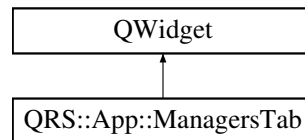
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[managersfactory.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[managersfactory.cpp](#)

## 4.25 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.*

#### 4.25.1 Detailed Description

A toolbar consisted of object designers.

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

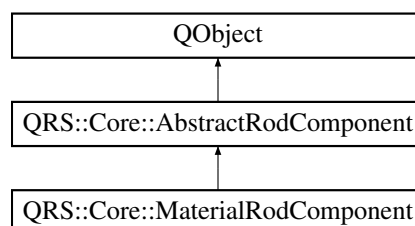
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/[controltabs.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/[controltabs.cpp](#)

## 4.26 QRS::Core::MaterialRodComponent Class Reference

Material properties of a rod.

```
#include <materialrodcomponent.h>
```

Inheritance diagram for QRS::Core::MaterialRodComponent:



## Public Member Functions

- **MaterialRodComponent** (QString const &name)
- [~MaterialRodComponent](#) ()  
*Decrease a number of instances while being destroyed.*
- [AbstractRodComponent](#) \* **clone** () const override  
*Clone a material rod component.*
- bool **isDataComplete** () const override  
*Check whether the component data is complete.*
- void **serialize** (QDataStream &stream) const override  
*Serialize all properties of a material component.*
- void **deserialize** (QDataStream &stream, DataObjects const &dataObjects) override  
*Deserialize a material component.*
- void **resolveReferences** (DataObjects const &dataObjects) override  
*Resolve references of a material rod component.*
- [ScalarDataObject](#) const \* **elasticModulus** () const
- [ScalarDataObject](#) const \* **shearModulus** () const
- [ScalarDataObject](#) const \* **poissonsRatio** () const
- [ScalarDataObject](#) const \* **density** () const
- void **setElasticModulus** ([ScalarDataObject](#) const \*pElasticModulus)
- void **setShearModulus** ([ScalarDataObject](#) const \*pShearModulus)
- void **setPoissonsRatio** ([ScalarDataObject](#) const \*pPoissonsRatio)
- void **setDensity** ([ScalarDataObject](#) const \*pDensity)

## Static Public Member Functions

- static quint32 **numberInstances** ()

## Private Attributes

- QPointer< [ScalarDataObject](#) const > **mpElasticModulus**
- QPointer< [ScalarDataObject](#) const > **mpShearModulus**
- QPointer< [ScalarDataObject](#) const > **mpPoissonsRatio**
- QPointer< [ScalarDataObject](#) const > **mpDensity**

## Static Private Attributes

- static quint32 **smNumInstances** = 0

## Additional Inherited Members

### 4.26.1 Detailed Description

Material properties of a rod.

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

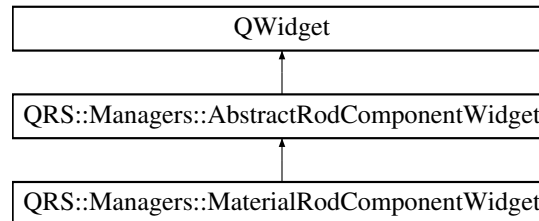
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[materialrodcomponent.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[materialrodcomponent.cpp](#)

## 4.27 QRS::Managers::MaterialRodComponentWidget Class Reference

Widget to construct a material rod component.

```
#include <materialrodcomponentwidget.h>
```

Inheritance diagram for QRS::Managers::MaterialRodComponentWidget:



### Public Member Functions

- **MaterialRodComponentWidget** ([Core::MaterialRodComponent](#) &materialRodComponent, QString const &mimeType, QWidget \*parent=nullptr)

### Private Member Functions

- void [createContent](#) ()  
*Create all the widgets.*
- QWidget \* [createModuliWidget](#) ()  
*Create a group consisted of widgets to set physical moduli.*
- QLayout \* [createBaseLayout](#) ()  
*Create a layout consisted of widgets to set density and Poisson's ratio.*
- void [setProperty](#) ([Core::AbstractDataObject](#) const \*pDataObject, auto setFun)  
*Set a material property which takes a scalar data object.*

### Private Attributes

- [Core::MaterialRodComponent](#) & **mMaterialRodComponent**

### Additional Inherited Members

#### 4.27.1 Detailed Description

Widget to construct a material rod component.

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

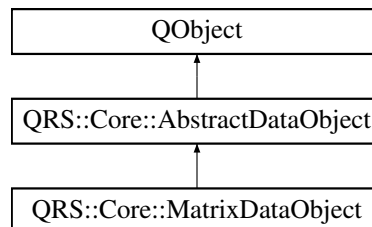
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[materialrodcomponentwidget.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[materialrodcomponentwidget.cpp](#)

## 4.28 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

#### 4.28.1 Detailed Description

Matrix data object.

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

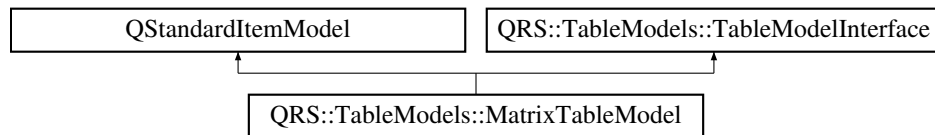
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[matrixdataobject.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[matrixdataobject.cpp](#)

## 4.29 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

#### 4.29.1 Detailed Description

Table model to represent a matrix data object.

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

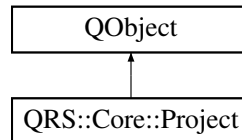
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/[matrixtablemodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/[matrixtablemodel.cpp](#)

## 4.30 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 [setDataObjects](#) (QRS::Core::DataObjects const &dataObjects, [QRS::Core::HierarchyTree](#) const &hierarchyDataObjects)  
*Substitute current data objects with new ones.*
- void [setRodComponents](#) (QRS::Core::RodComponents const &rodComponents, [QRS::Core::HierarchyTree](#) const &hierarchyRodComponents)  
*Substitute current rod components with new ones.*

### Signals

- void **dataObjectsSubstituted** ()
- void **propertiesDataObjectsChanged** ()
- void **rodComponentsSubstituted** ()
- void **propertiesRodComponentsChanged** ()
- void **projectHierarchyChanged** ()

### 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.*
- 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.*



- [AbstractRodComponent](#) \* [addMaterial](#) ()  
*Add a material rod component.*
- [AbstractRodComponent](#) \* [addLoad](#) ()  
*Add a rod load.*
- 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.*

## Private Attributes

- quint32 [mID](#)  
*Unique project identifier.*
- QString [mName](#)  
*Project name.*
- QString [mFilePath](#)  
*Path to a file where a project is stored.*
- 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](#)

### 4.30.1 Detailed Description

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

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

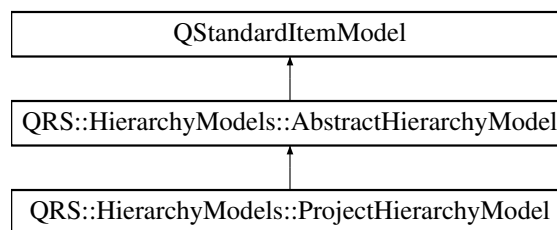
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project-base.cpp](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/project-io.cpp](#)

## 4.31 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

### 4.31.1 Detailed Description

Project hierarchy representative.

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

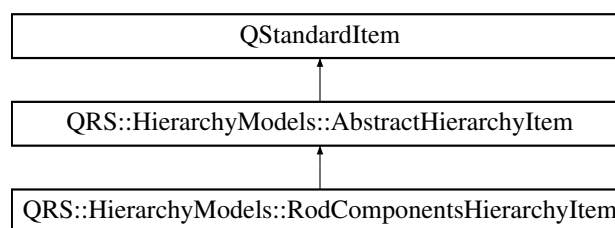
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[projecthierarchymodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[projecthierarchymodel.cpp](#)

## 4.32 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, [Core::RodComponents](#), [QString](#) const &text="Root", [QIcon](#) const &icon=[QIcon](#)())  
*Create the representative of the structure of rod components.*
- [RodComponentsHierarchyItem](#) ([Core::HierarchyNode](#) \*pNode, [Core::AbstractRodComponent](#) \*pRodComponent)  
*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

### 4.32.1 Detailed Description

Item to represent a hierarchy of rod components.

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

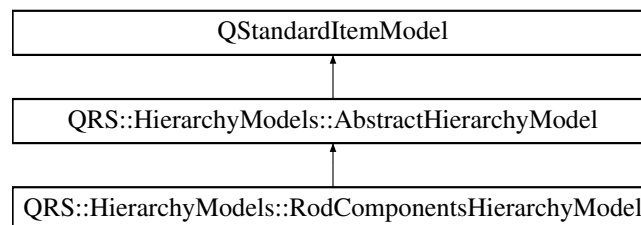
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[rodcomponentshierarchyitem.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[rodcomponentshierarchyitem.cpp](#)

## 4.33 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 objects to represent.*
- void [selectItem](#) (int iRow)  
*Select an item by row index.*

## Private Slots

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

## Private Attributes

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

## Additional Inherited Members

### 4.33.1 Detailed Description

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

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

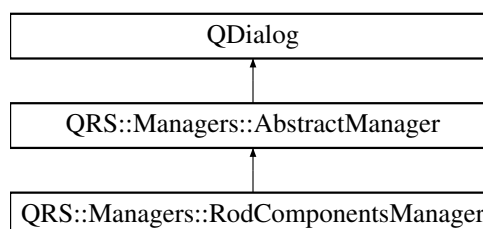
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[rodcomponentshierarchymodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/hierarchy/[rodcomponentshierarchymodel.cpp](#)

## 4.34 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 section↵  
Type)  
*Add a cross section.*
- [Core::AbstractRodComponent](#) \* [addMaterial](#) ()  
*Add a material component.*
- [Core::AbstractRodComponent](#) \* [addLoad](#) ()  
*Add a rod load.*
- void [resolveRodComponentsReferences](#) ()  
*Resolve references of rod components.*

## Signals

- void **applied** (Core::RodComponents const &rodComponents, [Core::HierarchyTree](#) const &hierarchyRod↵  
Components)
- void **editDataObjectRequested** (Core::DataIDType id)

## Public Member Functions

- **RodComponentsManager** (Core::DataObjects &dataObjects, [Core::HierarchyTree](#) &hierarchyData↵  
Objects, 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

### 4.34.1 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](#)

## 4.35 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`

### 4.35.1 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:

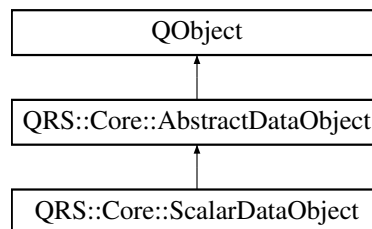
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/core/array.h`

## 4.36 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

### 4.36.1 Detailed Description

Scalar data object.

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

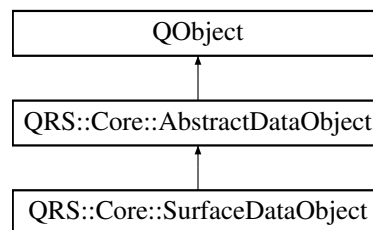
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/core/scalardataobject.h>
- </home/qinterfly/Library/Projects/Current/QRodSystems/src/core/scalardataobject.cpp>

## 4.37 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

### 4.37.1 Detailed Description

Surface data object.

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

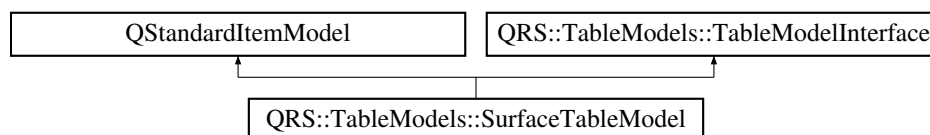
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[surfacedataobject.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[surfacedataobject.cpp](#)

## 4.38 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

### 4.38.1 Detailed Description

Table model to represent a surface data object.

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

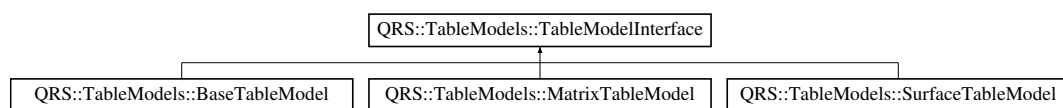
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/[surfacetablemodel.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/[surfacetablemodel.cpp](#)

## 4.39 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 a key.*
- static `QList< QStandardItem * > prepareRow` (QString const &name, `Core::Array< double > const &array`, quint32 iRow)  
*Helper function to copy a row from an array and associate it with a name.*
- static `QStandardItem * makeLabelItem` (QString const &name)  
*Helper function to create an item which holds a string and cannot be modified.*

### 4.39.1 Detailed Description

User interface to add and remove items.

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

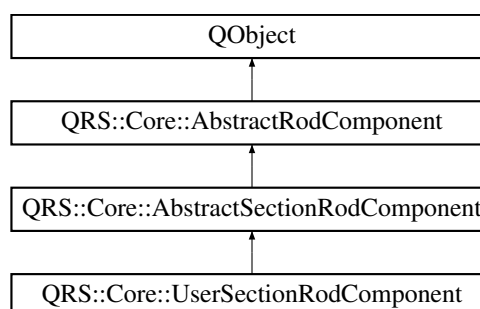
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/tablemodelinterface.h`
- `/home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/tablemodelinterface.cpp`

## 4.40 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 \* **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 **setCenterCoordinateX** ([ScalarDataObject](#) const \*pCenterCoordinateX)
- void **setCenterCoordinateY** ([ScalarDataObject](#) const \*pCenterCoordinateY)

## Additional Inherited Members

### 4.40.1 Detailed Description

Section which properties are defined by user.

### 4.40.2 Member Function Documentation

#### 4.40.2.1 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:

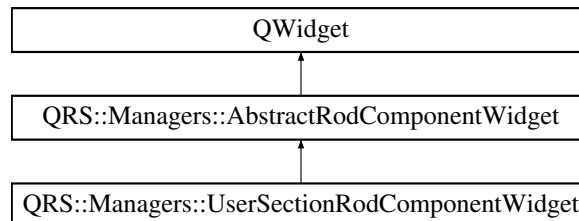
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[usersectionrodcomponent.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[usersectionrodcomponent.cpp](#)

## 4.41 QRS::Managers::UserSectionRodComponentWidget Class Reference

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

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

Inheritance diagram for QRS::Managers::UserSectionRodComponentWidget:



### 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 [setProperty](#) ([Core::AbstractDataObject](#) const \*pDataObject, auto setFun)  
*Set a section property which takes a scalar data object.*

### Private Attributes

- [Core::UserSectionRodComponent](#) & **mUserSectionRodComponent**

### Additional Inherited Members

#### 4.41.1 Detailed Description

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

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

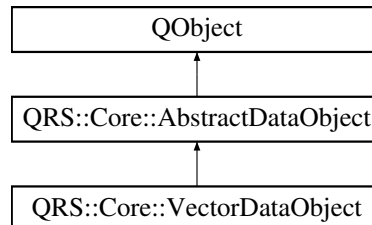
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[usersectionrodcomponentwidget.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/[usersectionrodcomponentwidget.cpp](#)

## 4.42 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

#### 4.42.1 Detailed Description

Vector data object.

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

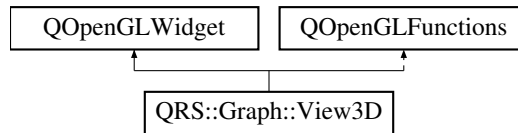
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[vectordataobject.h](#)
- /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/[vectordataobject.cpp](#)

## 4.43 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**

#### 4.43.1 Detailed Description

A widget to represent the resulted rod system.

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

- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/render/view3d.h](#)
- [/home/qinterfly/Library/Projects/Current/QRodSystems/src/render/view3d.cpp](#)



## Chapter 5

# File Documentation

### 5.1 [/home/qinterfly/Library/Projects/Current/QRod↵](#) Systems/src/central/controltabs.cpp File Reference

Implementation of the ControlTabs class.

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

#### 5.1.1 Detailed Description

Implementation of the ControlTabs class.

Author

Pavel Lakiza

Date

March 2021

### 5.2 [/home/qinterfly/Library/Projects/Current/QRod↵](#) Systems/src/central/controltabs.h File Reference

Declaration of the ControlTabs class.

```
#include <QWidget>
```

## Classes

- class [QRS::App::ManagersTab](#)

*A toolbar consisted of object designers.*

### 5.2.1 Detailed Description

Declaration of the ControlTabs class.

#### Author

Pavel Lakiza

#### Date

March 2021

## 5.3 /home/qinterfly/Library/Projects/Current/QRod← Systems/src/central/logwidget.cpp File Reference

Implementation of the LogWidget class.

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

## Enumerations

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

### 5.3.1 Detailed Description

Implementation of the LogWidget class.

#### Author

Pavel Lakiza

#### Date

May 2021

## 5.4 /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/logwidget.h File Reference

Declaration of the LogWidget class.

```
#include <QTableWidget>
```

### Classes

- class [QRS::App::LogWidget](#)  
*Log all the messages sent.*

### 5.4.1 Detailed Description

Declaration of the LogWidget class.

#### Author

Pavel Lakiza

#### Date

May 2021

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

Implementation of the MainWindow class.

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

### 5.5.1 Detailed Description

Implementation of the MainWindow class.

Author

Pavel Lakiza

Date

May 2021

## 5.6 /home/qinterfly/Library/Projects/Current/QRod↔ Systems/src/central/mainwindow.h File Reference

Declaration of the MainWindow class.

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

### Classes

- class [QRS::App::MainWindow](#)  
*The main window of the program.*

### Functions

- void [QRS::App::throwMessage](#) (QtMsgType type, const QMessageLogContext &, const QString &message)  
*Log all the messages.*

### 5.6.1 Detailed Description

Declaration of the MainWindow class.

Author

Pavel Lakiza

Date

May 2021

## 5.7 /home/qinterfly/Library/Projects/Current/QRodSystems/src/central/uiconstants.h File Reference

Common graphical constants shared between several windows.

```
#include <QString>
```

### Variables

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

### 5.7.1 Detailed Description

Common graphical constants shared between several windows.

#### Author

Pavel Lakiza

#### Date

April 2021

## 5.8 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/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 designed in the way to be represented in a table easily.*

### Typedefs

- using [QRS::Core::DataItemType](#) = Array< DataValueType >
- using [QRS::Core::DataHolder](#) = std::map< DataKeyType, DataItemType >

### Functions

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

#### 5.9.1 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

July 2021

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

Declaration of the AbstractRodComponent class.

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

### Classes

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

### 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

July 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

July 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

July 2021



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

Specification of data types used in a project.

```
#include <QtGlobal>
```

### Typedefs

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

#### 5.14.1 Detailed Description

Specification of data types used in a project.

##### Author

Pavel Lakiza

##### Date

May 2021

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

Specification of types of datasets used in a project.

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

### Typedefs

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

#### 5.15.1 Detailed Description

Specification of types of datasets used in a project.

##### Author

Pavel Lakiza

##### Date

June 2021

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

Implementation of the Array class.

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

### 5.16.1 Detailed Description

Implementation of the Array class.

Author

Pavel Lakiza

Date

March 2021

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

Declaration of the Array class.

```
#include <QDebug>
```

### Classes

- class [QRS::Core::Array< T >](#)  
*Numerical array class.*
- struct [QRS::Core::Array< T >::Row< U >](#)  
*Proxy class to acquire a row by index.*

### Typedefs

- using [QRS::Core::IndexType](#) = quint32

### Functions

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

### 5.17.1 Detailed Description

Declaration of the Array class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.18 /home/qinterfly/Library/Projects/Current/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

July 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/QRodSystems/src/core/hierarchytree.cpp File Reference

Implementation of the HierarchyTree class.

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

### 5.22.1 Detailed Description

Implementation of the HierarchyTree class.

Author

Pavel Lakiza

Date

June 2021

## 5.23 /home/qinterfly/Library/Projects/Current/QRodSystems/src/core/hierarchytree.h File Reference

Declaration of the HierarchyTree class.

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

### Classes

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

## Functions

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

### 5.23.1 Detailed Description

Declaration of the HierarchyTree class.

#### Author

Pavel Lakiza

#### Date

June 2021

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

Definition of the LoadRodComponent class.

```
#include "loadrodcomponent.h"
#include "scalardataobject.h"
#include "vectordataobject.h"
```

### 5.24.1 Detailed Description

Definition of the LoadRodComponent class.

#### Author

Pavel Lakiza

#### Date

July 2021

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

Declaration of the LoadRodComponent class.

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

## Classes

- class [QRS::Core::LoadRodComponent](#)  
*Load applied to a rod.*

### 5.25.1 Detailed Description

Declaration of the LoadRodComponent class.

#### Author

Pavel Lakiza

#### Date

July 2021

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

Definition of the MaterialRodComponent class.

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

### 5.26.1 Detailed Description

Definition of the MaterialRodComponent class.

#### Author

Pavel Lakiza

#### Date

July 2021

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

Declaration of the MaterialRodComponent class.

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

## Classes

- class [QRS::Core::MaterialRodComponent](#)  
*Material properties of a rod.*

### 5.27.1 Detailed Description

Declaration of the MaterialRodComponent class.

#### Author

Pavel Lakiza

#### Date

July 2021

## 5.28 [/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

### 5.28.1 Detailed Description

Implementation of the MatrixDataObject class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.29 [/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.*

### 5.29.1 Detailed Description

Declaration of the MatrixDataObject class.

Author

Pavel Lakiza

Date

April 2021

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

Implementation of the Project class.

```
#include <QRandomGenerator>
#include "project.h"
#include "scalarsdataobject.h"
#include "vectordataobject.h"
#include "matrixdataobject.h"
#include "surfacedataobject.h"
#include "geometryrodcomponent.h"
#include "usersectionrodcomponent.h"
#include "materialrodcomponent.h"
#include "loadrodcomponent.h"
```

## Functions

- `template<typename T >`  
`void clearDataMap (std::unordered_map< DataIDType, T * > &dataMap)`  
*Helper function to clear a map consisted of data pointers.*
- `AbstractDataObject * createDataObject (AbstractDataObject::ObjectType type)`  
*Helper function to create DataObject instance by a type and name.*

### 5.30.1 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

## 5.31 /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 "materialrodcomponent.h"
#include "loadrodcomponent.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.*

#### 5.31.1 Detailed Description

Implementation of the Project class.

##### Author

Pavel Lakiza

##### Date

June 2021

Implementation of the methods to operate with input/output streams

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

Declaration of the Project class.

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

### Classes

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

#### 5.32.1 Detailed Description

Declaration of the Project class.

Author

Pavel Lakiza

Date

June 2021

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

Implementation of the ScalarDataObject class.

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

#### 5.33.1 Detailed Description

Implementation of the ScalarDataObject class.

Author

Pavel Lakiza

Date

June 2021

## 5.34 /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.*

#### 5.34.1 Detailed Description

Declaration of the ScalarDataObject class.

Author

Pavel Lakiza

Date

April 2021

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

Implementation of the SurfaceDataObject class.

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

#### 5.35.1 Detailed Description

Implementation of the SurfaceDataObject class.

Author

Pavel Lakiza

Date

June 2021

## 5.36 /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.*

#### 5.36.1 Detailed Description

Declaration of the SurfaceDataObject class.

Author

Pavel Lakiza

Date

April 2021

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

Definition of the UserSectionRodComponent class.

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

#### 5.37.1 Detailed Description

Definition of the UserSectionRodComponent class.

Author

Pavel Lakiza

Date

June 2021

## 5.38 [/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.*

#### 5.38.1 Detailed Description

Declaration of the UserSectionRodComponent class.

##### Author

Pavel Lakiza

##### Date

June 2021

## 5.39 [/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"
```

#### 5.39.1 Detailed Description

Implementation of utilities.

##### Author

Pavel Lakiza

##### Date

May 2021

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

Declaration of utilities.

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

### Functions

- QPair< Core::AbstractDataObject::ObjectType, QSharedPointer< QFile > > [QRS::Utilities::File::getDataObjectFile](#) (QString const &path, QString const &fileName)  
*Retrieve a pair consisted of a data object file and its type.*
- QString [QRS::Utilities::File::loadFileContent](#) (QString const &path)  
*Load a style sheet.*

#### 5.40.1 Detailed Description

Declaration of utilities.

Author

Pavel Lakiza

Date

May 2021

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

Implementation of the VectorDataObject class.

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

### Variables

- const IndexType **skNumElements** = 3

#### 5.41.1 Detailed Description

Implementation of the VectorDataObject class.

Author

Pavel Lakiza

Date

June 2021

## 5.42 /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.*

### 5.42.1 Detailed Description

Declaration of the VectorDataObject class.

#### Author

Pavel Lakiza

#### Date

April 2021

## 5.43 /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.*



### 5.43.1 Detailed Description

The startup function.

Author

Pavel Lakiza

Date

May 2021

## 5.44 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/abstractmanager.cpp File Reference

Definition of the AbstractManager class.

```
#include <QMessageBox>
#include <QSettings>
#include <QToolBar>
#include "abstractmanager.h"
#include "central/uiconstants.h"
#include "DockManager.h"
```

### 5.44.1 Detailed Description

Definition of the AbstractManager class.

Author

Pavel Lakiza

Date

May 2021

## 5.45 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/abstractmanager.h File Reference

Declaration of the AbstractManager class.

```
#include <QDialog>
```

## Classes

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

### 5.45.1 Detailed Description

Declaration of the AbstractManager class.

#### Author

Pavel Lakiza

#### Date

May 2021

### 5.46 [/home/qinterfly/Library/Projects/Current/QRod](#)↵ Systems/src/managers/abstractrodcomponentwidget.cpp File Reference

Definition of the AbstractRodComponentWidget class.

```
#include "abstractrodcomponentwidget.h"
```

#### 5.46.1 Detailed Description

Definition of the AbstractRodComponentWidget class.

#### Author

Pavel Lakiza

#### Date

July 2021

### 5.47 [/home/qinterfly/Library/Projects/Current/QRod](#)↵ Systems/src/managers/abstractrodcomponentwidget.h File Reference

Declaration of the AbstractRodComponentWidget class.

```
#include <QWidget>  
#include "core/aliasdata.h"
```

## Classes

- class [QRS::Managers::AbstractRodComponentWidget](#)  
*Widget to construct rod components of different types.*

### 5.47.1 Detailed Description

Declaration of the AbstractRodComponentWidget class.

#### Author

Pavel Lakiza

#### Date

July 2021

## 5.48 /home/qinterfly/Library/Projects/Current/QRodSystems/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"
```

### 5.48.1 Detailed Description

Definition of the DataPointerLineEdit class.

#### Author

Pavel Lakiza

#### Date

June 2021

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

### 5.49.1 Detailed Description

Declaration of the DataPointerLineEdit class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.50 [/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/dataobjectshierarchy.h"
#include "doublespinboxitemdelegate.h"
```

## Functions

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

### 5.50.1 Detailed Description

Implementation of the DataObjectsManager class.

Author

Pavel Lakiza

Date

June 2021

## 5.51 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/dataobjectsmanager.h File Reference

Declaration of the DataObjectsManager class.

```
#include <unordered_map>
#include "abstractmanager.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.*

### 5.51.1 Detailed Description

Declaration of the DataObjectsManager class.

Author

Pavel Lakiza

Date

June 2021

## 5.52 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/doublespinboxitemdelegate.cpp File Reference

Implementation of the DoubleSpinBoxItemDelegate class.

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

### 5.52.1 Detailed Description

Implementation of the DoubleSpinBoxItemDelegate class.

Author

Pavel Lakiza

Date

March 2021

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

Declaration of the DoubleSpinBoxItemDelegate class.

```
#include <QStyledItemDelegate>
```

### Classes

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

### 5.53.1 Detailed Description

Declaration of the DoubleSpinBoxItemDelegate class.

Author

Pavel Lakiza

Date

March 2021

## 5.54 [/home/qinterfly/Library/Projects/Current/QRod](#) Systems/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/geometryrodcomponent.h"
#include "core/vectordataobject.h"
#include "core/matrixdataobject.h"
```

### 5.54.1 Detailed Description

Definiton of the GeometryComponentWidget class.

#### Author

Pavel Lakiza

#### Date

July 2021

## 5.55 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/geometryrodcomponentwidget.h File Reference

Declaration of the GeometryComponentWidget class.

```
#include "abstractrodcomponentwidget.h"
```

### Classes

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

### 5.55.1 Detailed Description

Declaration of the GeometryComponentWidget class.

#### Author

Pavel Lakiza

#### Date

July 2021

## 5.56 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/loadrodcomponentwidget.cpp File Reference

Definition of the LoadRodComponentWidget class.

```
#include <QVBoxLayout>
#include <QLabel>
#include <QComboBox>
#include <QGroupBox>
#include <QDoubleSpinBox>
#include "loadrodcomponentwidget.h"
#include "dataobjectlineedit.h"
#include "core/loadrodcomponent.h"
#include "core/scalardataobject.h"
#include "core/vectordataobject.h"
```

### 5.56.1 Detailed Description

Definition of the LoadRodComponentWidget class.

Author

Pavel Lakiza

Date

July 2021

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

Declaration of the LoadRodComponentWidget class.

```
#include "abstractrodcomponentwidget.h"
```

### Classes

- class [QRS::Managers::LoadRodComponentWidget](#)  
*Widget to construct a load applied to a rod.*

### 5.57.1 Detailed Description

Declaration of the LoadRodComponentWidget class.

Author

Pavel Lakiza

Date

July 2021

## 5.58 /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.*

### 5.58.1 Detailed Description

Definition of the ManagersFactory class.

Author

Pavel Lakiza

Date

June 2021

## 5.59 /home/qinterfly/Library/Projects/Current/QRodSystems/src/managers/managersfactory.h File Reference

Declaration of the ManagersFactory class.

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

## Classes

- class [QRS::Managers::ManagersFactory](#)

*Factory to create managers which utilize and modify project data.*

### 5.59.1 Detailed Description

Declaration of the ManagersFactory class.

Author

Pavel Lakiza

Date

June 2021

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

Definition of the MaterialRodComponentWidget class.

```
#include <QGridLayout>
#include <QSpacerItem>
#include <QLabel>
#include <QGroupBox>
#include "materialrodcomponentwidget.h"
#include "dataobjectlineedit.h"
#include "core/materialrodcomponent.h"
#include "core/scalardataobject.h"
```

### 5.60.1 Detailed Description

Definition of the MaterialRodComponentWidget class.

Author

Pavel Lakiza

Date

July 2021

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

Declaration of the MaterialRodComponentWidget class.

```
#include "abstractrodcomponentwidget.h"
```

### Classes

- class [QRS::Managers::MaterialRodComponentWidget](#)  
*Widget to construct a material rod component.*

### 5.61.1 Detailed Description

Declaration of the MaterialRodComponentWidget class.

Author

Pavel Lakiza

Date

July 2021

## 5.62 /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 "core/materialrodcomponent.h"
#include "core/loadrodcomponent.h"
#include "managers/geometryrodcomponentwidget.h"
#include "managers/usersectionrodcomponentwidget.h"
#include "managers/materialrodcomponentwidget.h"
#include "managers/loadrodcomponentwidget.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"

#### 5.62.1 Detailed Description

Definition of the RodComponentsManager class.

##### Author

Pavel Lakiza

##### Date

May 2021

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

Declaration of the RodComponentsManager class.

```
#include "managers/abstractmanager.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.*

#### 5.63.1 Detailed Description

Declaration of the RodComponentsManager class.

##### Author

Pavel Lakiza

##### Date

March 2021

## 5.64 /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"
```

#### 5.64.1 Detailed Description

Definition of the UserSectionRodComponentWidget class.

##### Author

Pavel Lakiza

##### Date

July 2021

**5.65** /home/qinterfly/Library/Projects/Current/QRod**Systems/src/managers/usersectionrodcomponentwidget.h File Reference**

Declaration of the UserSectionRodComponentWidget class.

```
#include "abstractrodcomponentwidget.h"
```

**Classes**

- class [QRS::Managers::UserSectionRodComponentWidget](#)

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

**5.65.1 Detailed Description**

Declaration of the UserSectionRodComponentWidget class.

**Author**

Pavel Lakiza

**Date**

July 2021

**5.66** /home/qinterfly/Library/Projects/Current/QRod**Systems/src/models/hierarchy/abstracthierarchyitem.cpp File Reference**

Definition of the AbstractHierarchyItem class.

```
#include "abstracthierarchyitem.h"
#include "core/hierarchy/node.h"
```

**5.66.1 Detailed Description**

Definition of the AbstractHierarchyItem class.

**Author**

Pavel Lakiza

**Date**

May 2021

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

Declaration of the AbstractHierarchyItem class.

```
#include <QStandardItem>
```

### Classes

- class [QRS::HierarchyModels::AbstractHierarchyItem](#)  
*Item to represent a hierarchy of elements of the same type.*

#### 5.67.1 Detailed Description

Declaration of the AbstractHierarchyItem class.

Author

Pavel Lakiza

Date

May 2021

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

Definition of the AbstractHierarchyModel class.

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

#### 5.68.1 Detailed Description

Definition of the AbstractHierarchyModel class.

Author

Pavel Lakiza

Date

July 2021

## 5.69 /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 >

#### 5.69.1 Detailed Description

Declaration of the AbstractHierarchyModel class.

Author

Pavel Lakiza

Date

July 2021

## 5.70 /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.*

### 5.70.1 Detailed Description

Definition of the DataObjectsHierarchyItem class.

#### Author

Pavel Lakiza

#### Date

May 2021

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

Declaration of the DataObjectsHierarchyItem class.

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

### Classes

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

### 5.71.1 Detailed Description

Declaration of the DataObjectsHierarchyItem class.

#### Author

Pavel Lakiza

#### Date

May 2021

## 5.72 [/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"
```



**5.72.1 Detailed Description**

Definition of the DataObjectsHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

July 2021

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

Declaration of the DataObjectsHierarchyModel class.

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

**Classes**

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

**5.73.1 Detailed Description**

Declaration of the DataObjectsHierarchyModel class.

**Author**

Pavel Lakiza

**Date**

July 2021

## **5.74 /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"
```

### 5.74.1 Detailed Description

Definition of the ProjectHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

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

Declaration of the ProjectHierarchyModel class.

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

### Classes

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

### 5.75.1 Detailed Description

Declaration of the ProjectHierarchyModel class.

Author

Pavel Lakiza

Date

May 2021

## 5.76 [/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.*

### 5.76.1 Detailed Description

Definition of the RodComponentsHierarchyItem class.

Author

Pavel Lakiza

Date

June 2021

## 5.77 /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.*

### 5.77.1 Detailed Description

Declaration of the RodComponentsHierarchyItem class.

Author

Pavel Lakiza

Date

June 2021

## 5.78 [/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"
```

### 5.78.1 Detailed Description

Definition of the RodComponentsHierarchyModel class.

#### Author

Pavel Lakiza

#### Date

June 2021

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

Declaration of the RodComponentsHierarchyModel class.

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

### Classes

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

### 5.79.1 Detailed Description

Declaration of the RodComponentsHierarchyModel class.

#### Author

Pavel Lakiza

#### Date

June 2021

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

Definition of the DataObjectsPropertiesModel class.

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

### 5.80.1 Detailed Description

Definition of the DataObjectsPropertiesModel class.

#### Author

Pavel Lakiza

#### Date

May 2021

## 5.81 /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.*

### 5.81.1 Detailed Description

Declaration of the DataObjectsPropertiesModel class.

#### Author

Pavel Lakiza

#### Date

May 2021

## 5.82 [/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"
```

### 5.82.1 Detailed Description

Implementation of the BaseTableModel class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.83 [/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.*

### 5.83.1 Detailed Description

Declaration of the BaseTableModel class.

#### Author

Pavel Lakiza

#### Date

March 2021

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

Implementation of the MatrixTableModel class.

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

### 5.84.1 Detailed Description

Implementation of the MatrixTableModel class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.85 /home/qinterfly/Library/Projects/Current/QRodSystems/src/models/table/matrixtablemodel.h File Reference

Declaration of the MatrixTableModel class.

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

### Classes

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

### 5.85.1 Detailed Description

Declaration of the MatrixTableModel class.

#### Author

Pavel Lakiza

#### Date

March 2021

## 5.86 [/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"
```

### 5.86.1 Detailed Description

Implementation of the SurfaceTableModel class.

#### Author

Pavel Lakiza

#### Date

June 2021

## 5.87 [/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.*

### 5.87.1 Detailed Description

Declaration of the SurfaceTableModel class.

#### Author

Pavel Lakiza

#### Date

March 2021



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

Implementation of static functions of TableModelInterface.

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

### 5.88.1 Detailed Description

Implementation of static functions of TableModelInterface.

Author

Pavel Lakiza

Date

June 2021

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

Declaration of the TableModelInterface.

```
#include <QItemSelection>
```

### Classes

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

### 5.89.1 Detailed Description

Declaration of the TableModelInterface.

Author

Pavel Lakiza

Date

June 2021

## 5.90 [/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"
```

### 5.90.1 Detailed Description

Implementation of the View3D class.

#### Author

Pavel Lakiza

#### Date

March 2021

## 5.91 [/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.*

### 5.91.1 Detailed Description

Declaration of the View3D class.

#### Author

Pavel Lakiza

#### Date

March 2021