

pFUnit

Generated by Doxygen 1.7.6

Thu Dec 18 2014 11:27:38

Contents

1	pFUnit 3 - Documentation - Version 2014-1212-0025-15-UTC MLR	1
1.1	Overview	1
1.2	Contents	1
1.3	See Also	2
1.4	LICENSE	2
1.5	Copyright	2
2	Obtaining pFUnit	3
3	Installation	5
3.1	Installing pFUnit	5
3.2	Prerequisites	5
3.3	Obtaining pFUnit	6
3.4	Manifest - What's in the directory?	6
3.5	Configuration	7
3.6	Building pFUnit	8
3.6.1	Building pFUnit for testing serial codes (Non-MPI)	8
3.6.2	Building pFUnit for testing parallel codes (MPI)	8
3.6.3	OPENMP	9
3.6.4	Cleaning	9
3.6.5	Documentation	9
3.6.6	CMAKE	10
3.7	Installation	10

3.7.1	Installation - Serial	10
3.7.2	Installation - MPI	11
3.7.3	Installation - OPENMP	11
3.7.4	Installation - DEFAULT DIRECTORY	11
4	Usage	13
4.1	Usage	13
4.1.1	Usage - Configuration	13
4.1.2	Usage - Hello World	13
4.2	Usage - Preprocessor	14
4.3	Compiling and Executing The Test	14
4.3.1	- Compiling and Executing the Tests (MPI PARALLEL)	14
4.3.2	Command Line Options	15
5	Development	17
6	Feedback & Support	19
6.1	Feedback	19
6.2	Support	19
7	FAQ and Tips	21
7.1	FAQ	21
7.1.1	Zero Tests Run	21
7.1.2	Some Tests Are Not Running	22
7.1.3	Intel Fortran Version 13: -DINTEL_13	22
7.1.4	Segmentation Faults and Odd Link Errors	22
7.2	Tips	23
7.2.1	Environment Modules	23
7.2.2	Compile Time Errors	23
7.2.3	Intermediate files used by pFUnit	23
7.2.4	Ignoring whitespace differences in assertions on strings.	23
8	Platform Specific Notes	25

8.1	Mac OSX	25
8.2	Windows/CYGWIN	25
8.3	Intel Fortran Version 13: -DINTEL_13	25
9	Acknowledgments	27
10	Known Installations & Versions	29
11	TODO	31
12	The Preprocessor - pFUnitParser	33
12.1	Using The Preprocessor	33
12.1.1	Configuration - testSuites.inc	34
12.1.2	Invocation	34
12.1.3	Preprocessor Input File (.pf)	34
12.1.4	Directives	35
12.1.4.1	@Test	35
12.1.4.2	@MPITest	35
12.1.4.3	@Assert	36
12.1.4.4	@Parameters	37
12.1.4.5	@TestCase	37
13	@Assert Preprocessor Directives	39
13.1	@Assert Preprocessor Directives	40
13.1.1	@assertEqual	40
13.1.2	@assertTrue	40
13.1.3	@assertEqualUserDefined	40
13.1.4	@assertFalse	40
13.1.5	@assertLessThan	40
13.1.6	@assertLessThanOrEqual	40
13.1.7	@assertGreaterThan	40
13.1.8	@assertGreaterThanOrEqual	40
13.1.9	@assertIsMemberOf	40

13.1.10 @assertContains	41
13.1.11 @assertAny	41
13.1.12 @assertAll	41
13.1.13 @assertNotAll	41
13.1.14 @assertNone	41
13.1.15 @assertIsPermutationOf	41
13.1.16 @assertExceptionRaised	41
13.1.17 @assertSameShape	41
13.1.18 @assertIsNaN	41
13.1.19 @assertIsFinite	41
13.1.20 @assertAssociated	41
13.1.21 @assertNotAssociated	41
13.1.22 @assertAssociatedWith	41
13.1.23 @assertNotAssociatedWith	42
13.1.24 @assertEquivalent	42
14 Revision Notes	43
15 Data Type Index	45
15.1 Class Hierarchy	45
16 Data Type Index	51
16.1 Data Types List	51
17 Data Type Documentation	57
17.1 AbstractTestParameter_mod Module Reference	57
17.2 AbstractTestResult_mod Module Reference	57
17.3 pFUnitParser::Action Class Reference	58
17.4 add_mod Module Reference	59
17.5 addComplex_mod Module Reference	59
17.6 CodeUtilities::ArrayDescription Class Reference	59
17.7 Assert_mod Module Reference	60
17.7.1 Detailed Description	60

17.8 AssertArraysInternalassertEqual_mod Module Reference	60
17.9 AssertArraysInternalassertGreaterThan_mod Module Reference	63
17.10 AssertArraysInternalassertGreaterThanOrEqual_mod Module Reference	66
17.11 AssertArraysInternalassertLessThan_mod Module Reference	70
17.12 AssertArraysInternalassertLessThanOrEqual_mod Module Reference	73
17.13 AssertArraysInternalassertNotEqual_mod Module Reference	77
17.14 AssertArraysInternalassertRelativelyEqual_mod Module Reference	80
17.15 AssertArraysSupport_mod Module Reference	83
17.16 AssertBasic_mod Module Reference	83
17.16.1 Detailed Description	84
17.17 AssertComplex0_mod Module Reference	85
17.18 AssertComplex1_mod Module Reference	85
17.19 AssertComplex2_mod Module Reference	86
17.20 AssertComplex3_mod Module Reference	86
17.21 AssertComplex4_mod Module Reference	86
17.22 AssertComplex5_mod Module Reference	87
17.23 AssertInteger0_mod Module Reference	87
17.24 AssertInteger1_mod Module Reference	87
17.25 AssertInteger2_mod Module Reference	88
17.26 AssertInteger3_mod Module Reference	88
17.27 AssertInteger4_mod Module Reference	88
17.28 AssertInteger5_mod Module Reference	89
17.29 AssertReal0_mod Module Reference	89
17.30 AssertReal1_mod Module Reference	90
17.31 AssertReal2_mod Module Reference	90
17.32 AssertReal3_mod Module Reference	91
17.33 AssertReal4_mod Module Reference	91
17.34 AssertReal5_mod Module Reference	92
17.35 GenerateAssertsOnArrays::AssertRealArrayArgument Class Reference	92
17.36 pFUnitParser::AtAfter Class Reference	93
17.37 pFUnitParser::AtAssert Class Reference	93

17.38pUnitParser::AtAssertAssociated Class Reference	94
17.39pUnitParser::AtAssertAssociatedWith Class Reference	95
17.40pUnitParser::AtAssertEqualUserDefined Class Reference	95
17.40.1 Detailed Description	96
17.41pUnitParser::AtAssertEquivalent Class Reference	96
17.41.1 Detailed Description	97
17.42pUnitParser::AtAssertNotAssociated Class Reference	97
17.43pUnitParser::AtAssertNotAssociatedWith Class Reference	98
17.44pUnitParser::AtBefore Class Reference	98
17.45pUnitParser::AtBegin Class Reference	99
17.46pUnitParser::AtMpiAssert Class Reference	100
17.47pUnitParser::AtMpiTest Class Reference	100
17.48pUnitParser::AtSuite Class Reference	101
17.49pUnitParser::AtTest Class Reference	101
17.50pUnitParser::AtTestCase Class Reference	102
17.51pUnitParser::AtTestParameter Class Reference	103
17.52TestCaseB_mod::B_Parameter Type Reference	103
17.53BaseTestRunner_mod Module Reference	104
17.53.1 Detailed Description	104
17.54BeforeAfter_mod Module Reference	105
17.55BrokenSetUpCase_mod Module Reference	105
17.56BrokenTestCase_mod Module Reference	105
17.57TestCaseC_mod::C_Parameter Type Reference	106
17.58Cases_mod Module Reference	106
17.59GenerateAssertsOnArrays::constraintASSERT Class Reference	107
17.59.1 Constructor & Destructor Documentation	107
17.59.1.1 __init__	107
17.59.2 Member Data Documentation	108
17.59.2.1 name1	108
17.59.2.2 tolerance	108
17.60Test_mod::countTestCases Interface Reference	108

17.61	<code>mods::pre::pre2::dataString</code> Class Reference	108
17.62	<code>DebugListener_mod</code> Module Reference	109
17.62.1	Detailed Description	109
17.63	<code>CodeUtilities::declaration</code> Class Reference	110
17.64	<code>DynamicTestCase_mod</code> Module Reference	110
17.64.1	Detailed Description	111
17.65	<code>Exception_mod</code> Module Reference	111
17.66	<code>Expectation_mod</code> Module Reference	112
17.67	<code>Fixture_mod</code> Module Reference	112
17.68	<code>FixtureTestCase_mod</code> Module Reference	113
17.69	<code>CodeUtilities::fortranSubroutineSignature</code> Class Reference	113
17.70	<code>AbstractTestResult_mod::getErrors</code> Interface Reference	114
17.71	<code>Test_mod::getName</code> Interface Reference	114
17.72	<code>AbstractTestResult_mod::getSuccesses</code> Interface Reference	114
17.73	<code>Halo_mod</code> Module Reference	114
17.74	<code>mods::pre::pre_If::IfDirective</code> Class Reference	115
17.75	<code>CodeUtilities::implementation</code> Class Reference	115
17.76	<code>CodeUtilities::interfaceBlock</code> Class Reference	116
17.77	<code>mods::pre::pre_If::interval</code> Class Reference	116
17.78	<code>GenerateAssertsOnArrays::IsWithinTolerance</code> Class Reference	116
17.79	<code>Test_RestrictSphericalCoordinates_mod::LatLonCase</code> Type Reference	117
17.80	<code>LinearInterpolator_mod</code> Module Reference	117
17.81	<code>MakeInfinity_mod</code> Module Reference	118
17.81.1	Detailed Description	118
17.82	<code>MakeNaN_mod</code> Module Reference	118
17.82.1	Detailed Description	119
17.83	<code>Mock_mod</code> Module Reference	119
17.83.1	Detailed Description	119
17.84	<code>MockCall_mod</code> Module Reference	120
17.84.1	Detailed Description	120
17.85	<code>MockListener_mod</code> Module Reference	121

17.86testParser::MockParser Class Reference	121
17.87MockRepository_mod Module Reference	122
17.87.1 Detailed Description	122
17.88MockSUT_mod Module Reference	123
17.89testParser::MockWriter Class Reference	123
17.90CodeUtilities::module Class Reference	124
17.91MpiContext_mod Module Reference	124
17.91.1 Detailed Description	125
17.92MpiStubs_mod Module Reference	125
17.92.1 Detailed Description	126
17.93MpiTestCase_mod Module Reference	126
17.93.1 Detailed Description	126
17.94MpiTestCaseB_mod::MpiTestCaseB Type Reference	127
17.95MpiTestCaseB_mod Module Reference	127
17.96MpiTestMethod_mod Module Reference	128
17.96.1 Detailed Description	128
17.97MpiTestParameter_mod Module Reference	129
17.98pFUnitParser::MyError Class Reference	129
17.99Cases_mod::MyParamType Type Reference	129
17.100Cases_mod::MyTestCase Type Reference	130
17.101TestCaseC_mod::newC_Parameter Interface Reference	130
17.102Node_mod Module Reference	130
17.103ParallelContext_mod Module Reference	131
17.103.1 Detailed Description	131
17.104ParallelException_mod Module Reference	131
17.104.1 Detailed Description	132
17.105ParameterizedTestCase_mod Module Reference	132
17.105.1 Detailed Description	133
17.106Params_mod Module Reference	133
17.106.1 Detailed Description	134
17.107pFUnitParser::Parser Class Reference	134

17.108	Test_Parameters_mod::peCase Type Reference	135
17.109	pFUnit Module Reference	136
17.109.1	Detailed Description	136
17.110	pFUnit_mod Module Reference	136
17.110.1	Detailed Description	137
17.111	PrivateException_mod Module Reference	137
17.111.1	Detailed Description	138
17.112	mods::pre::pre2::procDirective Class Reference	138
17.112.1	Member Function/Subroutine Documentation	139
17.112.1.1	addTokenRE	139
17.113	RemoteProxyTestCase_mod Module Reference	139
17.113.1	Detailed Description	139
17.114	mods::pre::pre_Repeat::RepeatDirective Class Reference	140
17.115	ResultPrinter_mod Module Reference	140
17.115.1	Detailed Description	141
17.116	RobustRunner_mod Module Reference	141
17.116.1	Detailed Description	142
17.117	RobustTestSuite_mod Module Reference	142
17.118	CodeUtilities::routineUnit Class Reference	143
17.119	SerialContext_mod Module Reference	143
17.119.1	Detailed Description	144
17.120	SimpleTestCase_mod Module Reference	144
17.121	SourceLocation_mod Module Reference	145
17.121.1	Detailed Description	145
17.122	SphericalCoordinates_mod Module Reference	146
17.123	TestListener_mod::startTest Interface Reference	146
17.124	StringConversionUtilities_mod Module Reference	146
17.124.1	Detailed Description	147
17.125	SubsetRunner_mod Module Reference	147
17.125.1	Detailed Description	148
17.126	SurrogateTestCase_mod Module Reference	148

17.126. Detailed Description	148
17.128UT_mod Module Reference	149
17.128Test_mod::Test Type Reference	149
17.129Test_Assert_mod Module Reference	150
17.130Test_AssertBasic_mod Module Reference	150
17.131Test_AssertComplex_mod Module Reference	150
17.132Test_AssertInteger_mod Module Reference	151
17.133Test_AssertReal_mod Module Reference	152
17.134Test_BasicOpenMP_mod Module Reference	153
17.135Test_Exception_mod Module Reference	153
17.136Test_FixtureTestCase_mod Module Reference	153
17.137Test_LinearInterpolator_mod::Test_LinearInterpolator Type Reference	154
17.138Test_LinearInterpolator_mod Module Reference	154
17.139Test_MockCall_mod Module Reference	154
17.140Test_MockRepository_mod Module Reference	155
17.141Test_mod Module Reference	155
17.141. Detailed Description	155
17.142Test_MpiContext_mod Module Reference	156
17.143Test_MpiException_mod Module Reference	156
17.144Test_MpiParameterizedTestCase_mod Module Reference	156
17.145Test_MpiTestCase_mod Module Reference	157
17.146Test_Parameters_mod::Test_Parameters Type Reference	157
17.147Test_Parameters_mod Module Reference	158
17.148Test_RestrictSphericalCoordinates_mod::Test_RestrictSpherical- Coordinates Type Reference	158
17.149Test_RestrictSphericalCoordinates_mod Module Reference	159
17.150Test_RobustRunner_mod Module Reference	159
17.151Test_SimpleTestCase_mod Module Reference	159
17.152Test_StringConversionUtilities_mod Module Reference	160
17.153Test_TestMethod_mod Module Reference	160
17.154Test_TestResult_mod Module Reference	160

17.155	Test_TestSuite_mod Module Reference	161
17.156	Test_UnixProcess_mod Module Reference	161
17.157	Test_XmlPrinter_mod Module Reference	161
17.157.1	Detailed Description	162
17.158	TestA_mod Module Reference	162
17.159	TestCase_mod Module Reference	162
17.159.1	Detailed Description	163
17.160	TestCaseA_mod::TestCaseA Type Reference	163
17.161	TestCaseA_mod Module Reference	164
17.162	TestCaseB_mod::TestCaseB Type Reference	164
17.163	TestCaseB_mod Module Reference	165
17.164	TestCaseC_mod::TestCaseC Type Reference	166
17.165	TestCaseC_mod Module Reference	166
17.166	TestFailure_mod Module Reference	167
17.166.1	Detailed Description	167
17.167	mod::pre::pre_If::TestIfDirective Class Reference	168
17.168	mod::pre::interleavedp::TestInterleaved Class Reference	168
17.169	TestListener_mod Module Reference	169
17.169.1	Detailed Description	169
17.170	TestMethod_mod Module Reference	169
17.170.1	Detailed Description	170
17.171	mod::pre::parseArgs::TestParseArgs Class Reference	170
17.172	TestParser::TestParseLine Class Reference	171
17.172.1	Member Function/Subroutine Documentation	172
17.172.1.1	testAtMpiTest	172
17.172.1.2	testAtTest	172
17.172.1.3	testAtTestFail	172
17.172.1.4	testAtTestNoParens	172
17.172.1.5	testAtTestSkipComment	172
17.172.1.6	testMatchAtAfter	172
17.172.1.7	testMatchAtAssertAssociated	172

17.172.1.8	TestMatchAtAssertAssociatedWith	172
17.172.1.9	TestMatchAtAssertEqual	173
17.172.1.10	TestMatchAtAssertEqualUserDefined	173
17.172.1.11	TestMatchAtAssertEqualUserDefinedWithMessage	173
17.172.1.12	TestMatchAtAssertEquivalent	173
17.172.1.13	TestMatchAtAssertNotassociated	173
17.172.1.14	TestMatchAtAssertNotassociatedWith	173
17.172.1.15	TestMatchAtAssertOther	173
17.172.1.16	TestMatchAtAssertUnAssociated	174
17.172.1.17	TestMatchAtAssertUnAssociatedWith	174
17.172.1.18	TestMatchAtBefore	174
17.172.1.19	TestMatchAtMpiAssert	174
17.172.1.20	TestMatchAtSuite	174
17.172.1.21	TestMatchAtTestCase	174
17.172.1.22	TestParseArgsFirstRest	174
17.172.1.23	TestParseArgsFirstSecondRest	175
17.173	ParseBrackets::TestRejoinBracketed Class Reference	175
17.174	Nodes::pre::pre_Repeat::TestRepeatDirective Class Reference	175
17.175	TestResult_mod Module Reference	175
17.175.1	Detailed Description	176
17.176	TestRunner_mod Module Reference	176
17.176.1	Detailed Description	177
17.177	TestSuite_mod Module Reference	177
17.177.1	Detailed Description	178
17.178	ThrowFundamentalTypes_mod Module Reference	178
17.178.1	Detailed Description	178
17.179	UnixPipeInterfaces_mod Module Reference	179
17.179.1	Detailed Description	179
17.180	UnixProcess_mod Module Reference	180
17.180.1	Detailed Description	180
17.181	GenerateAssertsOnArrays::VECTOR_NORM Class Reference	181

17.182	AbstractTestResult_mod::wasSuccessful Interface Reference	181
17.183	WrapbeforeAfter Module Reference	182
17.184	WrapMpiTestCaseB_mod Module Reference	182
17.185	Wrapsimple Module Reference	182
17.186	WrapTestA_mod Module Reference	182
17.187	WrapTestCaseA_mod Module Reference	183
17.188	WrapTestCaseB_mod Module Reference	183
17.189	WrapTestCaseC_mod Module Reference	183
17.190	XmlPrinter_mod Module Reference	184
17.190	Detailed Description	184

Chapter 1

pFUnit 3 - Documentation - Version 2014-1212-0025-15-UTC MLR

Quick links to the [code](#) or the project's [SourceForge site](#).

1.1 Overview

[pFUnit](#) is a unit testing framework enabling JUnit-like testing of serial and MPI-parallel software written in Fortran. Initial support for OPENMP has been implemented. [pFUnit](#) makes use of modern Fortran programming techniques, including object oriented programming, offering a convenient, lightweight mechanism for Fortran developers to create and run software tests that specify the desired behavior for a given piece of code. The framework was originally created by developers from NASA and NGC TASC. The project is hosted at sourceforge/projects/pfunit.

If you are using [pFUnit](#), please leave a note/topic at [Applications of pFUnit](#), or send a note to [Tom Clune](#), Ph.D., Advanced Software Technology Group, NASA Goddard Space Flight Center.

Please refer revisions and comments about the documentation to [Mike Rilee](#), Ph.D., Rilee Systems Technologies.

1.2 Contents

- [Installation](#)
 - [Obtaining pFUnit](#)
- [Usage](#)

- [Development](#)
- [Feedback & Support](#)
- [FAQ and Tips](#)
- [Platform Specific Notes](#)
- [Acknowledgments](#)
- [Known Installations & Versions](#)
- [TODO](#)
- [The Preprocessor - pFUnitParser](#)
- [Revision Notes](#)

1.3 See Also

- [sourceforge/projects/pfunit](#)
- [NASA Modeling Guru](#)
- [JUnit.org](#)

1.4 LICENSE

Rights of use for GSC-15,137-1 F-UNIT, also known as [pFUnit](#), are defined by the N-ASA Open Source Agreement (version 1.3). The LICENSE document may be found in the head directory of the [pFUnit](#) distribution.

1.5 Copyright

Copyright 2005,2013 United States Government as represented by the Administrator of the National Aeronautics and Space Administration. All Rights Reserved.

Chapter 2

Obtaining pFUnit

The best way to obtain **pFUnit** is to `clone pFUnit from the git repository` from SourceForge as follows.

```
# Read Only Access
git clone git://git.code.sf.net/p/pfunit/code pFUnit
```

This will create the directory **pFUnit** in the current working directory.

You may also visit the project page at SourceForge and download the source tarfile "pFUnit.tar.gz" there.

`http://sourceforge.net/projects/pfunit/` or `http://sourceforge.net/projects/pfunit/files/latest/download`

Extracting this tarfile via a command like

```
'$ tar xzf ./pFUnit.tar.gz'
```

will place the **pFUnit** files into the current working directory.

For other ways to acquire the code visit

`https://sourceforge.net/p/pfunit/code/ci/master/tree/`

or contact the **pFUnit** team.

Chapter 3

Installation

3.1 Installing pFUnit

Comentatry for the page.

- [Prerequisites](#)
- [Obtaining pFUnit](#)
- [Manifest - What's in the directory?](#)
- [Configuration](#)
- [Building pFUnit](#)
 - [Building pFUnit for testing serial codes \(Non-MPI\)](#)
 - [Building pFUnit for testing parallel codes \(MPI\)](#)
 - [OPENMP](#)
 - [Cleaning](#)
 - [Documentation](#)
- [Installation](#)

3.2 Prerequisites

The development work for [pFUnit](#) has mostly been carried out on a mixture of systems, including high-end computers, Apple Mac OSX, and linux-based systems. A preliminary Windows/CYGWIN port has been contributed by a user. Full use of the system depends on the following being available.

- Fortran 2003+ (Tested with Intel 13.1+, NAG 5.3, GCC 4.8.3, 4.9.0, IBM's XLF)
- The Message Passing Interface (MPI)
- OpenMP
- GNU Make
- Python

Note: Recent changes have exposed a latent bug in GCC 4.8.2. The fix is available in the GCC 4.9 development branch and will also appear in GCC 4.8.3 when that is released. Users that require older versions of GCC should use [pFUnit 2.1.x](#).

[Doxygen](#) is used to generate documentation.

The system routinely undergoes regression testing with GNU, Intel, and NAG fortran compilers and OpenMPI.

3.3 Obtaining pFUnit

The best way to obtain [pFUnit](#) is to [clone pFUnit from the git repository](#) from SourceForge as follows.

```
# Read Only Access
git clone git://git.code.sf.net/p/pfunit/code pFUnit
```

This will create the directory [pFUnit](#) in the current working directory.

You may also visit the project page at SourceForge and download the source tarfile "pFUnit.tar.gz" there.

<http://sourceforge.net/projects/pfunit/> or <http://sourceforge.net/projects/pfunit/files/latest/download>

Extracting this tarfile via a command like

```
'$ tar xzf ./pFUnit.tar.gz'
```

will place the [pFUnit](#) files into the current working directory.

For other ways to acquire the code visit

<https://sourceforge.net/p/pfunit/code/ci/master/tree/>

or contact the [pFUnit](#) team.

3.4 Manifest - What's in the directory?

In the top level of the [pFUnit](#) distribution you will see the following files.

CMakeLists.txt - Initial support for cmake-based builds.

COPYRIGHT - Contains information pertaining to the use and distribution of [pFUnit](#).

Examples - Contains examples of how to use [pFUnit](#) once it is installed.

GNUMakefile - The top level makefile for building and installing [pFUnit](#).

LICENSE - The NASA Open Source Agreement for GSC-15,137-1 F-UNIT, also known as [pFUnit](#).

README-INSTALL - Basic documentation on [pFUnit](#) installation and use.

bin - Executables used to construct and perform unit tests.

include - Files to be included into makefiles or source, including use code.

source - Source code and scripts of the [pFUnit](#) library and framework.

tests - Source code for unit testing [pFUnit](#) itself.

tools - Tools used to help develop, build, and install [pFUnit](#).

VERSION - Contains a string describing the current version of the framework.

3.5 Configuration

Little needs to be done to configure [pFUnit](#) for the build, however there are several environment variables on which the package depends.

'F90_VENDOR' - is set to include the correct makefile in /include, i.e. GNU, Intel, NAG, or PGI. Case insensitive file systems may cause some confusion from time-to-time.

'F90' - is set to the Fortran compiler being used: e.g. ifort for Intel, gfortran for GNU.

'COMPILER' - is set according to 'F90_VENDOR' and is automatically set in the top level makefile.

For MPI-based unit testing, your setup may require the following as well.

'MPIF90'

```
$ export MPIF90=mpif90
```

As a convenience for working with multiple MPI configurations, you may also set the following.

'MPIRUN'

```
$ export MPIRUN=/some.path/mpiexec
```

'PFUNIT_MAX_RANK' - controls the maximum size of the arrays asserts are defined over. If PFUNIT_MAX_RANK is not set, the default is 5 and [pFUnit](#)'s assertions will be able to handle arrays up to rank 5.

```
$ export PFUNIT_MAX_RANK=5
```

'DOXYGEN' - To generate documentation, set DOXYGEN to the desired executable. NOTE: Doxygen Version 1.8.5 does not respect CamelCase names from Fortran source code by currently converting all to lowercase. It does this to get HTML links correct for references in the source code that also do not respect the CamelCase convention. The Fortran standard specifies case insensitivity. Doxygen 1.7.x seems to better respect CamelCase.

```
$ export DOXYGEN=/opt/local/share/doxygen/doxygen-1.7.6/bin/doxygen
```

3.6 Building pFUnit

3.6.1 Building pFUnit for testing serial codes (Non-MPI)

1. Change to the directory into which pFUnit has been placed. 2. Set the environment variables (for example in bash):

```
$ export F90=gfortran-mp-4.8
$ export F90_VENDOR=GNU
```

3. To build pFUnit for unit testing of serial codes, execute make. The unit tests for pFUnit itself will run automatically.

```
$ make tests
```

3.1 Occasionally on the first run through, one will get a spurious (runtime) error, for example in the unix process component.

Re-execute "make tests" to check again.

4. At this point the pFUnit object library is in the source directory, along with a large number of Fortran module files.

3.6.2 Building pFUnit for testing parallel codes (MPI)

To build pFUnit for unit testing MPI-based codes, be sure that the environment is properly set up for the MPI implementation you are using. Depending on your local environment, you may need execute the build within a batch or other job queuing system, e.g. an interactive batch job under PBS. The steps for building pFUnit start out the same as for the serial case above, but add MPI=YES to the environment to switch on MPI support. The MPI-based unit tests for pFUnit itself will run automatically. Again, occasionally a spurious (runtime) error may appear on the first execution.

3. Execute make as follows.

```
$ make tests MPI=YES
```


4. At this point an MPI-enabled [pFUnit](#) object library is in the source directory, along with a large number of Fortran module files.

Also, one may get some harmless "no symbols" warnings when the [pFUnit](#) library is constructed.

3.6.3 OPENMP

Initial (limited) support for OPENMP has been implemented. At this writing, a basic functionality is available.

The process for building [pFUnit](#) for testing OPENMP-based codes is similar to that for other paradigms.

3. To compile for OPENMP support execute make as follows.

```
$ make tests OPENMP=YES
```

4. At this point the OPENMP-enabled [pFUnit](#) is ready to be installed.

3.6.4 Cleaning

To clean the [pFUnit](#) build directory for the space or to rebuild there are two options.

1. Make clean to remove object files and other intermediate products.

```
$ make clean
```

2. Make distclean to remove libraries and other more final products.

```
$ make distclean
```

3. Some directories support a 'make src_clean' to remove intermediate products in subdirectories.

3.6.5 Documentation

A start at documentation for [pFUnit](#) is in the documentation directory. [Doxygen](#) is our primary documentation tool. To make the documentation, which will be generated in the documentation directory, please invoke the following from the top level of your [pFUnit](#) distribution.

```
$ make documentation
```

Or to make a reference manual.

```
$ make documentation/pFUnit2-ReferenceManual.pdf
```

To select a specific version of Doxygen, please set the DOXYGEN environment variable as in [Configuration](#). You may wish to do this if your code uses CamelCase names as current versions of Doxygen (1.8.5) do not respect this convention for Fortran.

3.6.6 CMAKE

Initial support for CMAKE has been implemented. At this writing, a basic functionality is available.

3. The process for building [pFUnit](#) using cmake is as follows. In the top directory of the distribution make a new directory to support the build, then change to that directory and run cmake (pointing back to the source) to generate the required makefiles.

```
$ mkdir build
$ cd build
$ # e.g. cmake -DMPI=YES -DOPENMP=NO -DINSTALL_PATH=<A path> <path to source>
$ cmake -DMPI=NO ..
$ make tests
```

One may also set the environment variable PFUNIT instead of setting INSTALL_PATH on the cmake command line as given above.

If your MPI installation does not provide mpirun, you may try to set -DMPI_USE_MPIEXEC=YES to tell CMake to use its FindMPI function to find out how to execute the tests.

4. If the build is successful, then at this point make install should work.

3.7 Installation

3.7.1 Installation - Serial

To install [pFUnit](#) for regular use, set INSTALL_DIR to the location in which to place [pFUnit](#). This can be done on the make command line. For example, after compiling [pFUnit](#) for serial use (MPI absent or MPI=NO), please try.

```
$ # In the top of the pFUnit build directory.
$ make install INSTALL_DIR=/opt/pfunit/pfunit-serial
```

Note: you may need special privileges to install in some locations, e.g. via sudo.

To test the installation set PFUNIT to INSTALL_DIR, then change the working directory to Examples in [pFUnit](#) distribution and execute "buildIt," which will run a number of examples. These include some expected failures.

```
$ # In the top pFUnit build directory...
```

```
$ export PFUNIT=/opt/pfunit/pfunit-serial
$ cd Examples
$ ./buildIt
```

3.7.2 Installation - MPI

For installing an MPI-enabled [pFUnit](#) library, change to the top of the distribution and execute make with MPI=YES. You may need to "make distclean" first. After compilation and [pFUnit](#) passes its self-tests, then installation proceeds as for the serial case above.

```
$ make install INSTALL_DIR=/opt/pfunit/pfunit-parallel
```

To test, set PFUNIT and go into Examples/MPI_Halo directory.

```
$ # In the top pFUnit build directory...
$ export PFUNIT=/opt/pfunit/pfunit-parallel
$ # The variable MPIF90 must be set to the appropriate build script.
$ export MPIF90=mpif90
$ cd Examples/MPI_Halo
$ make
```

This will compile and run a set of parallel examples that includes intentional failures.

3.7.3 Installation - OPENMP

At this time the OPENMP version of [pFUnit](#) can be installed in the same way as for the serial or MPI-parallel codes. OPENMP support, tests, and examples are limited as of this writing.

3.7.4 Installation - DEFAULT DIRECTORY

If INSTALL_DIR is not set, "make install" will attempt to install [pFUnit](#) into the top build directory. This will create directories such as lib and mod in the top level of the build directory and will overwrite the include/base.mk with include/base-install.mk. If this is not desired, then "make develop" will put back the original base.mk, which is the file to be used for development and building [pFUnit](#). In general, we recommend installing to a directory that is not also the build directory.

Chapter 4

Usage

- [Usage - Configuration](#)
- [Usage - Hello World](#)
- [Usage - Preprocessor](#)
- [Compiling and Executing The Test](#)

4.1 Usage

4.1.1 Usage - Configuration

For regular use, after installation, the same compiler/MPI development configuration that was used to build [pFUnit](#) should be used. Once the environment variables and paths associated with the environment are set, to configure [pFUnit](#), please set the following.

'PFUNIT' - set to the directory into which [pFUnit](#) was installed.

'F90_VENDOR' - set to Intel, GNU, NAG, or PGI accordingly.

4.1.2 Usage - Hello World

For an example of a simple usage of [pFUnit](#), see Examples/Simple/tests.

The simplest way to write a test is to write a preprocessor input file (extension ".pf"), which is a Fortran free format file with preprocessor directives added. An example from "helloWorld.pf" follows.

```
! from helloWorld.pf
@test
```

```

subroutine testHelloWorld()
  use pfunit_mod
  implicit none
  @assertEqual("Hello World!", "Hello World!")
end subroutine testHelloWorld

```

One then instructs the preprocessor to construct a suite to execute these tests via the "testSuites.inc" file as follows.

```

! from testSuites.inc
ADD_TEST_SUITE(helloWorld_suite)

```

At this point, one can invoke the preprocessor to generate a Fortran file that when compiled and linked with [pFUnit](#) will execute the tests. For more information please see [The Preprocessor - pFUnitParser](#) or try out the examples in [Example/Simple](#).

4.2 Usage - Preprocessor

Please see [The Preprocessor - pFUnitParser](#).

4.3 Compiling and Executing The Test

An example of a GNU make rule for the final step of compiling a test follows.

```

# This step presumes "include $(PFUNIT)/include/base.mk" earlier in the
# makefile.
tests.x: testSuites.inc myTests.pf
    $(F90) -o $@ -I$(PFUNIT)/mod -I$(PFUNIT)/include \
        $(PFUNIT)/include/driver.F90 \
        ./*$(OBJ_EXT) $(LIBS) $(FFLAGS)

```

To execute the tests, one invokes "./tests.x" with the appropriate command line options (see below).

4.3.1 - Compiling and Executing the Tests (MPI PARALLEL)

One invokes MPI-based parallel tests according to the MPI framework being used. For example:

```

$ mpirun -np 4 tests.x

```

4.3.2 Command Line Options

The executable test program provides several command line options, when "include/driver.F90" is used, as it is automatically when using the PFUNIT preprocessor.

-v or -verbose	Verbose execution.
-d or -debug	Provide debugging information.
-h	Print help message.
-o <outputfile>	Direct pFUnit messages to a file.
-robust	Use the robust runner. Runs tests as processes so failures do not halt testing.
-skip <number of tests to skip>	Use the subset runner, which runs a subset of the tests in a suite.

An example from Examples/Robust:

```
$ ./tests.x -robust
```


Chapter 5

Development

Generally [pFUnit](#) development is performed in the build directory structure. Care should be taken to make clean or distclean in between configuration changes. As stated in - [Installation](#), it is best to set INSTALL_DIR and "make install" [pFUnit](#) to another directory that can be placed in a user's paths.

Chapter 6

Feedback & Support

- [Feedback](#)
- [Support](#)

6.1 Feedback

Feedback is welcome, please use the facilities at [sourceforge/projects/pfunit](#) to share your views.

Open a [ticket](#) for bugs, features, and patch recommendations.

If you use [pFUnit](#), please let us know by leaving a note in our [Applications of pFUnit](#) forum, or email [Tom Clune](#), Ph.D., NASA Goddard Space Flight Center. - Letting us know about your application helps us seek support for [pFUnit](#)'s continued development and improvement.

6.2 Support

Please open a [ticket](#) for bugs, features, and patch recommendations. For longer term needs or considerations, please visit our [discussion forums](#) or contact - [Tom Clune](#), Ph.D., NASA Goddard Space Flight Center.

You may also find some help at [FAQ and Tips](#).

[pFUnit](#) supports the software development of several weather and climate simulations efforts. We constantly seek to improve and correct [pFUnit](#) for our users' benefit, granting priority to the needs of our major users. Please share with us information about your application on our [Applications of pFUnit](#) forum.

Chapter 7

FAQ and Tips

- [FAQ](#)
 - [Zero Tests Run](#)
 - [Some Tests Are Not Running](#)
 - [Intel Fortran Version 13: -DINTEL_13](#)
 - [Segmentation Faults and Odd Link Errors](#)
- [Tips](#)
 - [Environment Modules](#)
 - [Compile Time Errors](#)
 - [Intermediate files used by pFUnit](#)
 - [Ignoring whitespace differences in assertions on strings.](#)

7.1 FAQ

7.1.1 Zero Tests Run

Symptom: The system under test compiles and runs fine, but reports zero tests run.

Solutions:

- There is no `testSuites.inc` file. Please add a `testSuites.inc` that lists the suites to add via `ADD_TEST_SUITE (the_suite_to_add)`, one to a line.
- There is no `-DUSE_MPI` passed to the compiler during the build. Please add to the compiler invocation. Please see [Some Tests Are Not Running](#).

7.1.2 Some Tests Are Not Running

Symptom: The system under test compiles and runs fine, but reports that some tests don't run.

Solutions:

- There is no `-DUSE_MPI` passed to the compiler during the build. Please add as in the following example.

```
% $PFUNIT/bin/pFUnitParser.py test_pio.pf test_pio.F90
% mpif90 -DUSE_MPI $PFUNIT/include/driver.F90 \
%      -I$PFUNIT/mod -L$PFUNIT/lib -lpfunit test_pio.F90

% mpirun -np 8 ./a.out

.
Time:          0.004 seconds

OK
```

7.1.3 Intel Fortran Version 13: -DINTEL_13

Using version 13 is deprecated. We have encountered problems using version 13, which we believe may be due to subtle compiler bugs. We strongly recommend upgrading to the latest version possible.

To make [pFUnit](#) work with Intel Fortran Version 13, please ensure that `-DINTEL_13` is passed to the compiler when building or using [pFUnit](#). In the build process for [pFUnit](#), this is added to the make variables `CPPFLAGS` and `FPPFLAGS`.

7.1.4 Segmentation Faults and Odd Link Errors

Q. [pFUnit](#) fails to build or now leads to segmentation faults. Did something change?

A. One cause for failure to build or odd runtime segmentation faults is when we change compiler configurations and some object or library files are left over from a previous environment. This might be hard to spot, for example, during compiler upgrades. - Switching from one compiler to another, e.g. from Intel to GNU, is more likely to generate link-time errors if old code is still around. A few items to check follow.

- Execute *make distclean* or remove objects (or their directories if using CMAKE) associated with previous builds.
- Ensure [pFUnit](#) and user applications are compiled using compatible (or the same) compilers.
- Ensure the environment variable `PFUNIT` is set to the appropriate install directory.

Finally, it is quite possible that a bug has been uncovered. Please contact the development team or open a [bug ticket](#).

7.2 Tips

7.2.1 Environment Modules

Though not strictly required, the Environment Modules package can be a convenient way to package, maintain, and switch between environments. This can be particularly important for [pFUnit](#), which must be built using the same tool suite being used for development, e.g. compilers, linkers, etc. [To do: A sample [pFUnit](#) modulefile is provided in the OTHER directory.]

7.2.2 Compile Time Errors

Compile time errors like "'include [...]include/.mk" not found' likely signify that you are not executing make in the top level directory during a build. Alternatively, during regular usage after installation, PFUNIT has not been set.

During building, if you wish to compile in a subdirectory within the [pFUnit](#) hierarchy, please try setting the COMPILER environment variable on the make command line. For example:

```
$ make all COMPILER=Intel
```

7.2.3 Intermediate files used by pFUnit

If you wish to see the intermediate files, use the target .PRECIOUS in the makefile to keep them from being deleted. For example:

```
# In GNUmakefile
.PRECIOUS: %_cpp.F90
```

7.2.4 Ignoring whitespace differences in assertions on strings.

Several options exist for how to compare strings with assertEquals.

```
call assertEquals(expectedString, foundString, &
    & whitespace=IGNORE_DIFFERENCES )
```

WhitespaceOptions:

- **IGNORE_DIFFERENCES** ignores whitespace differences (number and value).
- **IGNORE_ALL** strictly ignores all whitespace (spaces & tabs).
- **TRIM_ALL** strictly ignores leading and trailing whitespace.
- **KEEP_ALL** keeps all whitespace as significant, even discriminating between tabs and spaces.

Example usages can be seen in `tests/Test_AssertBasic.F90` or `Examples/Simple/tests/helloWorld.pf`.

Chapter 8

Platform Specific Notes

8.1 Mac OSX

The MacPorts package management system is a convenient way to install and maintain many packages, including gcc which includes gfortran.

8.2 Windows/CYGWIN

User contributed code for Windows/CYGWIN has been added, but is currently not tested and supported by the [pFUnit](#) team. At this writing, 2013-1031, serial Examples and MPI are not known to be supported. Please contact us if you wish to either contribute or otherwise discuss this port.

8.3 Intel Fortran Version 13: -DINTEL_13

To make [pFUnit](#) work with Intel Fortran Version 13, please ensure that `-DINTEL_13` is passed to the compiler when building or using [pFUnit](#). In the build process for [pFUnit](#), this is added to the make variables CPPFLAGS and FPPFLAGS.

Chapter 9

Acknowledgments

Thanks to the following for their review and comments: B. Van Aartsen, T. Clune.

Windows/CYGWIN contributions from E. Lezar.

Other acknowledgments: S.P. Santos (NCAR), M. Hambley (UK Met Office), J. Krishna (ANL).

The design of **pFUnit** is strongly influenced by **JUnit**.

Initial **pFUnit** 2 documentation by Michael Rilee (Rilee Systems Technologies).

Chapter 10

Known Installations & Versions

master - The current release.

development - The cutting edge of [pFUnit](#) development.

pfunit_2.1.0 - A feature freeze prior to a major upgrade of the preprocessor.

Chapter 11

TODO

- Make other directory.
- Make Environment Modules example in other directory.

Chapter 12

The Preprocessor - pFUnitParser

Overview of Preprocessor (pFUnitParser.py)

- [Using The Preprocessor](#)
 - [Configuration - testSuites.inc](#)
 - [Invocation](#)
 - [Command Line Options](#)
 - [Preprocessor Input File \(.pf\)](#)
 - [Directives](#)
 - * [@Test](#)
 - * [@MPITest](#)
 - * [@Assert](#) (or [Preprocessor Directives](#))
 - * [@Parameters](#)
 - * [@TestCase](#)

//

12.1 Using The Preprocessor

How to write tests using the ".pf" files. We expect this to be the main way people write pFUnit-based tests. Please see the Examples directory for a wide range of examples. The .pf files themselves are generally to be found in an example's "tests" subdirectory.

12.1.1 Configuration - testSuites.inc

The include file "testSuites.inc" tells the preprocessor to generate code for TestSuites listed therein. The suite names are based on the TestCases provided in the preprocessor input file or the name of the preprocessor input file (.pf) itself. For example, if no module is defined in a .pf file, i.e. the preprocessor will define the module, one can set up a "testSuites.inc" as follows.

```
! To load "exampleTestsNoModule.pf".
ADD_TEST_SUITE(exampleTestsNoModule_suite)
```

For a .pf file that contains a module associated with a test suite the syntax is as follows.

```
! To load "exampleTests.pf" implementing the module exampleTests_mod.
ADD_TEST_SUITE(exampleTests_mod_suite)
```

12.1.2 Invocation

To run the preprocessor on a preprocessor input file "exampleTests.pf", invoke:

```
$ ${PFUNIT}/bin/pFUnitParser.py exampleTests.pf exampleTests.F90
```

A convenient GNUmakefile rule is as follows.

```
%.F90: %.pf
    ${PFUNIT}/bin/pFUnitParser.py $< $@
```

12.1.3 Preprocessor Input File (.pf)

The preprocessor input file is a Fortran free format file that contains subroutines, including those implementing the suite of tests, or a module with the tests, TestCases, and support for parameters. The preprocessor reads and parses this file producing a fortran file implementing the tests, automating some boilerplate code. Embedded "@" directives inform the preprocessor about information needed to generate the test suite. If the .pf file does not implement a module providing a test suite, the preprocessor will use the name of .pf file referred to by "testSuites.inc". Currently only one test suite per .pf file is allowed, a limitation of the current implementation of the parser.

Many example .pf files may be found in the examples' "tests" subdirectories in the - Examples directory.

Below we present the most commonly used directives first, but in a .pf file using all of these capabilities, the most common order is as follows.

- @Parameters
- @TestCase
- @Test or @MPITest
- @Assert

12.1.4 Directives

Preprocessor "@" directives, which in keeping with Fortran style are not case sensitive, instruct the preprocessor how to interpret parts of the code relevant to the generation of the test suite. The most important directives follow.

12.1.4.1 @Test

This directive is used to indicate a test routine to the preprocessor, which then includes it in the test suite. There may be multiple tests in the .pf file, each annotated by the directive.

also supports MPI-parallel tests (see [@MPITest](#)).

An example, from Examples/Fixture:

```
@Test
  subroutine testBracketInterior(this)
    class (Test_LinearInterpolator), intent(inout) :: this
    @assertEqual([3,4], this%interpolator%getBracket(at=4.))
  end subroutine testBracketInterior

@Test
  subroutine testInterpolateAtNode(this)
    class (Test_LinearInterpolator), intent(inout) :: this
    @assertEqual(2., this%interpolator%interpolate(at=3.))
  end subroutine testInterpolateAtNode
```

12.1.4.2 @MPITest

is deprecated as now handles this case.

This directive indicates an MPI parallel test to the preprocessor, which then includes it in an MPI enabled test suite. The directive takes a single argument, the requested number of MPI processes to run. The syntax, exemplified by one of the tests from Examples/MPI_Halo:

```
@Test( npes=[1,2,3])
subroutine testHaloInterior(this)
  use Halo_mod
  use pfunit_mod
  implicit none
  class (MpiTestMethod) :: this

  integer, parameter :: N = 2
  real :: a(N,0:N+1)
  integer :: p

  p = this%getProcessRank()
  a(:,1:N) = p
```

```
a(:,0) = -1
a(:,N+1) = -1

call haloFill(a, this%getMpiCommunicator())

@assertEqual(real(p), a(1,1))
@assertEqual(real(p), a(2,1))
@assertEqual(real(p), a(1,2))
@assertEqual(real(p), a(2,2))

end subroutine testHaloInterior
```

12.1.4.3 @Assert

The directives are expanded into calls to similarly named [pFUnit](#) library routines. The syntax for the directives follows the pattern for below.

```
@assertEqual(expected,found,'An identifying or explanatory message.')
```

The preprocessor will automatically add information about source location (file & line number) to the call emitted to the test suite code. It also adds the check for exceptions.

For more information about directives, please refer to the following.

- [@assertEqual](#)
- [@assertTrue](#)
- [@assertEqualUserDefined](#)
- [@assertFalse](#)
- [@assertLessThan](#)
- [@assertLessThanOrEqual](#)
- [@assertGreaterThan](#)
- [@assertGreaterThanOrEqual](#)
- [@assertIsMemberOf](#)
- [@assertContains](#)
- [@assertAny](#)
- [@assertAll](#)
- [@assertNotAll](#)
- [@assertNone](#)

- [@assertIsPermutationOf](#)
- [@assertExceptionRaised](#)
- [@assertSameShape](#)
- [@assertIsNaN](#)
- [@assertIsFinite](#)
- [@assertAssociated](#)
- [@assertNotAssociated](#)
- [@assertAssociatedWith](#)
- [@assertNotAssociatedWith](#)
- [@assertEquivalent](#)

12.1.4.4 @Parameters

The directive indicates the declaration of the parameterized type used to generate the iteration over the multiple parameter values. It also identifies the names of the parameters to be iterated over. The preprocessor extracts type information from the declaration of the parameter type collection that immediately follows the directive. This directive will set up the iteration. To define the parameter values per iteration the `getParameters` method of the abstract `ParameterizedTest` must be implemented. For example:

```
@Parameters = [p1,p2]
type, extends (AbstractTestParameter) :: exampleCase
  integer :: i
  real :: x
end type exampleCase
```

12.1.4.5 @TestCase

This directive identifies to the preprocessor the `TestCase` declaration. The type declared at this point extends `TestCase` (or its extension), which includes setting methods such as the following: `setUp`, `tearDown`, `runMethod`, `userMethod`. For the extension `MPITestCase`, as with `ParameterizedTestCase`, you have the option (requirement if parameters are used) to set `getParameters` and `getParameterString`. For example:

```
@TestCase
type, extends (MPITestCase) :: Test_Parameters
  integer :: p1, p2
  procedure(runMethod), pointer :: userMethod => null()
contains
  procedure, nopass :: getParameters
```

```
    procedure :: getParameterString => getParameterString_  
    procedure :: runMethod  
end type Test_Parameters
```

Chapter 13

@Assert Preprocessor Directives

- [@assertEqual](#)
- [@assertTrue](#)
- [@assertEqualUserDefined](#)
- [@assertFalse](#)
- [@assertLessThan](#)
- [@assertLessThanOrEqual](#)
- [@assertGreaterThan](#)
- [@assertGreaterThanOrEqual](#)
- [@assertIsMemberOf](#)
- [@assertContains](#)
- [@assertAny](#)
- [@assertAll](#)
- [@assertNotAll](#)
- [@assertNone](#)
- [@assertIsPermutationOf](#)
- [@assertExceptionRaised](#)
- [@assertSameShape](#)
- [@assertIsNaN](#)

- [@assertIsFinite](#)
- [@assertAssociated](#)
- [@assertNotAssociated](#)
- [@assertAssociatedWith](#)
- [@assertNotAssociatedWith](#)
- [@assertEquivalent](#)

13.1 @Assert Preprocessor Directives

13.1.1 @assertEqual

13.1.2 @assertTrue

13.1.3 @assertEqualUserDefined

A convenience function that allows a user to write

```
@assertEqualUserDefined(a,b)
```

instead of

```
call assertTrue(a==b,...)
```

while a more instructive error message about the arguments and source code position is added by the preprocessor. The user may add an error message as follows.

```
@assertEqualUserDefined(a,b,message='a and b should be equal here.')
```

13.1.4 @assertFalse

13.1.5 @assertLessThan

13.1.6 @assertLessThanOrEqual

13.1.7 @assertGreaterThan

13.1.8 @assertGreaterThanOrEqual

13.1.9 @assertIsMemberOf

13.1.10 @assertContains

13.1.11 @assertAny

13.1.12 @assertAll

13.1.13 @assertNotAll

13.1.14 @assertNone

13.1.15 @assertIsPermutationOf

13.1.16 @assertExceptionRaised

13.1.17 @assertSameShape

13.1.18 @assertIsNaN

13.1.19 @assertIsFinite

13.1.20 @assertAssociated

maps to a call to the logical intrinsic function associated.

```
@assertAssociated(a)
```

becomes

```
call assertTrue(associated(a))
```

13.1.21 @assertNotAssociated

This directive is the same as `assertAssociated`, except that it maps to `assertFalse`. This directive was originally released as `assertUnAssociated`.

13.1.22 @assertAssociatedWith

This directive maps to a call to the logical intrinsic function associated.

```
@assertAssociatedWith(pointer,target)
```

becomes

```
call assertTrue(associated(pointer,target))
```

neglecting message and source location information.

13.1.23 @assertNotAssociatedWith

This directive is the same as `assertAssociatedWith`, except that it maps to `assertFalse`. This directive was originally released as `assertUnAssociatedWith`.

13.1.24 @assertEquivalent

This directive compares two logical values and throws an exception annotated with some useful information. We get a special directive for this one because comparing logicals uses the `.eqv.` infix operator in standard Fortran. The arguments `a` and `b` below may be 1d arrays.

```
@assertEquivalent(a,b)
```

becomes

```
call assertTrue(a.eqv.b)
```

neglecting the specification of message and source location information.

Chapter 14

Revision Notes

- 2014-1211 Minor updates for 3.0.2. MLR
- 2014-1110, 2014-1031 Minor edits. MLR
- 2014-0915 Minor updates for 3.0.1. MLR
- 2014-0404 Updated for release of 3.0. TLC
- 2014-0131, 2014-0205. Updated. MLR
- 2013-1227. First note of OPENMP additions by T. Clune. MLR.
- 2013-1212. Initial draft of Doxygen version. MLR
- 2013-1107. Minor edits. MLR
- 2013-1031. Added user contributed code for Windows/CYGWIN & IBM's XLF. MLR
- 2013-0830-1359. Minor corrections and added MPIF90 to 6.2. MLR
- 2013-0806-1345. Corrected git reference. Was using old URL. MLR
- 2013-0805. Initial draft. MLR

Chapter 15

Data Type Index

15.1 Class Hierarchy

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

AbstractTestParameter_mod	57
AbstractTestResult_mod	57
pUnitParser::Action	58
pUnitParser::AtAfter	93
pUnitParser::AtAssert	93
pUnitParser::AtAssertAssociated	94
pUnitParser::AtAssertAssociatedWith	95
pUnitParser::AtAssertEqualUserDefined	95
pUnitParser::AtAssertEquivalent	96
pUnitParser::AtAssertNotAssociated	97
pUnitParser::AtAssertNotAssociatedWith	98
pUnitParser::AtBefore	98
pUnitParser::AtBegin	99
pUnitParser::AtMpiAssert	100
pUnitParser::AtSuite	101
pUnitParser::AtTest	101
pUnitParser::AtMpiTest	100
pUnitParser::AtTestCase	102
pUnitParser::AtTestParameter	103
add_mod	59
addComplex_mod	59
CodeUtilities::ArrayDescription	59
Assert_mod	60
AssertArraysInternalassertEqual_mod	60
AssertArraysInternalassertGreaterThan_mod	63

AssertArraysInternalassertGreaterThanOrEqual_mod	66
AssertArraysInternalassertLessThan_mod	70
AssertArraysInternalassertLessThanOrEqual_mod	73
AssertArraysInternalassertNotEqual_mod	77
AssertArraysInternalassertRelativelyEqual_mod	80
AssertArraysSupport_mod	83
AssertBasic_mod	83
AssertComplex0_mod	85
AssertComplex1_mod	85
AssertComplex2_mod	86
AssertComplex3_mod	86
AssertComplex4_mod	86
AssertComplex5_mod	87
AssertInteger0_mod	87
AssertInteger1_mod	87
AssertInteger2_mod	88
AssertInteger3_mod	88
AssertInteger4_mod	88
AssertInteger5_mod	89
AssertReal0_mod	89
AssertReal1_mod	90
AssertReal2_mod	90
AssertReal3_mod	91
AssertReal4_mod	91
AssertReal5_mod	92
GenerateAssertsOnArrays::AssertRealArrayArgument	92
TestCaseB_mod::B_Parameter	103
BaseTestRunner_mod	104
BeforeAfter_mod	105
BrokenSetUpCase_mod	105
BrokenTestCase_mod	105
TestCaseC_mod::C_Parameter	106
Cases_mod	106
Test_mod::countTestCases	108
mods::pre::pre2::dataString	108
DebugListener_mod	109
CodeUtilities::declaration	110
DynamicTestCase_mod	110
Exception_mod	111
Expectation_mod	112
Fixture_mod	112
FixtureTestCase_mod	113
CodeUtilities::fortranSubroutineSignature	113
AbstractTestResult_mod::getErrors	114
Test_mod::getName	114
AbstractTestResult_mod::getSuccesses	114

Halo_mod	114
CodeUtilities::implementation	115
CodeUtilities::interfaceBlock	116
mods::pre::pre_If::interval	116
Test_RestrictSphericalCoordinates_mod::LatLonCase	117
LinearInterpolator_mod	117
MakeInfinity_mod	118
MakeNaN_mod	118
Mock_mod	119
MockCall_mod	120
MockListener_mod	121
MockRepository_mod	122
MockSUT_mod	123
testParser::MockWriter	123
CodeUtilities::module	124
MpiContext_mod	124
MpiStubs_mod	125
MpiTestCase_mod	126
MpiTestCaseB_mod::MpiTestCaseB	127
MpiTestCaseB_mod	127
MpiTestMethod_mod	128
MpiTestParameter_mod	129
pFUnitParser::MyError	129
Cases_mod::MyParamType	129
Cases_mod::MyTestCase	130
TestCaseC_mod::newC_Parameter	130
node_mod	130
ParallelContext_mod	131
ParallelException_mod	131
ParameterizedTestCase_mod	132
Params_mod	133
pFUnitParser::Parser	134
testParser::MockParser	121
Test_Parameters_mod::peCase	135
pFUnit	136
pFUnit_mod	136
PrivateException_mod	137
mods::pre::pre2::procDirective	138
mods::pre::pre_If::IfDirective	115
mods::pre::pre_Repeat::RepeatDirective	140
RemoteProxyTestCase_mod	139
ResultPrinter_mod	140
RobustRunner_mod	141
robustTestSuite_mod	142
CodeUtilities::routineUnit	143

GenerateAssertsOnArrays::constraintASSERT	107
GenerateAssertsOnArrays::IsWithinTolerance	116
GenerateAssertsOnArrays::VECTOR_NORM	181
SerialContext_mod	143
SimpleTestCase_mod	144
SourceLocation_mod	145
SphericalCoordinates_mod	146
TestListener_mod::startTest	146
StringConversionUtilities_mod	146
SubsetRunner_mod	147
SurrogateTestCase_mod	148
SUT_mod	149
Test_mod::Test	149
Test_Assert_mod	150
Test_AssertBasic_mod	150
Test_AssertComplex_mod	150
Test_AssertInteger_mod	151
Test_AssertReal_mod	152
Test_BasicOpenMP_mod	153
Test_Exception_mod	153
Test_FixtureTestCase_mod	153
Test_LinearInterpolator_mod::Test_LinearInterpolator	154
Test_LinearInterpolator_mod	154
Test_MockCall_mod	154
Test_MockRepository_mod	155
Test_mod	155
Test_MpiContext_mod	156
Test_MpiException_mod	156
Test_MpiParameterizedTestCase_mod	156
Test_MpiTestCase_mod	157
Test_Parameters_mod::Test_Parameters	157
Test_Parameters_mod	158
Test_RestrictSphericalCoordinates_mod::Test_RestrictSphericalCoordinates	158
Test_RestrictSphericalCoordinates_mod	159
Test_RobustRunner_mod	159
Test_SimpleTestCase_mod	159
Test_StringConversionUtilities_mod	160
Test_TestMethod_mod	160
Test_TestResult_mod	160
Test_TestSuite_mod	161
Test_UnixProcess_mod	161
Test_XmlPrinter_mod	161
TestA_mod	162
TestCase_mod	162
TestCaseA_mod::TestCaseA	163

TestCaseA_mod	164
TestCaseB_mod::TestCaseB	164
TestCaseB_mod	165
TestCaseC_mod::TestCaseC	166
TestCaseC_mod	166
TestFailure_mod	167
mods::pre::pre_If::TestIfDirective	168
mods::pre::interleavedp::TestInterleaved	168
TestListener_mod	169
TestMethod_mod	169
mods::pre::parseArgs::TestParseArgs	170
testParser::TestParseLine	171
parseBrackets::TestRejoinBracketed	175
mods::pre::pre_Repeat::TestRepeatDirective	175
TestResult_mod	175
TestRunner_mod	176
TestSuite_mod	177
ThrowFundamentalTypes_mod	178
UnixPipeInterfaces_mod	179
UnixProcess_mod	180
AbstractTestResult_mod::wasSuccessful	181
WrapbeforeAfter	182
WrapMpiTestCaseB_mod	182
Wrapsimple	182
WrapTestA_mod	182
WrapTestCaseA_mod	183
WrapTestCaseB_mod	183
WrapTestCaseC_mod	183
XmlPrinter_mod	184

Chapter 16

Data Type Index

16.1 Data Types List

Here are the data types with brief descriptions:

AbstractTestParameter_mod	57
AbstractTestResult_mod	57
pUnitParser::Action	58
add_mod	59
addComplex_mod	59
CodeUtilities::ArrayDescription	59
Assert_mod	
<BriefDescription>	60
AssertArraysInternalassertEqual_mod	60
AssertArraysInternalassertGreaterThan_mod	63
AssertArraysInternalassertGreaterThanOrEqual_mod	66
AssertArraysInternalassertLessThan_mod	70
AssertArraysInternalassertLessThanOrEqual_mod	73
AssertArraysInternalassertNotEqual_mod	77
AssertArraysInternalassertRelativelyEqual_mod	80
AssertArraysSupport_mod	83
AssertBasic_mod	
Provides fundamental assertions over the most basic types, a foundation for providing test services to end users	83
AssertComplex0_mod	85
AssertComplex1_mod	85
AssertComplex2_mod	86
AssertComplex3_mod	86
AssertComplex4_mod	86
AssertComplex5_mod	87

AssertInteger0_mod	87
AssertInteger1_mod	87
AssertInteger2_mod	88
AssertInteger3_mod	88
AssertInteger4_mod	88
AssertInteger5_mod	89
AssertReal0_mod	89
AssertReal1_mod	90
AssertReal2_mod	90
AssertReal3_mod	91
AssertReal4_mod	91
AssertReal5_mod	92
GenerateAssertsOnArrays::AssertRealArrayArgument	92
pFUnitParser::AtAfter	93
pFUnitParser::AtAssert	93
pFUnitParser::AtAssertAssociated	94
pFUnitParser::AtAssertAssociatedWith	95
pFUnitParser::AtAssertEqualUserDefined	95
pFUnitParser::AtAssertEquivalent	96
pFUnitParser::AtAssertNotAssociated	97
pFUnitParser::AtAssertNotAssociatedWith	98
pFUnitParser::AtBefore	98
pFUnitParser::AtBegin	99
pFUnitParser::AtMpiAssert	100
pFUnitParser::AtMpiTest	100
pFUnitParser::AtSuite	101
pFUnitParser::AtTest	101
pFUnitParser::AtTestCase	102
pFUnitParser::AtTestParameter	103
TestCaseB_mod::B_Parameter	103
BaseTestRunner_mod	
<BriefDescription>	104
BeforeAfter_mod	105
BrokenSetUpCase_mod	105
BrokenTestCase_mod	105
TestCaseC_mod::C_Parameter	106
Cases_mod	106
GenerateAssertsOnArrays::constraintASSERT	107
Test_mod::countTestCases	108
mods::pre::pre2::dataString	108
DebugListener_mod	
<BriefDescription>	109
CodeUtilities::declaration	110
DynamicTestCase_mod	
<BriefDescription>	110
Exception_mod	111

Expectation_mod	112
Fixture_mod	112
FixtureTestCase_mod	113
CodeUtilities::fortranSubroutineSignature	113
AbstractTestResult_mod::getErrors	114
Test_mod::getName	114
AbstractTestResult_mod::getSuccesses	114
Halo_mod	114
mods::pre::pre_If::IfDirective	115
CodeUtilities::implementation	115
CodeUtilities::interfaceBlock	116
mods::pre::pre_If::interval	116
GenerateAssertsOnArrays::IsWithinTolerance	116
Test_RestrictSphericalCoordinates_mod::LatLonCase	117
LinearInterpolator_mod	117
MakeInfinity_mod	
<BriefDescription>	118
MakeNaN_mod	
<BriefDescription>	118
Mock_mod	
<BriefDescription>	119
MockCall_mod	
<BriefDescription>	120
MockListener_mod	121
testParser::MockParser	121
MockRepository_mod	
<BriefDescription>	122
MockSUT_mod	123
testParser::MockWriter	123
CodeUtilities::module	124
MpiContext_mod	
<BriefDescription>	124
MpiStubs_mod	
<BriefDescription>	125
MpiTestCase_mod	
<BriefDescription>	126
MpiTestCaseB_mod::MpiTestCaseB	127
MpiTestCaseB_mod	127
MpiTestMethod_mod	
<BriefDescription>	128
MpiTestParameter_mod	129
pFUnitParser::MyError	129
Cases_mod::MyParamType	129
Cases_mod::MyTestCase	130
TestCaseC_mod::newC_Parameter	130
node_mod	130

ParallelContext_mod	
<BriefDescription>	131
ParallelException_mod	
<BriefDescription>	131
ParameterizedTestCase_mod	
<BriefDescription>	132
Params_mod	
<BriefDescription>	133
pUnitParser::Parser	134
Test_Parameters_mod::peCase	135
pUnit	
<BriefDescription>	136
pUnit_mod	
<BriefDescription>	136
PrivateException_mod	
<BriefDescription>	137
mods::pre::pre2::procDirective	138
RemoteProxyTestCase_mod	
<BriefDescription>	139
mods::pre::pre_Repeat::RepeatDirective	140
ResultPrinter_mod	
<BriefDescription>	140
RobustRunner_mod	
<BriefDescription>	141
robustTestSuite_mod	142
CodeUtilities::routineUnit	143
SerialContext_mod	
<BriefDescription>	143
SimpleTestCase_mod	144
SourceLocation_mod	
<BriefDescription>	145
SphericalCoordinates_mod	146
TestListener_mod::startTest	146
StringConversionUtilities_mod	
A collection of utilities used throughout the framework	146
SubsetRunner_mod	
<BriefDescription>	147
SurrogateTestCase_mod	
<BriefDescription>	148
SUT_mod	149
Test_mod::Test	149
Test_Assert_mod	150
Test_AssertBasic_mod	150
Test_AssertComplex_mod	150
Test_AssertInteger_mod	151
Test_AssertReal_mod	152

Test_BasicOpenMP_mod	153
Test_Exception_mod	153
Test_FixtureTestCase_mod	153
Test_LinearInterpolator_mod::Test_LinearInterpolator	154
Test_LinearInterpolator_mod	154
Test_MockCall_mod	154
Test_MockRepository_mod	155
Test_mod	
<BriefDescription>	155
Test_MpiContext_mod	156
Test_MpiException_mod	156
Test_MpiParameterizedTestCase_mod	156
Test_MpiTestCase_mod	157
Test_Parameters_mod::Test_Parameters	157
Test_Parameters_mod	158
Test_RestrictSphericalCoordinates_mod::Test_RestrictSphericalCoordinates	158
Test_RestrictSphericalCoordinates_mod	159
Test_RobustRunner_mod	159
Test_SimpleTestCase_mod	159
Test_StringConversionUtilities_mod	160
Test_TestMethod_mod	160
Test_TestResult_mod	160
Test_TestSuite_mod	161
Test_UnixProcess_mod	161
Test_XmlPrinter_mod	
Output test messages in junit.xsd-compatible XML	161
TestA_mod	162
TestCase_mod	
<BriefDescription>	162
TestCaseA_mod::TestCaseA	163
TestCaseA_mod	164
TestCaseB_mod::TestCaseB	164
TestCaseB_mod	165
TestCaseC_mod::TestCaseC	166
TestCaseC_mod	166
TestFailure_mod	
<BriefDescription>	167
mods::pre::pre_if::TestIfDirective	168
mods::pre::interleavedp::TestInterleaved	168
TestListener_mod	
<BriefDescription>	169
TestMethod_mod	
<BriefDescription>	169
mods::pre::parseArgs::TestParseArgs	170
testParser::TestParseLine	171
parseBrackets::TestRejoinBracketed	175

mods::pre::pre_Repeat::TestRepeatDirective	175
TestResult_mod	
<BriefDescription> Note: A possible extension point for user-specialized TestResults	175
TestRunner_mod	
<BriefDescription>	176
TestSuite_mod	
<BriefDescription>	177
ThrowFundamentalTypes_mod	
<BriefDescription>	178
UnixPipeInterfaces_mod	
<BriefDescription>	179
UnixProcess_mod	
<BriefDescription>	180
GenerateAssertsOnArrays::VECTOR_NORM	181
AbstractTestResult_mod::wasSuccessful	181
WrapbeforeAfter	182
WrapMpiTestCaseB_mod	182
Wrapsimple	182
WrapTestA_mod	182
WrapTestCaseA_mod	183
WrapTestCaseB_mod	183
WrapTestCaseC_mod	183
XmlPrinter_mod	
<BriefDescription>	184

Chapter 17

Data Type Documentation

17.1 AbstractTestParameter_mod Module Reference

Data Types

- type **AbstractTestParameter**
- interface **toString**

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

- AbstractTestParameter.F90

17.2 AbstractTestResult_mod Module Reference

Data Types

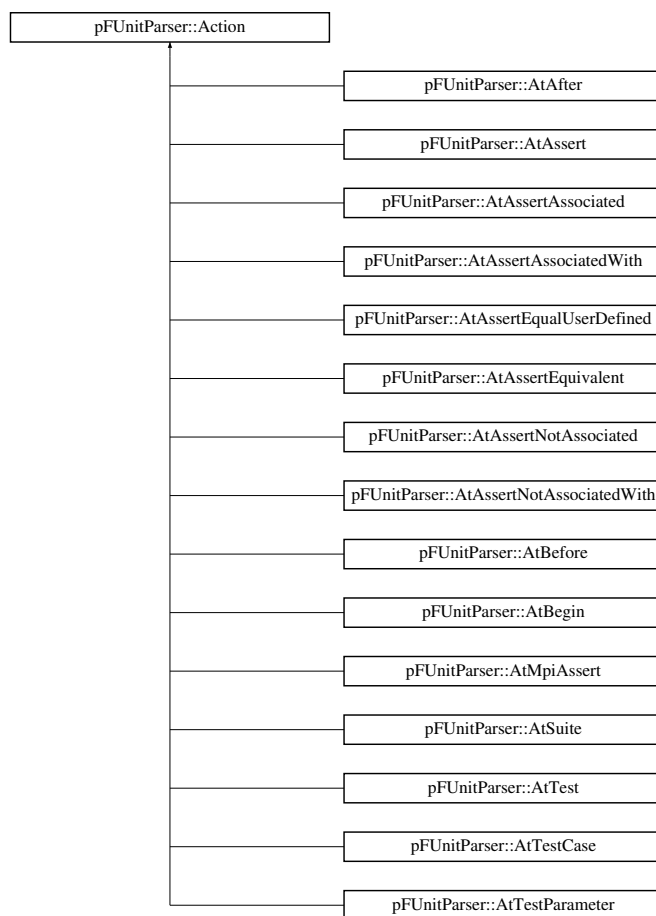
- type **AbstractTestResult**
- interface **errorCount**
- interface **failureCount**
- interface **getErrors**
- interface **getFailures**
- interface **getName**
- interface **getRunTime**
- interface **getSuccesses**
- interface **runCount**
- interface **setName**
- interface **wasSuccessful**

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

- AbstractTestResult.F90

17.3 pFUnitParser::Action Class Reference

Inheritance diagram for pFUnitParser::Action:



Public Member Functions

- def **apply**

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

- pFUnitParser.py

17.4 add_mod Module Reference

Public Member Functions

- real function **add** (x, y)
- real function **add** (x, y)

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

- Robust/src/add.F90
- Simple/src/add.F90

17.5 addComplex_mod Module Reference

Public Member Functions

- complex function, dimension(size(z0)) **add** (z0, z1)

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

- addComplex.F90

17.6 CodeUtilities::ArrayDescription Class Reference

Public Member Functions

- def **__init__**
- def **NAME**
- def **DECLARE**
- def **DECLARESCALAR**
- def **KIND**
- def **RANK**
- def **FTYPE**
- def **EXPANDSHAPE**
- def **FailureMessageFork**

Public Attributes

- **fType**
- **kind**
- **rank**

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

- CodeUtilities.py

17.7 Assert_mod Module Reference

<BriefDescription>

17.7.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- Assert.F90

17.8 AssertArraysInternalassertEqual_mod Module Reference

Data Types

- interface **differenceReport**
- interface **isWithinTolerance**
- interface **valuesReport**
- interface **vectorNorm**

Public Member Functions

- subroutine, public **assertEqual_e0_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertEqual_e1_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_integerdef_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_integerdef_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_integerdef_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_integerdef_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_integerdef_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_integerdef_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_integerdef_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_integerdef_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertEqual_e1_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_complex32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_complex32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_complex32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_complex32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_complex32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_complex32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e0_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertEqual_e1_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

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

- AssertArraysInternalassertEqual.F90

17.9 AssertArraysInternalassertGreaterThan_mod Module Reference

Data Types

- interface **differenceReport**
- interface **isWithinTolerance**
- interface **valuesReport**
- interface **vectorNorm**

Public Member Functions

- subroutine, public **assertGreaterThan_e0_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertGreaterThan_e1_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_integerdef_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_integerdef_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_integerdef_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_integerdef_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_integerdef_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_integerdef_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_integerdef_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_integerdef_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertGreaterThan_e1_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_complex32_f0_complex32_tol32_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_complex32_f0_complex32_tol32_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_complex32_f1_complex32_tol32_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_complex32_f1_complex32_tol32_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_complex32_f0_complex64_tol64_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_complex32_f0_complex64_tol64_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_complex32_f1_complex64_tol64_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_complex32_f1_complex64_tol64_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_complex64_f0_complex64_tol64_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_complex64_f0_complex64_tol64_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e0_complex64_f1_complex64_tol64_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThan_e1_complex64_f1_complex64_tol64_** - (expected, eShape, found, fShape, tolerance, message, location, comparison)

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

- AssertArraysInternalassertGreaterThan.F90

17.10 AssertArraysInternalassertGreaterThanOrEqual_mod - Module Reference

Data Types

- interface **differenceReport**
- interface **isWithinTolerance**
- interface **valuesReport**
- interface **vectorNorm**

Public Member Functions

- subroutine, public **assertGreaterThanOrEqual_e0_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertGreaterThanOrEqual_e1_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_integerdef_f0_complex32-_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_integerdef_f0_complex32-_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_integerdef_f1_complex32-_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_integerdef_f1_complex32-_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_integerdef_f0_complex64-_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_integerdef_f0_complex64-_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_integerdef_f1_complex64-_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_integerdef_f1_complex64-_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real32_f0_complex32_-_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

17.10 AssertArraysInternalassertGreaterThanOrEqual_mod Module Reference 69

- subroutine, public **assertGreaterThanOrEqual_e1_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_complex32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_complex32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_complex32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_complex32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertGreaterThanOrEqual_e0_complex32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_complex32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e0_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertGreaterThanOrEqual_e1_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

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

- AssertArraysInternalassertGreaterThanOrEqual.F90

17.11 AssertArraysInternalassertLessThan_mod Module Reference

Data Types

- interface **differenceReport**
- interface **isWithinTolerance**
- interface **valuesReport**
- interface **vectorNorm**

Public Member Functions

- subroutine, public **assertLessThan_e0_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertLessThan_e1_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertLessThan_e1_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_integerdef_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_integerdef_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_integerdef_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_integerdef_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_integerdef_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_integerdef_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_integerdef_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_integerdef_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_complex32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertLessThan_e1_complex32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_complex32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_complex32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_complex32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_complex32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e0_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThan_e1_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

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

- AssertArraysInternalassertLessThan.F90

17.12 AssertArraysInternalassertLessThanOrEqual_mod Module - Reference

Data Types

- interface **differenceReport**
- interface **isWithinTolerance**
- interface **valuesReport**
- interface **vectorNorm**

Public Member Functions

- subroutine, public **assertLessThanOrEqual_e0_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertLessThanOrEqualTo_e1_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e0_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e1_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e0_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e1_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e0_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e1_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e0_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e1_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e0_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e1_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e0_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e1_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e0_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e1_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e0_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e1_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e0_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e1_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e0_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqualTo_e1_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertLessThanOrEqual_e0_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_integerdef_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_integerdef_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_integerdef_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_integerdef_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_integerdef_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_integerdef_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_integerdef_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_integerdef_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertLessThanOrEqual_e0_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_complex32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_complex32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_complex32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_complex32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_complex32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_complex32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e0_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertLessThanOrEqual_e1_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

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

- AssertArraysInternalassertLessThanOrEqual.F90

17.13 AssertArraysInternalassertNotEqual_mod Module Reference

Data Types

- interface **differenceReport**
- interface **isWithinTolerance**
- interface **valuesReport**
- interface **vectorNorm**

Public Member Functions

- subroutine, public **assertNotEqual_e0_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertNotEqual_e1_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_integerdef_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_integerdef_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_integerdef_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_integerdef_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_integerdef_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_integerdef_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_integerdef_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_integerdef_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertNotEqual_e1_real32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_real32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_real32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_real64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_real64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_complex32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_complex32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_complex32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_complex32_f1_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_complex32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_complex32_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e0_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertNotEqual_e1_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

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

- AssertArraysInternalassertNotEqual.F90

17.14 AssertArraysInternalassertRelativelyEqual_mod Module - Reference

Data Types

- interface **differenceReport**
- interface **isWithinTolerance**
- interface **valuesReport**
- interface **vectorNorm**

Public Member Functions

- subroutine, public **assertRelativelyEqual_e0_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_integerdef_f0_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_integerdef_f1_integerdef_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_integerdef_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_integerdef_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_integerdef_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_integerdef_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_real32_f0_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertRelativelyEqual_e1_real32_f1_real32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_real32_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_real32_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_real64_f0_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_real64_f1_real64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_integerdef_f0_complex32 - tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_integerdef_f0_complex32 - tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_integerdef_f1_complex32 - tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_integerdef_f1_complex32 - tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_integerdef_f0_complex64 - tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_integerdef_f0_complex64 - tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_integerdef_f1_complex64 - tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_integerdef_f1_complex64 - tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real32_f0_complex32_tol32_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertRelativelyEqual_e1_real32_f0_complex32_tol32_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real32_f1_complex32_tol32_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_real32_f1_complex32_tol32_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real32_f0_complex64_tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_real32_f0_complex64_tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real32_f1_complex64_tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_real32_f1_complex64_tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real64_f0_complex64_tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_real64_f0_complex64_tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_real64_f1_complex64_tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_real64_f1_complex64_tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_complex32_f0_complex32 - tol32_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_complex32_f0_complex32 - tol32_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_complex32_f1_complex32 - tol32_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_complex32_f1_complex32 - tol32_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_complex32_f0_complex64 - tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_complex32_f0_complex64 - tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_complex32_f1_complex64 - tol64_**
(expected, eShape, found, fShape, tolerance, message, location, comparison)

- subroutine, public **assertRelativelyEqual_e1_complex32_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_complex64_f0_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e0_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)
- subroutine, public **assertRelativelyEqual_e1_complex64_f1_complex64_tol64_** (expected, eShape, found, fShape, tolerance, message, location, comparison)

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

- AssertArraysInternalassertRelativelyEqual.F90

17.15 AssertArraysSupport_mod Module Reference

Data Types

- interface **differenceReport**
- interface **isWithinTolerance**
- interface **valuesReport**
- interface **vectorNorm**

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

- AssertArraysSupport.F90

17.16 AssertBasic_mod Module Reference

Provides fundamental assertions over the most basic types, a foundation for providing test services to end users.

Data Types

- interface **assertEqual**
- interface **assertExceptionRaised**
- interface **assertFail**
- interface **assertFalse**
- interface **assertIsFinite**
- interface **assertIsNaN**
- interface **assertTrue**
- interface **fail**
- type **UnusableArgument**

Public Member Functions

- subroutine **assertExceptionRaisedMessage** (message, location)
- subroutine, public **assertSameShape** (shapeA, shapeB, message, location)
- logical function, public **conformable** (shapeA, shapeB)
- logical function, public **nonConformable** (shapeA, shapeB)
- subroutine, public **assertAny** (conditions, message, location)
- subroutine, public **assertAll** (conditions, message, location)
- subroutine, public **assertNone** (conditions, message, location)
- subroutine, public **assertNotAll** (conditions, message, location)
- subroutine **assertIsNaN_double** (x, message, location)
- subroutine **assertIsFinite_single** (x, message, location)
- subroutine **assertIsFinite_double** (x, message, location)

17.16.1 Detailed Description

Provides fundamental assertions over the most basic types, a foundation for providing test services to end users.

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

For assertions on strings whitespace may or may not be significant to a test. We now have several options for dealing with whitespace via the optional argument `Whitespace`. These options are `IGNORE_ALL`, `TRIM_ALL`, and `KEEP_ALL`. - Usage is as follows.

```
call assertEquals(expectedString, foundString, & & Whitespace==  
IGNORE_ALL )
```

WhitespaceOptions:

- **TRIM_ALL** ignores leading and trailing whitespace.
- **KEEP_ALL** keeps all whitespace as significant, even discriminating between tabs and spaces.
- **IGNORE_ALL** ignores all whitespace (spaces & tabs).

Example usages can be seen in `tests/Test_AssertBasic.F90` or `Examples/-Simple/tests/helloWorld.pf`.

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

- `AssertBasic.F90`

17.17 AssertComplex0_mod Module Reference

Data Types

- interface **assertEquals**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

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

- `AssertComplex0.F90`

17.18 AssertComplex1_mod Module Reference

Data Types

- interface **assertEquals**

- interface **assertNotEqual**
- interface **assertRelativelyEqual**

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

- AssertComplex1.F90

17.19 AssertComplex2_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

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

- AssertComplex2.F90

17.20 AssertComplex3_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

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

- AssertComplex3.F90

17.21 AssertComplex4_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

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

- AssertComplex4.F90

17.22 AssertComplex5_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

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

- AssertComplex5.F90

17.23 AssertInteger0_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**

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

- AssertInteger0.F90

17.24 AssertInteger1_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**

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

- AssertInteger1.F90

17.25 AssertInteger2_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**

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

- AssertInteger2.F90

17.26 AssertInteger3_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**

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

- AssertInteger3.F90

17.27 AssertInteger4_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**

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

- AssertInteger4.F90

17.28 AssertInteger5_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**

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

- AssertInteger5.F90

17.29 AssertReal0_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

Public Attributes

- integer, parameter, public **L_INFINITY_NORM** = 0
- integer, parameter, public **L1_NORM** = 1
- integer, parameter, public **L2_NORM** = 2

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

- AssertReal0.F90

17.30 AssertReal1_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

Public Attributes

- integer, parameter, public **L_INFINITY_NORM** = 0
- integer, parameter, public **L1_NORM** = 1
- integer, parameter, public **L2_NORM** = 2

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

- AssertReal1.F90

17.31 AssertReal2_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

Public Attributes

- integer, parameter, public **L_INFINITY_NORM** = 0
- integer, parameter, public **L1_NORM** = 1
- integer, parameter, public **L2_NORM** = 2

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

- AssertReal2.F90

17.32 AssertReal3_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

Public Attributes

- integer, parameter, public **L_INFINITY_NORM** = 0
- integer, parameter, public **L1_NORM** = 1
- integer, parameter, public **L2_NORM** = 2

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

- AssertReal3.F90

17.33 AssertReal4_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

Public Attributes

- integer, parameter, public **L_INFINITY_NORM** = 0
- integer, parameter, public **L1_NORM** = 1
- integer, parameter, public **L2_NORM** = 2

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

- AssertReal4.F90

17.34 AssertReal5_mod Module Reference

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **assertNotEqual**
- interface **assertRelativelyEqual**

Public Attributes

- integer, parameter, public **L_INFINITY_NORM** = 0
- integer, parameter, public **L1_NORM** = 1
- integer, parameter, public **L2_NORM** = 2

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

- AssertReal5.F90

17.35 GenerateAssertsOnArrays::AssertRealArrayArgument Class Reference

Public Member Functions

- def **__init__**
- def **updateDescriptions**
- def **getAssertionName**
- def **getExpectedDescription**
- def **getFoundDescription**
- def **getTolerance**

Public Attributes

- **assertionName**
- **expectedFType**
- **expectedPrecision**
- **expectedRank**

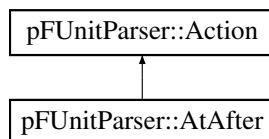
- **foundFType**
- **foundPrecision**
- **foundRank**
- **tolerance**
- **expectedDescription**
- **foundDescription**

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

- GenerateAssertsOnArrays.py

17.36 pFUnitParser::AtAfter Class Reference

Inheritance diagram for pFUnitParser::AtAfter:



Public Member Functions

- **def __init__**
- **def match**
- **def action**

Public Attributes

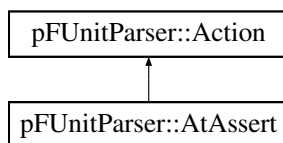
- **parser**

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

- pFUnitParser.py

17.37 pFUnitParser::AtAssert Class Reference

Inheritance diagram for pFUnitParser::AtAssert:



Public Member Functions

- def `__init__`
- def `match`
- def `appendSourceLocation`
- def `action`

Public Attributes

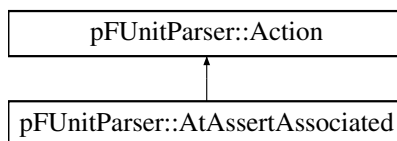
- `parser`

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

- `pFUnitParser.py`

17.38 pFUnitParser::AtAssertAssociated Class Reference

Inheritance diagram for pFUnitParser::AtAssertAssociated:



Public Member Functions

- def `__init__`
- def `match`
- def `appendSourceLocation`
- def `action`

Public Attributes

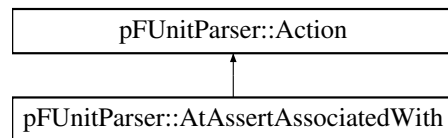
- **parser**

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

- pFUnitParser.py

17.39 pFUnitParser::AtAssertAssociatedWith Class Reference

Inheritance diagram for pFUnitParser::AtAssertAssociatedWith:



Public Member Functions

- def **__init__**
- def **match**
- def **appendSourceLocation**
- def **action**

Public Attributes

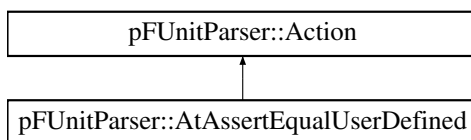
- **parser**

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

- pFUnitParser.py

17.40 pFUnitParser::AtAssertEqualUserDefined Class Reference

Inheritance diagram for pFUnitParser::AtAssertEqualUserDefined:



Public Member Functions

- def `__init__`
- def `match`
- def `appendSourceLocation`
- def `action`

Public Attributes

- `parser`

17.40.1 Detailed Description

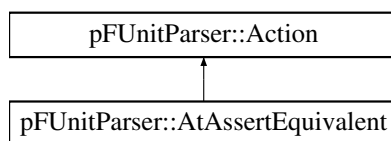
Convenience directive replacing (a,b) with a call to `assertTrue(a==b)` and an error message, if none is provided when invoked.

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

- `pFUnitParser.py`

17.41 pFUnitParser::AtAssertEquivalent Class Reference

Inheritance diagram for `pFUnitParser::AtAssertEquivalent`:



Public Member Functions

- def `__init__`

- def **match**
- def **appendSourceLocation**
- def **action**

Public Attributes

- **parser**

17.41.1 Detailed Description

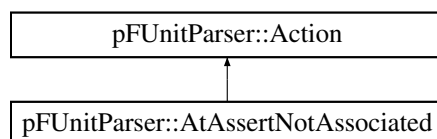
Convenience directive replacing `(a,b)` with a call to `assertTrue(a.eqv.b)` and an error message, if none is provided when invoked.

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

- pFUnitParser.py

17.42 pFUnitParser::AtAssertNotAssociated Class Reference

Inheritance diagram for pFUnitParser::AtAssertNotAssociated:



Public Member Functions

- def **__init__**
- def **match**
- def **appendSourceLocation**
- def **action**

Public Attributes

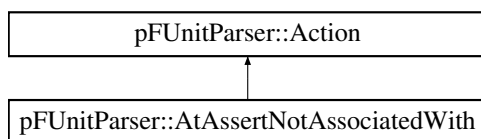
- **parser**
- **name**

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

- pFUnitParser.py

17.43 pFUnitParser::AtAssertNotAssociatedWith Class Reference

Inheritance diagram for pFUnitParser::AtAssertNotAssociatedWith:



Public Member Functions

- def **__init__**
- def **match**
- def **appendSourceLocation**
- def **action**

Public Attributes

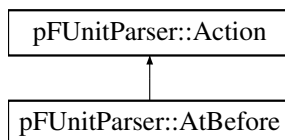
- **parser**
- **name**

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

- pFUnitParser.py

17.44 pFUnitParser::AtBefore Class Reference

Inheritance diagram for pFUnitParser::AtBefore:



Public Member Functions

- def **__init__**
- def **match**
- def **action**

Public Attributes

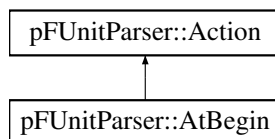
- **parser**

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

- pFUnitParser.py

17.45 pFUnitParser::AtBegin Class Reference

Inheritance diagram for pFUnitParser::AtBegin:



Public Member Functions

- def **__init__**
- def **match**
- def **action**

Public Attributes

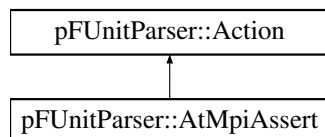
- **parser**

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

- pFUnitParser.py

17.46 pFUnitParser::AtMpiAssert Class Reference

Inheritance diagram for pFUnitParser::AtMpiAssert:



Public Member Functions

- def **__init__**
- def **match**
- def **appendSourceLocation**
- def **action**

Public Attributes

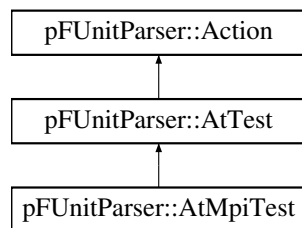
- **parser**

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

- pFUnitParser.py

17.47 pFUnitParser::AtMpiTest Class Reference

Inheritance diagram for pFUnitParser::AtMpiTest:



Public Member Functions

- def **__init__**

Public Attributes

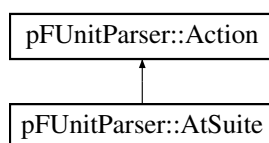
- **parser**
- **keyword**

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

- pFUnitParser.py

17.48 pFUnitParser::AtSuite Class Reference

Inheritance diagram for pFUnitParser::AtSuite:



Public Member Functions

- def **__init__**
- def **match**
- def **action**

Public Attributes

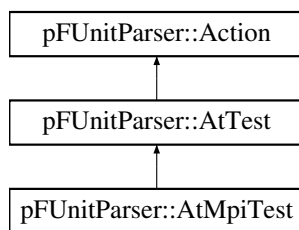
- **parser**

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

- pFUnitParser.py

17.49 pFUnitParser::AtTest Class Reference

Inheritance diagram for pFUnitParser::AtTest:



Public Member Functions

- `def __init__`
- `def match`
- `def action`

Public Attributes

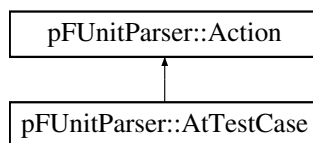
- `parser`
- `keyword`

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

- `pFUnitParser.py`

17.50 pFUnitParser::AtTestCase Class Reference

Inheritance diagram for `pFUnitParser::AtTestCase`:



Public Member Functions

- `def __init__`
- `def match`
- `def action`

Public Attributes

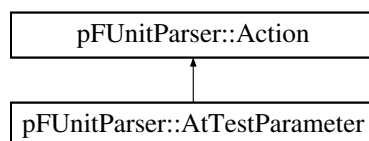
- **parser**

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

- pFUnitParser.py

17.51 pFUnitParser::AtTestParameter Class Reference

Inheritance diagram for pFUnitParser::AtTestParameter:



Public Member Functions

- def **__init__**
- def **match**
- def **action**

Public Attributes

- **parser**

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

- pFUnitParser.py

17.52 TestCaseB_mod::B_Parameter Type Reference

Public Member Functions

- procedure **toString**
- procedure **toString**

Public Attributes

- real **phi**
- real **theta**

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

- ParameterizedTestCaseB.F90
- ParameterizedTestCaseB.pf

17.53 BaseTestRunner_mod Module Reference

<BriefDescription>

Data Types

- type **BaseTestRunner**
- interface **run2**

17.53.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- BaseTestRunner.F90

17.54 BeforeAfter_mod Module Reference

Public Member Functions

- subroutine **first** (this)
- subroutine **last** (this)
- subroutine **firstAndLastCalled** (this)
- subroutine **succeeds** (this)
- subroutine **fails** (this)

Public Attributes

- integer **countStart** = 0
- integer **countComplete** = 0

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

- Examples/MPI_Halo/tests/beforeAfter.pf

17.55 BrokenSetUpCase_mod Module Reference

Data Types

- type **BrokenSetUpCase**

Public Member Functions

- type(BrokenSetUpCase) function, pointer, public **newBrokenSetUpCase** ()

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

- BrokenSetUpCase.F90

17.56 BrokenTestCase_mod Module Reference

Data Types

- type **BrokenTestCase**

Public Member Functions

- subroutine **tearDown** (this)

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

- BrokenTestCase.F90

17.57 TestCaseC_mod::C_Parameter Type Reference

Public Member Functions

- procedure **toString**
- procedure **toString**

Public Attributes

- real **phi**
- real **theta**

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

- MpiParameterizedTestCaseC.F90
- MpiParameterizedTestCaseC.pf

17.58 Cases_mod Module Reference

Data Types

- type [MyParamType](#)
- type [MyTestCase](#)

Public Member Functions

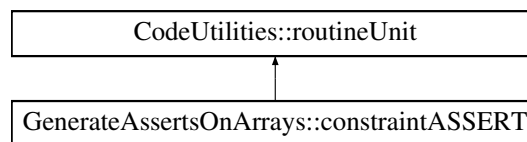
- type([MyParamType](#)) function **newMyParam** (i)
- type([MyTestCase](#)) function **newMyTestCase** (param)
- subroutine **test_odd** (this)
- subroutine **test_even** (this)
- character(:) function, allocatable **toString** (this)

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

- Test_Cases.pf

17.59 GenerateAssertsOnArrays::constraintASSERT Class - Reference

Inheritance diagram for GenerateAssertsOnArrays::constraintASSERT:



Public Member Functions

- def [__init__](#)
Dependency injection.

Public Attributes

- **expectedDescr**
- **foundDescr**
- **name**
- [name1](#)
Add in the extra module procedures...
- [tolerance](#)
If you need another kind of code generator, perhaps conditioned on eDesc., fDesc., or tol, then that logic would go here...

17.59.1 Constructor & Destructor Documentation

17.59.1.1 **def** GenerateAssertsOnArrays::constraintASSERT::__init__(*self*,
 assertionName, *expectedDescr*, *foundDescr*, *tolerance*)

Dependency injection.

Will generate "assert"+assertionName assertionName="Equal" This next line actually generates the text of the code.

17.59.2 Member Data Documentation

17.59.2.1 `GenerateAssertsOnArrays::constraintASSERT::name1`

Add in the extra module procedures...

If needed... Kluge. Need to make `makeSubroutineNames` and load the extra interface entries there.

17.59.2.2 `GenerateAssertsOnArrays::constraintASSERT::tolerance`

If you need another kind of code generator, perhaps conditioned on `eDesc.`, `fDesc.`, or `tol`, then that logic would go here...

E.g. to implement `assertEqual(Logical(...))`

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

- `GenerateAssertsOnArrays.py`

17.60 `Test_mod::countTestCases` Interface Reference

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

- `Test.F90`

17.61 `mods::pre::pre2::dataString` Class Reference

Public Member Functions

- `def __init__`
- `def insert`
- `def getLength`
- `def getPosition`
- `def setPosition`
- `def getItem`
- `def getDataAtPosition`
- `def getData`
- `def getSlice`
- `def getSliceForward`
- `def removeSlice`
- `def getCurrentData`

- def **insertAtCurrent**
- def **append**
- def **advanceAndGetNextData**
- def **validPosition**
- def **findToEnd**
- def **match**
- def **matchToEnd**
- def **searchToEnd**
- def **searchToPosition**
- def **finditerToEnd**
- def **finditerToPosition**

Public Attributes

- **data**
- **position**

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

- pre2.py

17.62 DebugListener_mod Module Reference

<BriefDescription>

Data Types

- interface **DebugListener**

Public Member Functions

- subroutine **addFailure** (this, testName, exceptions)
- subroutine **startTest** (this, testName)

17.62.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- DebugListener.F90

17.63 CodeUtilities::declaration Class Reference

Public Member Functions

- def **__init__**
- def **generate**

Public Attributes

- **simpleDeclaration**
- **fullDeclaration**
- **name**

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

- CodeUtilities.py

17.64 DynamicTestCase_mod Module Reference

<BriefDescription>

Data Types

- interface **delete**
- type **DynamicTestCase**
- interface **testmethod**

Public Member Functions

- type(DynamicTestCase) function, pointer, public **newDynamicTestCase** (test-Method, name)

17.64.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- DynamicTestCase.F90

17.65 Exception_mod Module Reference

Data Types

- interface **anyExceptions**
- interface **catch**
- interface **getNumExceptions**
- interface **throw**

Public Member Functions

- subroutine, public **initializeGlobalExceptionList** ()
- type(Exception) function, public **catchNext** (preserve)
- type(Exception) function, dimension(:), allocatable, public **getExceptions** ()
- logical function, public **noExceptions** ()
- logical function, public **anyErrors** ()

- subroutine, public **gatherExceptions** (context)
- subroutine, public **clearAll** ()

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

- Exception.F90

17.66 Expectation_mod Module Reference

Data Types

- type **Expectation**
- type **Predicate**
- type **Subject**
- interface **subVoid**

Public Member Functions

- type(Predicate) function, public **newPredicate** (name)
- type(Subject) function, public **newSubject** (name, sub)
- type(Subject) function, public **newSubjectNameOnly** (name)
- type(Expectation) function, public **newExpectation** (subj, pred)

Public Attributes

- type(Predicate), parameter, public **wasCalled** = Predicate('wasCalled')
- type(Predicate), parameter, public **wasNotCalled** = Predicate('wasNotCalled')
- type(Predicate), parameter, public **wasCalledOnce** = Predicate('wasCalled-Once')

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

- Expectation.F90

17.67 Fixture_mod Module Reference

Public Member Functions

- subroutine **mySetup** ()

- subroutine **myTearDown** ()
- subroutine **testRead** ()
- subroutine **testEOF** ()

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

- fixtureTests.pf

17.68 FixtureTestCase_mod Module Reference

Data Types

- interface **delete**
- type **FixtureTestCase**

Public Member Functions

- type(FixtureTestCase) function, public **newFixtureTestCase** ()
- subroutine, public **simpleTestMethod** (this)
- subroutine, public **methodA** (this)
- subroutine, public **methodB** (this)

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

- FixtureTestCase.F90

17.69 CodeUtilities::fortranSubroutineSignature Class Reference

Public Member Functions

- def **__init__**
- def **setReturnFType**
- def **addArg**
- def **generateInterfaceEntry**
- def **generateImplementationSignature**
- def **generateImplementationClose**

Public Attributes

- **name**
- **ArgumentToFType**
- **ReturnFType**
- **SubroutineType**

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

- CodeUtilities.py

17.70 AbstractTestResult_mod::getErrors Interface Reference

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

- AbstractTestResult.F90

17.71 Test_mod::getName Interface Reference

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

- Test.F90

17.72 AbstractTestResult_mod::getSuccesses Interface Reference

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

- AbstractTestResult.F90

17.73 Halo_mod Module Reference

Public Member Functions

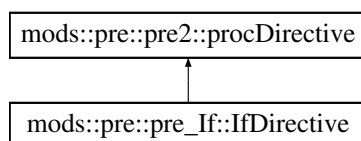
- subroutine **haloFill** (array, communicator)

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

- Halo.F90

17.74 mods::pre::pre_If::IfDirective Class Reference

Inheritance diagram for mods::pre::pre_If::IfDirective:



Public Member Functions

- def **evaluate**

Public Attributes

- **startPosition**
- **newPosition**

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

- pre_If.py

17.75 CodeUtilities::implementation Class Reference

Public Member Functions

- def **__init__**
- def **generate**

Public Attributes

- **name**
- **source**

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

- CodeUtilities.py

17.76 CodeUtilities::interfaceBlock Class Reference

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

- CodeUtilities.py

17.77 mods::pre::pre_if::interval Class Reference

Public Member Functions

- def **__init__**
- def **getInterval**
- def **setInterval**
- def **getStart**
- def **getEnd**

Public Attributes

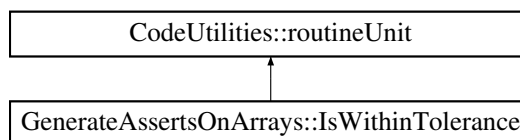
- **start**
- **end**
- **interval**

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

- pre_if.py

17.78 GenerateAssertsOnArrays::IsWithinTolerance Class Reference

Inheritance diagram for GenerateAssertsOnArrays::IsWithinTolerance:



Public Member Functions

- def **__init__**

17.79 Test_RestrictSphericalCoordinates_mod::LatLonCase Type Reference 117

Public Attributes

- **rank**
- **precision**
- **name**
- **fType**
- **declaration**
- **declarations**

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

- GenerateAssertsOnArrays.py

17.79 Test_RestrictSphericalCoordinates_mod::LatLonCase Type - Reference

Public Member Functions

- procedure **toString**

Public Attributes

- real **lat**
- real **lon**
- real **restrictedLat**
- real **restrictedLon**

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

- Test_RestrictedSphericalCoordinates.pf

17.80 LinearInterpolator_mod Module Reference

Data Types

- interface **LinearInterpolator**
- type **Node**

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

- LinearInterpolator.F90

17.81 MakeInfinity_mod Module Reference

<BriefDescription>

Public Member Functions

- real(r32) function, public **makeInf_32** ()
- real(r64) function, public **makeInf_64** ()

17.81.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC SIVO

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- MakeInfinity.F90

17.82 MakeNaN_mod Module Reference

<BriefDescription>

Public Member Functions

- real(r32) function, public **makeNaN_32** ()
- real(r64) function, public **makeNaN_64** ()

17.82.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- MakeNaN.F90

17.83 Mock_mod Module Reference

<BriefDescription>

Data Types

- type **Mock**

17.83.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

12 May 2014

Note

<A note here.> <Or starting here...>

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

- Mock.F90

17.84 MockCall_mod Module Reference

<BriefDescription>

Data Types

- type **MockCall**

Public Member Functions

- type(MockCall) function, public **newMockCall** (name)

17.84.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- MockCall.F90

17.85 MockListener_mod Module Reference

Data Types

- type **MockListener**

Public Member Functions

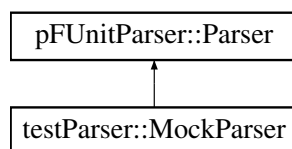
- subroutine **startTest** (this, testName)

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

- MockListener.F90

17.86 testParser::MockParser Class Reference

Inheritance diagram for testParser::MockParser:



Public Member Functions

- def **__init__**
- def **nextLine**
- def **reset**

Public Attributes

- **saveLines**
- **lines**
- **outputFile**
- **outLines**
- **userTestCase**
- **userTestMethods**
- **currentSelfObjectName**

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

- testParser.py

17.87 MockRepository_mod Module Reference

<BriefDescription>

Data Types

- interface **addExpectationThat_**
- type **MockRepository**
- interface **registerMockCallBy_**
- interface **subVoid**

Public Member Functions

- type(MockRepository) function, pointer, public **newMockRepository** ()
- subroutine **expectCall** (this, obj, method)

Public Attributes

- integer, parameter, public **MAX_LEN_METHOD_NAME** = 32
- integer, parameter, public **MAX_LEN_CALL_REGISTRATION** = 32
- class(MockRepository), pointer, public **MockRepositoryPointer** = > null()

17.87.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- MockRepository.F90

17.88 MockSUT_mod Module Reference

Data Types

- type **MockSUT**

Public Member Functions

- type(MockSUT) function, allocatable, public **newMockSUT** (repository)
- subroutine **method1** (this)

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

- Test_MockRepository.F90

17.89 testParser::MockWriter Class Reference

Public Member Functions

- def **__init__**
- def **write**

Public Attributes

- **parser**

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

- testParser.py

17.90 CodeUtilities::module Class Reference

Public Member Functions

- def `__init__`
- def `generate`
- def `addDeclaration`
- def `addImplementation`
- def `addRoutineUnit`
- def `addInterfaceBlock`
- def `getName`
- def `setFileName`
- def `getFileName`

Public Attributes

- `name`
- `declarations`
- `implementations`
- `generation`
- `fileName`

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

- `CodeUtilities.py`

17.91 MpiContext_mod Module Reference

<BriefDescription>

Data Types

- type `MpiContext`
- interface `newMpiContext`

Public Member Functions

- subroutine `barrier` (this)
- integer function `getMpiCommunicator` (this)

17.91.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- `MpiContext.F90`

17.92 `MpiStubs_mod` Module Reference

<BriefDescription>

Public Member Functions

- subroutine, public **MPI_Comm_rank** (comm, rank, ier)
- subroutine, public **MPI_Comm_size** (comm, size, ier)
- subroutine, public **MPI_Comm_dup** (comm, newComm, ier)
- subroutine, public **MPI_Comm_group** (comm, group, ier)
- subroutine, public **MPI_Group_range_incl** (group, n, ranges, newGroups, ier)
- subroutine, public **MPI_Comm_create** (comm, group, newComm, ier)

Public Attributes

- integer, parameter, public **MPI_COMM_WORLD** = -1
- integer, parameter, public **MPI_COMM_NULL** = -1
- integer, parameter, public **MPI_COMM_SUCCESS** = 0

17.92.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- `MpiStubs.F90`

17.93 `MpiTestCase_mod` Module Reference

<BriefDescription>

Data Types

- type **`MpiTestCase`**

Public Member Functions

- recursive subroutine **`runBare`** (this)
- integer function **`getMpiCommunicator`** (this)
- integer function **`getProcessRank`** (this)

17.93.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- `MpiTestCase.F90`

17.94 `MpiTestCaseB_mod::MpiTestCaseB` Type Reference

Public Member Functions

- procedure **setUp**
- procedure **tearDown**
- procedure **setUp**
- procedure **tearDown**

Public Attributes

- integer **componentI**

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

- `MpiTestCaseB.F90`
- `MpiTestCaseB.pf`

17.95 `MpiTestCaseB_mod` Module Reference

Data Types

- type `MpiTestCaseB`

Public Member Functions

- subroutine **setUp** (this)
- subroutine **tearDown** (this)

- subroutine **testA** (this)
- subroutine **testB** (this)
- subroutine **setUp** (this)
- subroutine **tearDown** (this)
- subroutine **testA** (this)
- subroutine **testB** (this)

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

- `MpiTestCaseB.F90`
- `MpiTestCaseB.pf`

17.96 `MpiTestMethod_mod` Module Reference

<BriefDescription>

Data Types

- interface **mpiMethod**
- type **MpiTestMethod**
- interface **newMpiTestMethod**

17.96.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- `MpiTestMethod.F90`

17.97 `MpiTestParameter_mod` Module Reference

Data Types

- type **`MpiTestParameter`**

Public Member Functions

- `type(MpiTestParameter)` function, public **`newMpiTestParameter`** (`num-ProcessesRequested`)

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

- `MpiTestParameter.F90`

17.98 `pFUnitParser::MyError` Class Reference

Inherits `Exception`.

Public Member Functions

- `def __init__`
- `def __str__`

Public Attributes

- **`value`**

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

- `pFUnitParser.py`

17.99 `Cases_mod::MyParamType` Type Reference

Public Member Functions

- procedure **`toString`**

Public Attributes

- integer `i`

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

- `Test_Cases.pf`

17.100 `Cases_mod::MyTestCase` Type Reference

Public Attributes

- integer `i`

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

- `Test_Cases.pf`

17.101 `TestCaseC_mod::newC_Parameter` Interface Reference

Public Member Functions

- type([C_Parameter](#)) function `newC_Parameter_phiTheta` (`npes`, `phi`, `theta`)
- elemental function `newC_Parameter_case` (`i`)
- type([C_Parameter](#)) function `newC_Parameter_phiTheta` (`npes`, `phi`, `theta`)
- elemental function `newC_Parameter_case` (`i`)

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

- `MpiParameterizedTestCaseC.F90`
- `MpiParameterizedTestCaseC.pf`

17.102 `node_mod` Module Reference

Data Types

- interface `node`

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

- `node.F90`

17.103 ParallelContext_mod Module Reference

<BriefDescription>

Data Types

- interface **allReduceLogical**
- interface **gatherInteger**
- interface **gatherLogical**
- interface **gatherString**
- interface **getNumProcesses**
- type **ParallelContext**
- interface **processRank**
- interface **sum**

17.103.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- ParallelContext.F90

17.104 ParallelException_mod Module Reference

<BriefDescription>

Data Types

- interface **anyExceptions**
- interface **getNumExceptions**

Public Member Functions

- subroutine, public **gather** (context)

17.104.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- `ParallelException.F90`

17.105 ParameterizedTestCase_mod Module Reference

<BriefDescription>

Data Types

- type **ParameterizedTestCase**

Public Attributes

- integer, parameter, public **MAX_LEN_LABEL** = 32

17.105.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- ParameterizedTestCase.F90

17.106 Params_mod Module Reference

<BriefDescription>

Public Attributes

- integer, parameter, public **MAX_LENGTH_NAME** = 128
- integer, parameter **R32** = selected_real_kind(p=6)
- integer, parameter **R64** = selected_real_kind(p=14)
- integer, parameter **C32** = selected_real_kind(p=6)
- integer, parameter **C64** = selected_real_kind(p=14)
- integer, parameter **NEQP** = 0
- integer, parameter **EQP** = 1
- integer, parameter **GTP** = 2
- integer, parameter **GEP** = 3
- integer, parameter **LTP** = 4
- integer, parameter **LEP** = 5
- integer, parameter **RELEQP** = 6

17.106.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

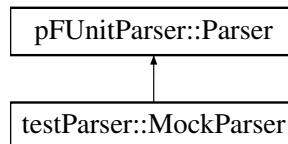
<A note here.> <Or starting here...>

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

- Params.F90

17.107 pFUnitParser::Parser Class Reference

Inheritance diagram for pFUnitParser::Parser:



Public Member Functions

- def **__init__**
- def **commentLine**
- def **run**
- def **isComment**
- def **nextLine**
- def **printHeader**
- def **printTail**
- def **printWrapUserTestCase**
- def **printRunMethod**

- def **printParameterHeader**
- def **printMakeSuite**
- def **addSimpleTestMethod**
- def **addMpiTestMethod**
- def **addUserTestMethod**
- def **printMakeCustomTest**
- def **makeWrapperModule**
- def **final**

Public Attributes

- **fileName**
- **inputFile**
- **outputFile**
- **defaultSuiteName**
- **suiteName**
- **currentLineNumber**
- **userModuleName**
- **userTestCase**
- **userTestMethods**
- **wrapModuleName**
- **actions**

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

- pFUnitParser.py

17.108 Test_Parameters_mod::peCase Type Reference

Public Member Functions

- procedure **toString**

Public Attributes

- integer **p1**
- integer **p2**

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

- parameterizedTests.pf

17.109 pFUnit Module Reference

<BriefDescription>

Public Member Functions

- integer function **run** ()

17.109.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- pFUnitPackage.F90

17.110 pFUnit_mod Module Reference

<BriefDescription>

Public Member Functions

- subroutine, public **initialize** (useMpi)
- subroutine, public **finalize** (successful)

17.110.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- pFUnit.F90

17.111 PrivateException_mod Module Reference

<BriefDescription>

Data Types

- type **Exception**
- type **ExceptionList**
- interface **newException**

Public Member Functions

- type(ExceptionList) function, public **newExceptionList** ()
- logical function **noExceptions** (this)

Public Attributes

- integer, parameter, public **MAXLEN_MESSAGE** = 80*15
- integer, parameter, public **MAXLEN_FILE_NAME** = 80
- character(len=*), parameter, public **NULL_MESSAGE** = "

17.111.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

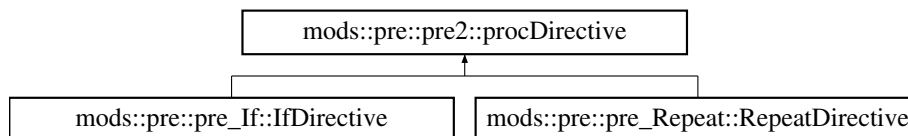
<A note here.> <Or starting here...>

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

- Exception.F90

17.112 mods::pre::pre2::procDirective Class Reference

Inheritance diagram for mods::pre::pre2::procDirective:



Public Member Functions

- def `__init__`
- def `getLength`
- def `match`
- def `evaluate`
- def `getNewPosition`
- def `addTokenRE`
- def `searchTokenToEnd`
- def `searchTokenToPosition`
- def `finditerTokenToPosition`
- def `makeTokenErrorMessage`

Public Attributes

- **name**
- **newPosition**
- **tokens**
- **TokenREs**

17.112.1 Member Function/Subroutine Documentation

17.112.1.1 **def mods::pre::pre2::procDirective::addTokenRE (self, args, key, defaultToken, prefix = r' ' '(?i) [\t]*' ', postfix = ' ')**

Add a token/create an RE with a prefix that by default ignores preceding whitespace. Stores the RE in a dictionary for this directive.

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

- pre2.py

17.113 RemoteProxyTestCase_mod Module Reference

<BriefDescription>

Data Types

- interface **RemoteProxyTestCase**

17.113.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

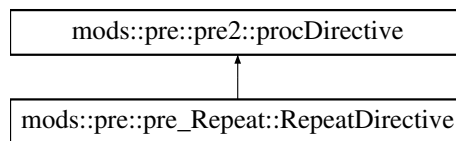
<A note here.> <Or starting here...>

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

- RemoteProxyTestCase.F90

17.114 mods::pre::pre_Repeat::RepeatDirective Class Reference

Inheritance diagram for mods::pre::pre_Repeat::RepeatDirective:

**Public Member Functions**

- def **evaluate**

Public Attributes

- **startPosition**
- **newPosition**

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

- pre_Repeat.py

17.115 ResultPrinter_mod Module Reference

<BriefDescription>

Data Types

- type **ResultPrinter**

Public Member Functions

- type(ResultPrinter) function, public **newResultPrinter** (unit)
- subroutine **addError** (this, testName, exceptions)
- subroutine **startTest** (this, testName)
- subroutine **print** (this, result)
- subroutine **printHeader** (this, runTime)
- subroutine **printFooter** (this, result)

17.115.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- ResultPrinter.F90

17.116 RobustRunner_mod Module Reference

<BriefDescription>

Data Types

- interface **RobustRunner**
- type **TestCaseMonitor**

Public Member Functions

- subroutine **runWithResult** (this, aTest, context, result)
- subroutine **launchRemoteRunner** (this, numSkip)
- subroutine **startTest** (this, testName)
- subroutine **addFailure** (this, testName, exceptions)
- subroutine **addError** (this, testName, exceptions)
- type(TestResult) function **createTestResult** (this)

17.116.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- RobustRunner.F90

17.117 robustTestSuite_mod Module Reference

Public Member Functions

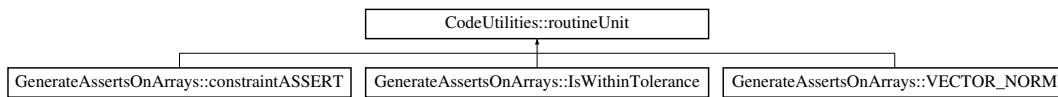
- type(TestSuite) function, public **suite** ()
- subroutine **testRunSucceeds** ()
- subroutine **testRunAssertFailure** ()
- subroutine **testRunStops** ()

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

- robustTestSuite.F90

17.118 CodeUtilities::routineUnit Class Reference

Inheritance diagram for CodeUtilities::routineUnit:



Public Member Functions

- def **__init__**
- def **setName**
- def **getName**
- def **setDeclaration**
- def **addDeclaration**
- def **setImplementation**
- def **getDeclaration**
- def **getDeclarations**
- def **getImplementation**
- def **clearDeclarations**

Public Attributes

- **name**
- **declaration**
- **declarations**
- **implementation**

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

- CodeUtilities.py

17.119 SerialContext_mod Module Reference

<BriefDescription>

Data Types

- type **SerialContext**

Public Member Functions

- type(`SerialContext`) function, public **newSerialContext** ()

Public Attributes

- type(`SerialContext`), parameter, public **THE_SERIAL_CONTEXT** = `SerialContext()`

17.119.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- `SerialContext.F90`

17.120 SimpleTestCase_mod Module Reference

Data Types

- interface **method**
- type **SimpleTestCase**

Public Member Functions

- type(`TestSuite`) function, public **suite** ()
- type(`SimpleTestCase`) function, public **newSimpleTestCase** (name, user-Method)

- subroutine, public **method1** (this)
- subroutine, public **method2** (this)
- subroutine, public **methodWith2Exceptions** (this)
- subroutine **delete_** (this)

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

- SimpleTestCase.F90

17.121 SourceLocation_mod Module Reference

<BriefDescription>

Data Types

- type **SourceLocation**

Public Attributes

- character(len=MAXLEN_FILE_NAME), parameter, public **UNKNOWN_FILE_NAME** = '<unknown file>'
- integer, parameter, public **UNKNOWN_LINE_NUMBER** = -1
- type(SourceLocation), parameter, public **UNKNOWN_SOURCE_LOCATION** = SourceLocation()

17.121.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- SourceLocation.F90

17.122 SphericalCoordinates_mod Module Reference

Data Types

- interface **SphericalCoordinates**

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

- SphericalCoordinates.F90

17.123 TestListener_mod::startTest Interface Reference

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

- TestListener.F90

17.124 StringConversionUtilities_mod Module Reference

A collection of utilities used throughout the framework.

Data Types

- interface **toString**
- type **WhitespaceOptions**

Public Member Functions

- character(len=len_trim(a)+1+len_trim(b)) function, public **appendWithSpace** (a, b)
- character(len=:) function, allocatable, public **nullTerminate** (string)
- character(len=:) function, allocatable, public **unlessScalar** (vShape, string)
- logical function, public **whitespacep** (c)
- character(len=:) function, allocatable, public **trimAll** (s)
- character(len=:) function, allocatable, public **trimTrailingWhitespace** (s)

Public Attributes

- integer, parameter, public **MAXLEN_STRING** = 80
- type(WhitespaceOptions), parameter, public **IGNORE_ALL** = WhitespaceOptions(IGNORE_ALL_)
- type(WhitespaceOptions), parameter, public **TRIM_ALL** = WhitespaceOptions(-TRIM_ALL_)
- type(WhitespaceOptions), parameter, public **KEEP_ALL** = WhitespaceOptions(-KEEP_ALL_)
- type(WhitespaceOptions), parameter, public **IGNORE_DIFFERENCES** = - WhitespaceOptions(IGNORE_DIFFERENCES_)

17.124.1 Detailed Description

A collection of utilities used throughout the framework.

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- StringConversionUtilities.F90

17.125 SubsetRunner_mod Module Reference

<BriefDescription>

Data Types

- interface **SubsetRunner**

Public Member Functions

- subroutine **addFailure** (this, testName, exceptions)
- subroutine **startTest** (this, testName)

17.125.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- SubsetRunner.F90

17.126 SurrogateTestCase_mod Module Reference

<BriefDescription>

Data Types

- interface **getName**
- interface **runBare**
- interface **setName**
- type **SurrogateTestCase**

17.126.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- SurrogateTestCase.F90

17.127 SUT_mod Module Reference

Data Types

- type **SUT**

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

- Test_MockRepository.F90

17.128 Test_mod::Test Type Reference

Public Member Functions

- procedure([countTestCases](#)), deferred **countTestCases**
- procedure([run](#)), deferred **run**
- procedure([getName](#)), deferred **getName**
- procedure **setName**

Public Attributes

- integer **placeholder**

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

- Test.F90

17.129 Test_Assert_mod Module Reference

Public Member Functions

- type(`TestSuite`) function, public **suite** ()
- subroutine **testAssertEqualStringDiffer1st** ()

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

- `Test_Assert.F90`

17.130 Test_AssertBasic_mod Module Reference

Public Member Functions

- type(`TestSuite`) function, public **suite** ()
- subroutine **testAssertTrueF** ()
- subroutine **testAssertIsFinite** ()
- subroutine **testAssertExceptionRaised** ()
- subroutine **testAssertFail** ()

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

- `Test_AssertBasic.F90`

17.131 Test_AssertComplex_mod Module Reference

Public Member Functions

- type(`TestSuite`) function, public **suite** ()
- subroutine **testEquals_C_complexScalar** ()
- subroutine **testEquals_C_0D1D** ()
- subroutine **testEquals_C_1D_nonConformable1** ()
- subroutine **testEquals_C_2D_SingleElementDifferent** ()
- subroutine **testEquals_C_MultiD_SingleElementDifferent** ()
- subroutine **testEquals_C_MultiD_SingleElementDifferent1**
- subroutine **testEquals_C_MultiD_SingleElementDifferent2**
- subroutine **testEquals_C_MultiD_SingleElementDifferent3**
- subroutine **testEquals_C_MultiD_SingleElementDifferent4**
- subroutine **testEquals_C_MultiD_SingleElementDifferent5**

- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff1** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff2** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff3** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff4** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff5** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff6** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff7** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff8** ()
- subroutine **testEquals_ScalarWithTolerance** ()
- subroutine **testEquals_C_MultiDWithTolerance** ()
- subroutine **testEquals_C_MultiDWithTolerance1** ()
- subroutine **testEquals_C_MultiDWithTolerance64** ()
- subroutine **testEquals_C_MultiDWithTolerance64_1** ()
- subroutine **testEquals_C_MultiDWithTolerance64_2** ()
- subroutine **testEquals_C_MultiDSourceLocation** ()
- subroutine **testEquals_4DPComplex_DifferenceReport** ()
- subroutine **testEquals_ComplexMultiD_SingleElementNE1**
- subroutine **testEquals_ComplexMultiD_SingleElementRE1**
- subroutine **testEquals_ComplexMultiD_SingleEltVarious1**
- subroutine **assertCatch** (string, location)

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

- Test_AssertComplex.F90

17.132 Test_AssertInteger_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testAssertEqual_equal** ()

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

- Test_AssertInteger.F90

17.133 Test_AssertReal_mod Module Reference

Public Member Functions

- type(`TestSuite`) function, public `suite` ()
- subroutine `testEquals_0D1D` ()
- subroutine `testEquals_1D_nonConformable1` ()
- subroutine `testEquals_2D_SingleElementDifferent` ()
- subroutine `testEquals_MultiD_SingleElementDifferent` ()
- subroutine `testEquals_MultiD_SingleElementDifferent1`
- subroutine `testEquals_MultiD_SingleElementDifferent2`
- subroutine `testEquals_MultiD_SingleElementDifferent3`
- subroutine `testEquals_MultiD_SingleElementDifferent4`
- subroutine `testEquals_MultiD_SingleElementDifferent5`
- subroutine `testEquals_MultiDMultiPrec_SingleEltDiff` ()
- subroutine `testEquals_MultiDMultiPrec_SingleEltDiff1` ()
- subroutine `testEquals_MultiDMultiPrec_SingleEltDiff2` ()
- subroutine `testEquals_MultiDMultiPrec_SingleEltDiff3` ()
- subroutine `testEquals_MultiDMultiPrec_SingleEltDiff4` ()
- subroutine `testEquals_MultiDMultiPrec_SingleEltDiff5` ()
- subroutine `testEquals_MultiDMultiPrec_SingleEltDiff6` ()
- subroutine `testEquals_MultiDMultiPrec_SingleEltDiff7` ()
- subroutine `testEquals_MultiDMultiPrec_SingleEltDiff8` ()
- subroutine `testEquals_ScalarWithTolerance` ()
- subroutine `testEquals_ScalarWithToleranceNoMsg` ()
- subroutine `testEquals_VectorWithToleranceNoMsg` ()
- subroutine `testEquals_MultiDWithTolerance` ()
- subroutine `testEquals_MultiDWithTolerance1` ()
- subroutine `testEquals_MultiDWithTolerance64` ()
- subroutine `testEquals_MultiDWithTolerance64_1` ()
- subroutine `testEquals_MultiDWithTolerance64_2` ()
- subroutine `testEquals_MultiDSourceLocation` ()
- subroutine `testEquals_ScalarAndLocation` ()
- subroutine `testEquals_ScalarInfinity_equal` ()
- subroutine `testEquals_ScalarInfinity_unequal_A` ()
- subroutine `testEquals_ScalarInfinity_unequal_B` ()
- subroutine `testEquals_ScalarInfinity_unequal_C` ()
- subroutine `testEquals_MultiD_SingleElementGT1`
- subroutine `testEquals_MultiD_SingleElementGT2`
- subroutine `testEquals_MultiD_SingleEltVarious1`
- subroutine `testEquals_MultiD_SingleEltVarious2`
- subroutine `assertCatch` (string, location)

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

- Test_AssertReal.F90

17.134 **Test_BasicOpenMP_mod** Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testRunWithOpenMP** ()
- subroutine **testSerializeExceptions** ()

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

- Test_BasicOpenMP.F90

17.135 **Test_Exception_mod** Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testGetNumExceptions** ()
- subroutine **testCatchSucceed** ()
- subroutine **testGetLineNumber** ()
- subroutine **testGetFileName** ()

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

- Test_Exception.F90

17.136 **Test_FixtureTestCase_mod** Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testRunWithFixture** ()
- subroutine **testBrokenTestCase** ()
- subroutine **testBrokenSetUpCase** ()

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

- Test_FixtureTestCase.F90

17.137 Test_LinearInterpolator_mod::Test_LinearInterpolator Type Reference

Public Member Functions

- procedure **setUp**
- procedure **tearDown**

Public Attributes

- type(LinearInterpolator) **interpolator**

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

- Test_LinearInterpolator.pf

17.138 Test_LinearInterpolator_mod Module Reference

Data Types

- type [Test_LinearInterpolator](#)

Public Member Functions

- subroutine **setUp** (this)
- subroutine **tearDown** (this)
- subroutine **testBracketAtNode** (this)
- subroutine **testBracketInterior** (this)
- subroutine **testInterpolateAtNode** (this)
- subroutine **testInterpolateConstant** (this)

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

- Test_LinearInterpolator.pf

17.139 Test_MockCall_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()

- subroutine **testExpectOneIntegerArgument**
- subroutine **testFailExpectOneIntegerArgument**

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

- Test_MockCall.F90

17.140 Test_MockRepository_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testNoAction** ()

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

- Test_MockRepository.F90

17.141 Test_mod Module Reference

<BriefDescription>

Data Types

- interface [countTestCases](#)
- interface [getName](#)
- interface **run**
- type [Test](#)

17.141.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- Test.F90

17.142 Test_MpiContext_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testNumProcesses1** (context)

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

- Test_MpiContext.F90

17.143 Test_MpiException_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **test_anyExceptions_none** (this)
- subroutine **test_getNumExceptions** (this)
- subroutine **test_gather** (this)

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

- Test_MpiException.F90

17.144 Test_MpiParameterizedTestCase_mod Module Reference

Data Types

- type **ExtendedTestParameter**
- interface **method**
- type **Test_MpiTestCase**

Public Member Functions

- type(TestSuite) function, public **suite** ()
- type(Test_MpiTestCase) function, public **newTest_MpiTestCase** (name, user-Method, testParameter)
- subroutine **testToString** (this)
- recursive subroutine **runMethod** (this)

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

- Test_MpiParameterizedTestCase.F90

17.145 Test_MpiTestCase_mod Module Reference

Data Types

- interface **method**
- type **Test_MpiTestCase**

Public Member Functions

- type(TestSuite) function, public **suite** ()
- type(Test_MpiTestCase) function, public **newTest_MpiTestCase** (name, user-Method, numProcesses)
- subroutine **testRunOn2Processors** (this)
- subroutine **brokenProcess1** (this)
- subroutine **brokenOnProcess2** (this)
- subroutine **testFailOn1** (this)
- subroutine **testFailOn2** (this)
- subroutine **testTooFewProcs** (this)
- recursive subroutine **runMethod** (this)

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

- Test_MpiTestCase.F90

17.146 Test_Parameters_mod::Test_Parameters Type Reference

Public Attributes

- integer **p1**

- integer **p2**

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

- parameterizedTests.pf

17.147 Test_Parameters_mod Module Reference

Data Types

- type [peCase](#)
- type [Test_Parameters](#)

Public Member Functions

- type([Test_Parameters](#)) function **newTest** (testParameter)
- type([peCase](#)) function **newPeCase** (p1, p2)
- type([peCase](#)) function, dimension(:), allocatable **getParameters** ()
- character(:) function, allocatable **toString** (this)
- subroutine **testParamBroken** (this)

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

- parameterizedTests.pf

17.148 Test_RestrictSphericalCoordinates_mod::Test_Restrict-SphericalCoordinates Type Reference

Public Attributes

- real **lat**
- real **lon**
- real **restrictedLat**
- real **restrictedLon**
- type(SphericalCoordinates) **unrestricted**
- type(SphericalCoordinates) **restricted**

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

- Test_RestrictedSphericalCoordinates.pf

17.149 Test_RestrictSphericalCoordinates_mod Module Reference

Data Types

- type [LatLonCase](#)
- type [Test_RestrictSphericalCoordinates](#)

Public Member Functions

- type([Test_RestrictSphericalCoordinates](#)) function **newTest** (testParameter)
- type([LatLonCase](#)) function, dimension(:), allocatable **getParameters** ()
- subroutine **testRestrict** (this)
- character(:) function, allocatable **toString** (this)

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

- Test_RestrictedSphericalCoordinates.pf

17.150 Test_RobustRunner_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testRunVariety** ()

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

- Test_RobustRunner.F90

17.151 Test_SimpleTestCase_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- type(TestSuite) function **internalSuite** ()
- subroutine **testWorks** ()
- subroutine **testFails** ()
- subroutine **testRunSuite** ()
- subroutine **testRunMethodShouldFail** ()

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

- `Test_SimpleTestCase.F90`

17.152 `Test_StringConversionUtilities_mod` Module Reference

Public Member Functions

- `type(TestSuite)` function, public **suite** ()
- subroutine **testToStringInteger1D** ()

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

- `Test_StringConversionUtilities.F90`

17.153 `Test_TestMethod_mod` Module Reference

Public Member Functions

- `type(TestSuite)` function, public **suite** ()
- subroutine **testMethodWasRun** ()
- subroutine **testWasRun** ()

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

- `Test_TestMethod.F90`

17.154 `Test_TestResult_mod` Module Reference

Public Member Functions

- `type(TestSuite)` function, public **suite** ()
- subroutine **testGetNumRun** ()
- subroutine **testGetNumFailed** ()
- subroutine **testAddListenerEnd** ()
- subroutine **testAddListenerStart** ()
- subroutine **testAddListenerFailure** ()

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

- `Test_TestResult.F90`

17.155 Test_TestSuite_mod Module Reference

Data Types

- type **Verbose**

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testCountTestCases** ()
- subroutine **testCountTestCasesNestedA** ()
- subroutine **testCountTestCasesNestedB** ()
- subroutine **testCountTestCasesNestedC** ()
- subroutine **testGetTestCases** ()
- subroutine **myTestMethod** ()

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

- Test_TestSuite.F90

17.156 Test_UnixProcess_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testIsActive** ()

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

- Test_UnixProcess.F90

17.157 Test_XmlPrinter_mod Module Reference

Output test messages in junit.xsd-compatible XML.

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testValidXml** ()
- subroutine **compareXMLFileToExpectation** (xmlFile)

17.157.1 Detailed Description

Output test messages in junit.xsd-compatible XML.

Author

Halvor Lund

Date

2014 July

Note

Set up a test failure and feed it to an XML-based printer so that we can test its output. Use command line call (via "system") to try to find "xmllint," and if available, use it to validate the output against junit.xsd. Either way, check the output against a hard-coded expected result (a regression test).

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

- Test_XmlPrinter.F90

17.158 TestA_mod Module Reference

Public Member Functions

- subroutine **testMethodA** ()
- subroutine **testMethodB** ()
- subroutine **testMethodC** (this)
- subroutine **testMethodA** ()
- subroutine **testMethodB** ()
- subroutine **testMethodC** (this)

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

- TestA.F90
- TestA.pf

17.159 TestCase_mod Module Reference

<BriefDescription>

Data Types

- type **ConcreteSurrogate**
- type **TestCase**
- type **TestCaseReference**

Public Member Functions

- recursive subroutine **runBare** (this)
- recursive subroutine **runBare_surrogate** (this)

17.159.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- TestCase.F90

17.160 TestCaseA_mod::TestCaseA Type Reference

Public Member Functions

- procedure **setUp**
- procedure **tearDown**
- procedure **setUp**
- procedure **tearDown**

Public Attributes

- integer **componentI**

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

- TestCaseA.F90
- TestCaseA.pf

17.161 TestCaseA_mod Module Reference

Data Types

- type [TestCaseA](#)

Public Member Functions

- subroutine **setUp** (this)
- subroutine **tearDown** (this)
- subroutine **testA** (this)
- subroutine **testB** (this)
- subroutine **setUp** (this)
- subroutine **tearDown** (this)
- subroutine **testA** (this)
- subroutine **testB** (this)

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

- TestCaseA.F90
- TestCaseA.pf

17.162 TestCaseB_mod::TestCaseB Type Reference

Public Member Functions

- procedure **setUp**
- procedure **tearDown**
- procedure **setUp**
- procedure **tearDown**

Public Attributes

- integer, dimension(:), allocatable **table**
- real **phi**
- real **theta**

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

- ParameterizedTestCaseB.F90
- ParameterizedTestCaseB.pf

17.163 TestCaseB_mod Module Reference

Data Types

- type [B_Parameter](#)
- type [TestCaseB](#)

Public Member Functions

- type([TestCaseB](#)) function **newTestCaseB** (testParameter)
- subroutine **setUp** (this)
- subroutine **tearDown** (this)
- subroutine **testA** (this)
- subroutine **testB** (this)
- character(:) function, allocatable **toString** (this)
- type([TestCaseB](#)) function **newTestCaseB** (testParameter)
- subroutine **setUp** (this)
- subroutine **tearDown** (this)
- subroutine **testA** (this)
- subroutine **testB** (this)
- character(:) function, allocatable **toString** (this)

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

- ParameterizedTestCaseB.F90
- ParameterizedTestCaseB.pf

17.164 TestCaseC_mod::TestCaseC Type Reference

Public Member Functions

- procedure **setUp**
- procedure **tearDown**
- procedure **setUp**
- procedure **tearDown**

Public Attributes

- integer, dimension(:), allocatable **table**
- real **phi**
- real **theta**

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

- `MpiParameterizedTestCaseC.F90`
- `MpiParameterizedTestCaseC.pf`

17.165 TestCaseC_mod Module Reference

Data Types

- type [C_Parameter](#)
- interface [newC_Parameter](#)
- type [TestCaseC](#)

Public Member Functions

- type([TestCaseC](#)) function **newTestCaseC** (testParameter)
- subroutine **setUp** (this)
- subroutine **tearDown** (this)
- subroutine **testA** (this)
- subroutine **testB** (this)
- subroutine **testC** (this)
- type([C_Parameter](#)) function **newC_Parameter_phiTheta** (npes, phi, theta)
- elemental function **newC_Parameter_case** (i)
- type([C_Parameter](#)) function, allocatable **paramGenerator** ()
- character(:) function, allocatable **toString** (this)

- type([TestCaseC](#)) function **newTestCaseC** (testParameter)
- subroutine **setUp** (this)
- subroutine **tearDown** (this)
- subroutine **testA** (this)
- subroutine **testB** (this)
- subroutine **testC** (this)
- type([C_Parameter](#)) function **newC_Parameter_phiTheta** (npes, phi, theta)
- elemental function **newC_Parameter_case** (i)
- type([C_Parameter](#)) function, allocatable **paramGenerator** ()
- character(:) function, allocatable **toString** (this)

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

- MpiParameterizedTestCaseC.F90
- MpiParameterizedTestCaseC.pf

17.166 TestFailure_mod Module Reference

<BriefDescription>

Data Types

- type **TestFailure**

17.166.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- TestFailure.F90

17.167 mods::pre::pre_If::TestIfDirective Class Reference

Public Member Functions

- def **testTokenNotFound1**
- def **testNoTest**
- def **testIfTestFalse**
- def **testIfTestTrue1**
- def **testIfTestTrue2**
- def **testIfClearTokens**
- def **testIfClearTokensUntilEnd1**

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

- pre_If.py

17.168 mods::pre::interleavedp::TestInterleaved Class Reference

Public Member Functions

- def **test_InOrder**
- def **test_NumberMismatch**
- def **test_OrderMismatch1**
- def **test_OrderMismatch2**
- def **test_OrderMismatch3**
- def **test_ElseMid1**
- def **test_ElseMid2**
- def **test_ElseMid3**
- def **test_ElseMid4**
- def **test_ElseMid5**
- def **test_ElseMid6**
- def **test_ElseMid7**
- def **test_ElseMid8**
- def **test_ElseMid9**
- def **test_ElseMid10**

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

- interleavedp.py

17.169 TestListener_mod Module Reference

<BriefDescription>

Data Types

- interface **addFailure**
- interface **endRun**
- interface **endTest**
- type **ListenerPointer**
- interface [startTest](#)
- type **TestListener**

Public Member Functions

- subroutine **addError** (this, testName, exceptions)
- subroutine **setDebug** (this)

17.169.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- TestListener.F90

17.170 TestMethod_mod Module Reference

<BriefDescription>

Data Types

- interface **empty**
- interface **newTestMethod**
- type **TestMethod**

17.170.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- TestMethod.F90

17.171 mods::pre::parseArgs::TestParseArgs Class Reference

Public Member Functions

- def **test_ParseArgs_OneArgWithBrackets1**
- def **test_ParseArgs_OneArgWithBrackets2**
- def **test_ParseArgs_OneArgWithBrackets3**
- def **test_ParseArgs_OneArgWithBrackets4**
- def **test_ParseArgs_OneArgWithBrackets5**
- def **test_ParseArgs_OneArgWithBrackets6**
- def **test_ParseArgs_OneArgWithBrackets7**
- def **test_ParseArgs_oneArg**
- def **test_ParseArgs_twoArgs1**
- def **test_ParseArgs_twoArgs2**
- def **test_ParseArgs_oneArgArray1**
- def **test_ParseArgs_TwoArgArray**

- def **test_ParseArgs_ThreeArgs**

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

- parseArgs.py

17.172 testParser::TestParseLine Class Reference

Public Member Functions

- def **testCppSetLineAndFile**
- def **testGetSubroutineName**
- def **testGetSelfObjectName**
- def **testGetTypeNames**
- def [testAtTest](#)
- def [testAtTestNoParens](#)
- def [testAtTestFail](#)
- def [testAtTestSkipComment](#)
- def [testAtMpiTest](#)
- def [testMatchAtTestCase](#)
- def [testMatchAtAssertEqual](#)
- def [testParseArgsFirstRest](#)
- def [testParseArgsFirstSecondRest](#)
- def [testMatchAtAssertAssociated](#)
- def [testMatchAtAssertAssociatedWith](#)
- def [testMatchAtAssertUnAssociated](#)
- def [testMatchAtAssertUnAssociatedWith](#)
- def [testMatchAtAssertNotassociated](#)
- def [testMatchAtAssertNotassociatedWith](#)
- def [testMatchAtAssertEqualUserDefined](#)
- def [testMatchAtAssertEqualUserDefinedWithMessage](#)
- def [testMatchAtAssertEquivalent](#)
- def [testMatchAtAssertOther](#)
- def [testMatchAtMpiAssert](#)
- def [testMatchAtBefore](#)
- def [testMatchAtAfter](#)
- def [testMatchAtSuite](#)

17.172.1 Member Function/Subroutine Documentation

17.172.1.1 `def testParser::TestParseLine::testAtMpiTest (self)`

Check that a line starting with '@mpitest' is detected as an annotation and that optional parameters are collected.

17.172.1.2 `def testParser::TestParseLine::testAtTest (self)`

Check that a line starting with '@test' is detected as an annotation.

17.172.1.3 `def testParser::TestParseLine::testAtTestFail (self)`

Check that useful error is sent if next line is not properly formatted.

17.172.1.4 `def testParser::TestParseLine::testAtTestNoParens (self)`

Check that test procedure with no parens is accepted.

17.172.1.5 `def testParser::TestParseLine::testAtTestSkipComment (self)`

Ignore comment lines between @test and subroutine foo().

17.172.1.6 `def testParser::TestParseLine::testMatchAtAfter (self)`

Check that a line starting with '@after*' ...

17.172.1.7 `def testParser::TestParseLine::testMatchAtAssertAssociated (self)`

Check that a line starting with '@assertAssociated' is detected as an annotation.

17.172.1.8 `def testParser::TestParseLine::testMatchAtAssertAssociatedWith (self)`

Check that a line starting with '@assertAssociatedWith' is detected as an annotation. atAssertAssociatedWith(a,b) implies a points to b.

17.172.1.9 def testParser::TestParseLine::testMatchAtAssertEqual (self)

Check that a line starting with '@assertEqual' is detected as an annotation.

17.172.1.10 def testParser::TestParseLine::testMatchAtAssertEqualUserDefined (self)

Check that a line starting with '@assertEqualUserDefined' is detected as an annotation. atAssertEqualUserDefined(a,b) implies a points to b.

**17.172.1.11 def testParser::TestParseLine::testMatchAtAssertEqualUserDefined-
WithMessage (self)**

Check that a line starting with '@assertEqualUserDefined' is detected as an annotation. atAssertEqualUserDefined(a,b) implies a points to b.

17.172.1.12 def testParser::TestParseLine::testMatchAtAssertEquivalent (self)

Check that a line starting with '@assertEquivalent' is detected as an annotation. atAssertEquivalent(a,b) implies a points to b.

17.172.1.13 def testParser::TestParseLine::testMatchAtAssertNotassociated (self)

Check that a line starting with '@assertNotAssociated' is detected as an annotation.

17.172.1.14 def testParser::TestParseLine::testMatchAtAssertNotassociatedWith (self)

Check that a line starting with '@assertNotassociatedWith' is detected as an annotation. atAssertNotassociatedWith(a,b) implies a points to b.

17.172.1.15 def testParser::TestParseLine::testMatchAtAssertOther (self)

Check that a line starting with '@assert*' is detected as an annotation.

17.172.1.16 `def testParser::TestParseLine::testMatchAtAssertUnAssociated (self)`

Check that a line starting with '@assertUnAssociated' is detected as an annotation.

17.172.1.17 `def testParser::TestParseLine::testMatchAtAssertUnAssociatedWith (self)`

Check that a line starting with '@assertUnAssociatedWith' is detected as an annotation. atAssertUnAssociatedWith(a,b) implies a points to b.

17.172.1.18 `def testParser::TestParseLine::testMatchAtBefore (self)`

Check that a line starting with '@before*' ...

17.172.1.19 `def testParser::TestParseLine::testMatchAtMpiAssert (self)`

Check that a line starting with '@mpiAssert*' is detected as an annotation.

17.172.1.20 `def testParser::TestParseLine::testMatchAtSuite (self)`

Check that a line starting with '@suite changes the suite name ...

17.172.1.21 `def testParser::TestParseLine::testMatchAtTestCase (self)`

Check that a line starting with '@testcase' is detected as an annotation.

17.172.1.22 `def testParser::TestParseLine::testParseArgsFirstRest (self)`

Test that the first-rest argument parsing is adequate.

17.172.1.23 `def testParser::TestParseLine::testParseArgsFirstSecondRest (self)`

Test that the first-second-rest argument parsing is adequate.

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

- testParser.py

17.173 parseBrackets::TestRejoinBracketed Class Reference

Public Member Functions

- `def testRejoinBracketed`
- `def testParseBrackets`

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

- parseBrackets.py

17.174 mods::pre::pre_Repeat::TestRepeatDirective Class Reference

Public Member Functions

- `def test_copyBlock1`
- `def test_copyBlock2`
- `def test_copyBlock2Vars`
- `def test_copyBlock2VarsMulti`
- `def test_copyBlock2VarsMultiWithStrings`
- `def test_copyNaiveRecursion`
- `def test_copyNaiveRecursion1`
- `def test_copyFunction1`

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

- pre_Repeat.py

17.175 TestResult_mod Module Reference

<BriefDescription> Note: A possible extension point for user-specialized TestResults.

Data Types

- type **TestResult**

Public Member Functions

- type(**TestResult**) function, public **newTestResult** (name)
- subroutine **addError** (this, aTest, exceptions)
- subroutine **addSuccess** (this, aTest)
- integer function **failureCount** (this)
- subroutine **addListener** (this, listener)

17.175.1 Detailed Description

<BriefDescription> Note: A possible extension point for user-specialized TestResults.

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- **TestResult.F90**

17.176 TestRunner_mod Module Reference

<BriefDescription>

Data Types

- interface **newTestRunner**
- type **TestRunner**

Public Member Functions

- type(TestResult) function **run** (this, aTest, context)
- subroutine **startTest** (this, testName)
- subroutine **addFailure** (this, testName, exceptions)

17.176.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- TestRunner.F90

17.177 TestSuite_mod Module Reference

<BriefDescription>

Data Types

- interface **newTestSuite**
- type **TestReference**
- type **TestSuite**

Public Member Functions

- recursive subroutine **addTest** (this, aTest)

17.177.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- TestSuite.F90

17.178 ThrowFundamentalTypes_mod Module Reference

<BriefDescription>

Data Types

- interface **throwDifferentValues**
- interface **throwDifferentValuesWithLocation**

Public Member Functions

- subroutine, public **throwNonConformable** (shapeExpected, shapeFound, location)
- character(len=MAXLEN_SHAPE) function, public **locationFormat** (iLocation)

17.178.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- ThrowFundamentalTypes.F90

17.179 UnixPipeInterfaces_mod Module Reference

<BriefDescription>

Data Types

- interface **fgets**
- interface **free**
- interface **getdelim**
- interface **getline**
- interface **pclose**
- interface **popen**

Public Attributes

- integer(C_INT), parameter, public **CLOSE_FAILED** = -1

17.179.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

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

- UnixPipeInterfaces.F90

17.180 UnixProcess_mod Module Reference

<BriefDescription>

Data Types

- interface **UnixProcess**

Public Member Functions

- character(len=:) function, allocatable **makeCommand** (baseCommand, runInBackground)
- logical function **isActive** (this)
- character(len=:) function, allocatable **getDelim** (this, delimiter)
- integer function **getPid** (this)

17.180.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

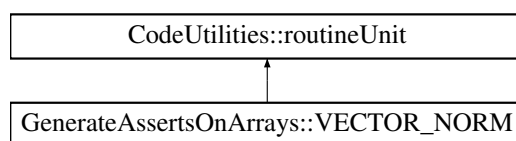
<A note here.> <Or starting here...>

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

- UnixProcess.F90

17.181 GenerateAssertsOnArrays::VECTOR_NORM Class Reference

Inheritance diagram for GenerateAssertsOnArrays::VECTOR_NORM:

**Public Member Functions**

- def __init__

Public Attributes

- rank
- fType
- precision
- name
- declaration
- declarations

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

- GenerateAssertsOnArrays.py

17.182 AbstractTestResult_mod::wasSuccessful Interface Reference

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

- AbstractTestResult.F90

17.183 WrapbeforeAfter Module Reference

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

- beforeAfter.F90

17.184 WrapMpiTestCaseB_mod Module Reference

Data Types

- interface **userTestMethod**
- type **WrapUserTestCase**

Public Member Functions

- subroutine **runMethod** (this)
- type(WrapUserTestCase) function, public **makeCustomTest** (methodName, testMethod, npesRequested)

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

- MpiTestCaseB.F90

17.185 Wrapsimple Module Reference

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

- simple.F90

17.186 WrapTestA_mod Module Reference

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

- TestA.F90

17.187 WrapTestCaseA_mod Module Reference

Data Types

- interface **userTestMethod**
- type **WrapUserTestCase**

Public Member Functions

- subroutine **runMethod** (this)
- type(WrapUserTestCase) function, public **makeCustomTest** (methodName, testMethod)

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

- TestCaseA.F90

17.188 WrapTestCaseB_mod Module Reference

Data Types

- interface **userTestMethod**
- type **WrapUserTestCase**

Public Member Functions

- subroutine **runMethod** (this)
- type(WrapUserTestCase) function, public **makeCustomTest** (methodName, testMethod, testParameter)

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

- ParameterizedTestCaseB.F90

17.189 WrapTestCaseC_mod Module Reference

Data Types

- interface **userTestMethod**
- type **WrapUserTestCase**

Public Member Functions

- subroutine **runMethod** (this)
- type(WrapUserTestCase) function, public **makeCustomTest** (methodName, testMethod, testParameter, npesRequested)

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

- `MpiParameterizedTestCaseC.F90`

17.190 XmlPrinter_mod Module Reference

<BriefDescription>

Data Types

- type **XmlPrinter**

Public Member Functions

- type(XmlPrinter) function, public **newXmlPrinter** (unit)
- subroutine **addError** (this, testName, exceptions)
- subroutine **startTest** (this, testName)
- subroutine **print** (this, result)
- subroutine **printHeader** (this, result)
- subroutine **printFailure** (this, label, aFailedTest)
- subroutine **printExceptions** (this, label, testName, exceptions)
- subroutine **printFailure1** (this, label, aFailedTest)
- subroutine **printFailures** (this, label, failures)
- subroutine **printTestName** (this, testName)
- subroutine **printSuccess** (this, aSuccessTest)
- subroutine **printSuccesses** (this, successes)
- subroutine **printFooter** (this, result)
- character(:) function, allocatable **cleanXml** (string_in)

17.190.1 Detailed Description

<BriefDescription>

Author

Halvor Lund, SINTEF Energy Research

Date

30 Jan 2014

Note

<A note here.> Need to improve the handling of nested quotes.

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

- XmlPrinter.F90