pFUnit

Generated by Doxygen 1.8.10

Mon Apr 25 2016 08:49:38

Contents

1 pFUnit 3 - Documentation - Version 3.1.1 development 2015-1210-1447-48-EST 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 . . . 7

3.6.1 Building pFUnit for testing serial codes (Non-MPI) . . . 7

3.6.2 Building pFUnit for testing parallel codes (MPI) . . . 8

3.6.3 OPENMP . . . 8

3.6.4 Cleaning . . . 8

3.6.5 Documentation . . . 8

3.6.6 CMAKE . . . 9

3.7 Installation . . . 9

3.7.1 Installation - Serial . . . 9

3.7.2 Installation - MPI . . . 9

3.7.3 Installation - OPENMP . . . 10

3.7.4 Installation - DEFAULT DIRECTORY . . . 10

4 Usage **11**

4.1 Usage . . . 11
4.1.1 Usage - Configuration . . . 11
4.1.2 Usage - Hello World . . . 11
4.2 Usage - Preprocessor . . . 12
4.3 Compiling and Executing The Test . . . 12
4.3.1 - Compiling and Executing the Tests (MPI PARALLEL) . . . 12
4.3.2 Command Line Options . . . 12
4.3.3 XML output . . . 13

5 Development **15**

6 Feedback & Support **17**
6.1 Feedback . . . 17
6.2 Support . . . 17

7 FAQ and Tips **19**
7.1 FAQ . . . 19
7.1.1 Zero Tests Run . . . 19
7.1.2 Some Tests Are Not Running . . . 19
7.1.3 Intel Fortran Version 13: -DINTEL_13 . . . 20
7.1.4 Segmentation Faults and Odd Link Errors . . . 20
7.2 Tips . . . 20
7.2.1 Environment Modules . . . 20
7.2.2 Compile Time Errors . . . 20
7.2.3 Intermediate files used by pFUnit . . . 21
7.2.4 Ignoring whitespace differences in assertions on strings. . . . 21

8 Platform Specific Notes **23**
8.1 Mac OSX . . . 23
8.2 Windows/CYGWIN . . . 23
8.3 Intel Fortran Version 13: -DINTEL_13 . . . 23

9 Acknowledgments **25**

10 Known Installations & Versions **27**

11 TODO **29**

12 The Preprocessor - pFUnitParser **31**
12.1 Using The Preprocessor . . . 31

12.1.1 Configuration - testSuites.inc . . . 31
12.1.2 Invocation . . . 32
12.1.3 Preprocessor Input File (.pf) . . . 32
12.1.4 Directives . . . 32
12.1.4.1 @Test . . . 32
12.1.4.2 @MPITest . . . 33
12.1.4.3 @Assert . . . 33
12.1.4.4 @Parameters . . . 34
12.1.4.5 @TestCase . . . 34

13 @Assert Preprocessor Directives **35**

13.1 @Assert Preprocessor Directives . . . 36
13.1.1 @assertEqual . . . 36
13.1.2 @assertTrue . . . 36
13.1.3 @assertEqualUserDefined . . . 36
13.1.4 @assertFalse . . . 36
13.1.5 @assertLessThan . . . 36
13.1.6 @assertLessThanOrEqual . . . 36
13.1.7 @assertGreaterThan . . . 36
13.1.8 @assertGreaterThanOrEqual . . . 36
13.1.9 @assertIsMemberOf . . . 36
13.1.10 @assertContains . . . 36
13.1.11 @assertAny . . . 36
13.1.12 @assertAll . . . 36
13.1.13 @assertNotAll . . . 36
13.1.14 @assertNone . . . 36
13.1.15 @assertIsPermutationOf . . . 36
13.1.16 @assertExceptionRaised . . . 36
13.1.17 @assertSameShape . . . 36
13.1.18 @assertIsNaN . . . 37
13.1.19 @assertIsFinite . . . 37
13.1.20 @assertAssociated . . . 37
13.1.21 @assertNotAssociated . . . 37
13.1.22 @assertEquivalent . . . 37

14 Revision Notes **39**

15 Modules Index **41**

15.1 Modules List . . . 41

16 Data Type Index **45**

16.1 Class Hierarchy . . . 45

17 Data Type Index **47**

17.1 Data Types List . . . 47

18 Module Documentation **49**

18.1 assert_mod Module Reference . . . 49

18.1.1 Detailed Description . . . 49

18.2 assertbasic_mod Module Reference . . . 49

18.2.1 Detailed Description . . . 50

18.3 basetestrunner_mod Module Reference . . . 50

18.3.1 Detailed Description . . . 50

18.4 brokensetupcase_mod Module Reference . . . 51

18.4.1 Detailed Description . . . 51

18.5 brokentestcase_mod Module Reference . . . 51

18.5.1 Detailed Description . . . 51

18.6 debuglistener_mod Module Reference . . . 52

18.6.1 Detailed Description . . . 52

18.7 dynamictestcase_mod Module Reference . . . 52

18.7.1 Detailed Description . . . 52

18.8 fixturetestcase_mod Module Reference . . . 53

18.8.1 Detailed Description . . . 53

18.9 makeinfinity_mod Module Reference . . . 53

18.9.1 Detailed Description . . . 53

18.10 makenan_mod Module Reference . . . 54

18.10.1 Detailed Description . . . 54

18.11 mock_mod Module Reference . . . 54

18.11.1 Detailed Description . . . 54

18.12 mockcall_mod Module Reference . . . 54

18.12.1 Detailed Description . . . 55

18.13 mocklistener_mod Module Reference . . . 55

18.13.1 Detailed Description . . . 55

18.14 mockrepository_mod Module Reference . . . 56

18.14.1 Detailed Description . . . 56

18.15 mpicontext_mod Module Reference . . . 56

18.15.1 Detailed Description . . . 56
18.16 mpistubs_mod Module Reference . . . 57
18.16.1 Detailed Description . . . 57
18.17 mpitestcase_mod Module Reference . . . 57
18.17.1 Detailed Description . . . 58
18.18 mpitestmethod_mod Module Reference . . . 58
18.18.1 Detailed Description . . . 58
18.19 parallelcontext_mod Module Reference . . . 58
18.19.1 Detailed Description . . . 59
18.20 parallelexception_mod Module Reference . . . 59
18.20.1 Detailed Description . . . 59
18.21 parameterizedtestcase_mod Module Reference . . . 59
18.21.1 Detailed Description . . . 60
18.22 params_mod Module Reference . . . 60
18.22.1 Detailed Description . . . 60
18.23 pfunit Module Reference . . . 61
18.23.1 Detailed Description . . . 61
18.24 pfunit_mod Module Reference . . . 61
18.24.1 Detailed Description . . . 61
18.25 privateexception_mod Module Reference . . . 62
18.25.1 Detailed Description . . . 62
18.26 remoteproxytestcase_mod Module Reference . . . 62
18.26.1 Detailed Description . . . 62
18.27 resultprinter_mod Module Reference . . . 63
18.27.1 Detailed Description . . . 63
18.28 robustrunner_mod Module Reference . . . 63
18.28.1 Detailed Description . . . 64
18.29 robusttestsuite_mod Module Reference . . . 64
18.29.1 Detailed Description . . . 64
18.30 serialcontext_mod Module Reference . . . 65
18.30.1 Detailed Description . . . 65
18.31 simpletestcase_mod Module Reference . . . 65
18.31.1 Detailed Description . . . 66
18.32 sourcelocation_mod Module Reference . . . 66
18.32.1 Detailed Description . . . 66
18.33 stringconversionutilities_mod Module Reference . . . 66
18.33.1 Detailed Description . . . 67

18.34subsetrunner_mod Module Reference . . . 67
18.34.1 Detailed Description . . . 68
18.35surrogatetestcase_mod Module Reference . . . 68
18.35.1 Detailed Description . . . 68
18.36sut_mod Module Reference . . . 68
18.36.1 Detailed Description . . . 69
18.37test_assert_mod Module Reference . . . 69
18.37.1 Detailed Description . . . 69
18.38test_assertbasic_mod Module Reference . . . 69
18.38.1 Detailed Description . . . 70
18.39test_assertcomplex_mod Module Reference . . . 70
18.39.1 Detailed Description . . . 71
18.40test_assertinteger_mod Module Reference . . . 71
18.40.1 Detailed Description . . . 71
18.41test_assertreal_mod Module Reference . . . 71
18.41.1 Detailed Description . . . 73
18.42test_basicopenmp_mod Module Reference . . . 73
18.42.1 Detailed Description . . . 73
18.43test_exception_mod Module Reference . . . 73
18.43.1 Detailed Description . . . 74
18.44test_fixturetestcase_mod Module Reference . . . 74
18.44.1 Detailed Description . . . 74
18.45test_mockcall_mod Module Reference . . . 75
18.45.1 Detailed Description . . . 75
18.46test_mod Module Reference . . . 75
18.46.1 Detailed Description . . . 75
18.47test_mpicontext_mod Module Reference . . . 76
18.47.1 Detailed Description . . . 76
18.48test_mpiexception_mod Module Reference . . . 76
18.48.1 Detailed Description . . . 76
18.49test_mpiparameterizedtestcase_mod Module Reference . . . 77
18.49.1 Detailed Description . . . 77
18.50test_mpitestcase_mod Module Reference . . . 77
18.50.1 Detailed Description . . . 78
18.51test_robustrunner_mod Module Reference . . . 78
18.51.1 Detailed Description . . . 78
18.52test_simpletestcase_mod Module Reference . . . 78

18.52.1 Detailed Description . . . 79
18.53test_stringconversionutilities_mod Module Reference . . . 79
18.53.1 Detailed Description . . . 79
18.54test_testmethod_mod Module Reference . . . 80
18.54.1 Detailed Description . . . 80
18.55test_testresult_mod Module Reference . . . 80
18.55.1 Detailed Description . . . 80
18.56test_testsuite_mod Module Reference . . . 81
18.56.1 Detailed Description . . . 81
18.57test_unixprocess_mod Module Reference . . . 81
18.57.1 Detailed Description . . . 82
18.58test_xmlprinter_mod Module Reference . . . 82
18.58.1 Detailed Description . . . 82
18.59testcase_mod Module Reference . . . 83
18.59.1 Detailed Description . . . 83
18.60testfailure_mod Module Reference . . . 83
18.60.1 Detailed Description . . . 83
18.61testlistener_mod Module Reference . . . 83
18.61.1 Detailed Description . . . 84
18.62testmethod_mod Module Reference . . . 84
18.62.1 Detailed Description . . . 84
18.63testresult_mod Module Reference . . . 85
18.63.1 Detailed Description . . . 85
18.64testrunner_mod Module Reference . . . 85
18.64.1 Detailed Description . . . 86
18.65testsuite_mod Module Reference . . . 86
18.65.1 Detailed Description . . . 86
18.66throwfundamentaltypes_mod Module Reference . . . 86
18.66.1 Detailed Description . . . 87
18.67unixpipeinterfaces_mod Module Reference . . . 87
18.67.1 Detailed Description . . . 87
18.68unixprocess_mod Module Reference . . . 87
18.68.1 Detailed Description . . . 88
18.69xmlprinter_mod Module Reference . . . 88
18.69.1 Detailed Description . . . 88

19 Data Type Documentation **89**

19.1 pFUnitParser.Action Class Reference . . . 89
19.2 CodeUtilities.ArrayDescription Class Reference . . . 90
19.3 GenerateAssertsOnArrays.AssertRealArrayArgument Class Reference . . . 90
19.4 pFUnitParser.AtAfter Class Reference . . . 91
19.5 pFUnitParser.AtAssert Class Reference . . . 91
19.6 pFUnitParser.AtAssertAssociated Class Reference . . . 92
19.7 pFUnitParser.AtAssertEqualUserDefined Class Reference . . . 93
19.7.1 Detailed Description . . . 93
19.8 pFUnitParser.AtAssertEquivalent Class Reference . . . 93
19.8.1 Detailed Description . . . 94
19.9 pFUnitParser.AtAssertNotAssociated Class Reference . . . 94
19.10 pFUnitParser.AtBefore Class Reference . . . 94
19.11 pFUnitParser.AtBegin Class Reference . . . 95
19.12 pFUnitParser.AtMpiAssert Class Reference . . . 95
19.13 pFUnitParser.AtMpiTest Class Reference . . . 96
19.14 pFUnitParser.AtSuite Class Reference . . . 96
19.15 pFUnitParser.AtTest Class Reference . . . 97
19.16 pFUnitParser.AtTestCase Class Reference . . . 98
19.17 pFUnitParser.AtTestParameter Class Reference . . . 98
19.18 testcaseb_mod::b_parameter Type Reference . . . 99
19.19 testcasec_mod::c_parameter Type Reference . . . 99
19.20 GenerateAssertsOnArrays.constraintASSERT Class Reference . . . 100
19.20.1 Constructor & Destructor Documentation . . . 100
19.20.1.1 __init__(self, assertionName, expectedDescr, foundDescr, tolerance) . . . 100
19.20.2 Member Data Documentation . . . 100
19.20.2.1 name1 . . . 100
19.20.2.2 tolerance . . . 100
19.21 test_mod::countTestCases Interface Reference . . . 101
19.22 mods.pre.pre2.dataString Class Reference . . . 101
19.23 CodeUtilities.declaration Class Reference . . . 102
19.24 mods.pre.pre2.environment Class Reference . . . 102
19.25 CodeUtilities.fortranSubroutineSignature Class Reference . . . 102
19.26 abstracttestresult_mod::getErrors Interface Reference . . . 103
19.27 test_mod::getName Interface Reference . . . 103
19.28 abstracttestresult_mod::getSuccesses Interface Reference . . . 103
19.29 mods.pre.pre_If.IfDirective Class Reference . . . 103
19.30 CodeUtilities.implementation Class Reference . . . 104

19.31 mods.pre.pre2.includeDirective Class Reference . . . 104
19.32 CodeUtilities.interfaceBlock Class Reference . . . 105
19.33 mods.pre.pre_If.interval Class Reference . . . 105
19.34 GenerateAssertsOnArrays.IsWithinTolerance Class Reference . . . 105
19.35 test_restrictsphericalcoordinates_mod::latloncase Type Reference . . . 106
19.36 testParser.MockParser Class Reference . . . 106
19.37 testParser.MockWriter Class Reference . . . 107
19.38 CodeUtilities.module Class Reference . . . 107
19.39 mpitestcaseb_mod::mpitestcaseb Type Reference . . . 108
19.40 pFUnitParser.MyError Class Reference . . . 108
19.41 cases_mod::myparamtype Type Reference . . . 109
19.42 cases_mod::mytestcase Type Reference . . . 109
19.43 testcasec_mod::newc_parameter Interface Reference . . . 110
19.44 pFUnitParser.Parser Class Reference . . . 110
19.45 test_parameters_mod::pecase Type Reference . . . 111
19.46 mods.pre.pre2.procDirective Class Reference . . . 112
19.46.1 Member Function Documentation . . . 112
19.46.1.1 addTokenRE . . . 112
19.47 mods.pre.pre_Repeat.RepeatDirective Class Reference . . . 112
19.48 CodeUtilities.routineUnit Class Reference . . . 113
19.49 testlistener_mod::startTest Interface Reference . . . 114
19.50 test_mod::test Type Reference . . . 114
19.51 test_linearinterpolator_mod::test_linearinterpolator Type Reference . . . 114
19.52 test_parameters_mod::test_parameters Type Reference . . . 115
19.53 test_restrictsphericalcoordinates_mod::test_restrictsphericalcoordinates Type Reference . . . 115
19.54 testcasea_mod::testcasea Type Reference . . . 116
19.55 testcaseb_mod::testcaseb Type Reference . . . 116
19.56 testcasec_mod::testcasec Type Reference . . . 117
19.57 mods.pre.pre_If.TestIfDirective Class Reference . . . 117
19.58 mods.pre.interleavedp.TestInterleaved Class Reference . . . 118
19.59 mods.pre.parseArgs.TestParseArgs Class Reference . . . 119
19.60 parseDirectiveArgs.TestParseDirectiveArgs Class Reference . . . 119
19.61 testParser.TestParseLine Class Reference . . . 120
19.61.1 Member Function Documentation . . . 121
19.61.1.1 testAtMpiTest(self) . . . 121
19.61.1.2 testAtTest(self) . . . 121
19.61.1.3 testAtTestFail(self) . . . 121

19.61.1.4 testAtTestNoParens(self) . . . 121
19.61.1.5 testAtTestSkipComment(self) . . . 121
19.61.1.6 testMatchAtAfter(self) . . . 121
19.61.1.7 testMatchAtAssertAssociated(self) . . . 121
19.61.1.8 testMatchAtAssertAssociatedOverloaded1(self) . . . 121
19.61.1.9 testMatchAtAssertAssociatedOverloaded2(self) . . . 121
19.61.1.10 testMatchAtAssertEqual(self) . . . 122
19.61.1.11 testMatchAtAssertEqualUserDefined(self) . . . 122
19.61.1.12 testMatchAtAssertEqualUserDefinedWithMessage(self) . . . 122
19.61.1.13 testMatchAtAssertEquivalent(self) . . . 122
19.61.1.14 testMatchAtAssertNotassociated(self) . . . 122
19.61.1.15 testMatchAtAssertNotassociatedWith(self) . . . 122
19.61.1.16 testMatchAtAssertOther(self) . . . 122
19.61.1.17 testMatchAtAssertUnAssociated(self) . . . 122
19.61.1.18 testMatchAtAssertUnAssociatedWith(self) . . . 122
19.61.1.19 testMatchAtBefore(self) . . . 123
19.61.1.20 testMatchAtMpiAssert(self) . . . 123
19.61.1.21 testMatchAtSuite(self) . . . 123
19.61.1.22 testMatchAtTestCase(self) . . . 123
19.61.1.23 testParseArgsFirstRest(self) . . . 123
19.61.1.24 testParseArgsFirstSecondRest(self) . . . 123
19.62 mods.pre.pre2.TestPreprocessor Class Reference . . . 123
19.63 parseBrackets.TestRejoinBracketed Class Reference . . . 124
19.64 mods.pre.pre_Repeat.TestRepeatDirective Class Reference . . . 125
19.65 GenerateAssertsOnArrays.VECTOR_NORM Class Reference . . . 125
19.66 abstracttestresult_mod::wasSuccessful Interface Reference . . . 126

Index **127**

Chapter 1

pFUnit 3 - Documentation - Version 3.1.1 development 2015-1210-1447-48-EST 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 NASA 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/lates

Extracting this tarfile via a command like

```
$ tar zxf ./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 14+, NAG 6.0, GCC 4.9.+, IBM's XLF, PGI 15.4)
- 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/lates

Extracting this tarfile via a command like

```
$ tar zxf ./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/mpirun
```

PFUNIT_MAX_ARRAY_RANK

PFUNIT_MAX_ARRAY_RANK - controls the maximum size of the arrays asserts are defined over. If PFUNIT_MAX_↩ ARRAY_RANK is not set, the default is 5 and pFUnit's assertions will be able to handle arrays up to rank 5, i.e. A(:,:,:,:,:). PFUNIT_MAX_ARRAY_RANK and MAX_RANK do not refer to MPI ranks (process id within a group). Example:

```
$ export PFUNIT_MAX_ARRAY_RANK=5
```

PFUNIT_MAX_RANK is a deprecated way to set maximum rank and is to be removed in version 4.

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 queing 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.

1. Execute make as follows.

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

2. 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.

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

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

2. 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.

1. 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.

1. 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 priveleges 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 "make," which will run a number of examples. These include some expected (intentional) failures.

```
$ # In the top pFUnit build directory...
$ export PFUNIT=/opt/pfunit/pfunit-serial
$ cd Examples
$ make
```

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. To run all of the examples try executing "make MPI=YES" in the Examples directory.

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 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).

In some cases, since include/driver.F90 is "implicit none," it may be necessary to insert a "use" clause to identify external suite-wide fixture code to the compiler. As a convenience, the CPP macro PFUNIT_EXTRA_USAGE can be set to a module of fixture code via a compiler command line argument turning on a "use PFUNIT_EXTRA_USAGE" line at the beginning of include/driver.F90.

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.
-max-timeout-duration <duration> Limit detection time for robust runner.	
-max-launch-duration <duration> Limit detection time for robust runner.	

-skip <number of tests to skip>	Use the subset runner, which runs a subset of the tests in a suite.
-xml <xmlfile>	Generate XML output in JUnit compatible format, write it to given file. This XML output can be used in integration with e.g. Jenkins. To ensure the XML file is written correctly, it is recommended to also use the -robust flag.
-name <name>	Give the set of tests an identifying name, which is used in the XML output.

An example from Examples/Robust:

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

4.3.3 XML output

To output JUnit XML, execute tests with the -xml flag:

```
$ ./tests.x -robust -xml test.xml -name my_suite_name
```

This creates a file named test.xml. As an example, the output may look like this:

```
<testsuite name="my_suite_name" errors="1" failures="1" tests="3" time="2.1020">
<testcase name="test_math_suite.test_addition"/>
<testcase name="test_math_suite.test_division">
<error message="Location: [[unknown location]], RUNTIME-ERROR: terminated during execution "/>
</testcase>
<testcase name="test_other_suite.test_foo">
<failure message="Location: [ test_other.pf:24],  "/>
</testcase>
</testsuite>
```

Output explained: The test suite took 2.1020 seconds to execute. One test (test_addition) succeeded, one (test_division) crashed for some reason, and one test (test_foo) failed at line 24 of test_other.pf.

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 invokation. 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 FPPFL↩ AGS.

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 heriarchy, 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 assertEqual.

```
call assertEqual(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 FPPFL↩AGS.

Chapter 9

Acknowledgments

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

Windows/CYGWIN contributions from E. Lezar.

PGI port contributions from M. Leair (PG Group).

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.

mock_services - Experimental support for mocking.

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 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 @Test directive.

@Test 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

@MPITest is deprecated as @Test 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 @Assert directives are expanded into calls to similarly named pFUnit library routines. The syntax for the directives follows the pattern for @assertEqual 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 @assert 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
- @assertEquivalent

12.1.4.4 @Parameters

The @Parameter 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
- @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))
```

The directive also handles the two-argument pointer-target case.

```
@assertAssociated(pointer,target)
```

becomes

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

neglecting message and source location information.

A message may be passed as follows.

```
@assertAssociated(a,message="A message.")
```

```
@assertAssociated(pointer,target,message="A message.")
```

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 @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

- 2015-0508 Some PGI workarounds removed for PGI 15.4. MLR
- 2015-0320 PGI port workarounds, including examples. 3.1. MLR
- 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

Modules Index

15.1 Modules List

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

assert_mod
<BriefDescription> . . . 49
assertbasic_mod
Provides fundamental assertions over the most basic types, a foundation for providing test services to end users . . . 49
basetestrunner_mod
<BriefDescription> . . . 50
brokensetupcase_mod
<BriefDescription> . . . 51
brokentestcase_mod
<BriefDescription> . . . 51
debuglistener_mod
<BriefDescription> . . . 52
dynamictestcase_mod
<BriefDescription> . . . 52
fixturetestcase_mod
<BriefDescription> . . . 53
makeinfinity_mod
<BriefDescription> . . . 53
makenan_mod
<BriefDescription> . . . 54
mock_mod
<BriefDescription> . . . 54
mockcall_mod
<BriefDescription> . . . 54
mocklistener_mod
<BriefDescription> . . . 55
mockrepository_mod
<BriefDescription> . . . 56
mpicontext_mod
<BriefDescription> . . . 56
mpistubs_mod
<BriefDescription> . . . 57

mpitestcase_mod
<BriefDescription> . . . 57
mpitestmethod_mod
<BriefDescription> . . . 58
parallelcontext_mod
<BriefDescription> . . . 58
parallelexception_mod
<BriefDescription> . . . 59
parameterizedtestcase_mod
<BriefDescription> . . . 59
params_mod
<BriefDescription> . . . 60
pfunit
<BriefDescription> . . . 61
pfunit_mod
<BriefDescription> . . . 61
privateexception_mod
<BriefDescription> . . . 62
remoteproxytestcase_mod
<BriefDescription> . . . 62
resultprinter_mod
<BriefDescription> . . . 63
robustrunner_mod
<BriefDescription> . . . 63
robusttestsuite_mod
<BriefDescription> . . . 64
serialcontext_mod
<BriefDescription> . . . 65
simpletestcase_mod
<BriefDescription> . . . 65
sourcelocation_mod
<BriefDescription> . . . 66
stringconversionutilities_mod
A collection of utilities used throughout the framework . . . 66
subsetrunner_mod
<BriefDescription> . . . 67
surrogatetestcase_mod
<BriefDescription> . . . 68
sut_mod
<BriefDescription> . . . 68
test_assert_mod
<BriefDescription> . . . 69
test_assertbasic_mod
<BriefDescription> . . . 69
test_assertcomplex_mod
<BriefDescription> . . . 70
test_assertinteger_mod
<BriefDescription> . . . 71
test_assertreal_mod
<BriefDescription> . . . 71
test_basicopenmp_mod
<BriefDescription> . . . 73
test_exception_mod
<BriefDescription> . . . 73

test_fixturetestcase_mod
<BriefDescription> . . . 74
test_mockcall_mod
<BriefDescription> . . . 75
test_mod
<BriefDescription> . . . 75
test_mpicontext_mod
<BriefDescription> . . . 76
test_mpiexception_mod
<BriefDescription> . . . 76
test_mpiparameterizedtestcase_mod
<BriefDescription> . . . 77
test_mpitestcase_mod
<BriefDescription> . . . 77
test_robustrunner_mod
<BriefDescription> . . . 78
test_simpletestcase_mod
<BriefDescription> . . . 78
test_stringconversionutilities_mod
<BriefDescription> . . . 79
test_testmethod_mod
<BriefDescription> . . . 80
test_testresult_mod
<BriefDescription> . . . 80
test_testsuite_mod
<BriefDescription> . . . 81
test_unixprocess_mod
<BriefDescription> . . . 81
test_xmlprinter_mod
Output test messages in junit.xsd-compatible XML . . . 82
testcase_mod
<BriefDescription> . . . 83
testfailure_mod
<BriefDescription> . . . 83
testlistener_mod
<BriefDescription> . . . 83
testmethod_mod
<BriefDescription> . . . 84
testresult_mod
<BriefDescription> Note: A possible extension point for user-specialized TestResults . . . 85
testrunner_mod
<BriefDescription> . . . 85
testsuite_mod
<BriefDescription> . . . 86
throwfundamentaltypes_mod
<BriefDescription> . . . 86
unixpipeinterfaces_mod
<BriefDescription> . . . 87
unixprocess_mod
<BriefDescription> . . . 87
xmlprinter_mod
<BriefDescription> . . . 88

Chapter 16

Data Type Index

16.1 Class Hierarchy

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

pFUnitParser.Action . . . 89
- pFUnitParser.AtAfter . . . 91
- pFUnitParser.AtAssert . . . 91
- pFUnitParser.AtAssertAssociated . . . 92
- pFUnitParser.AtAssertEqualUserDefined . . . 93
- pFUnitParser.AtAssertEquivalent . . . 93
- pFUnitParser.AtAssertNotAssociated . . . 94
- pFUnitParser.AtBefore . . . 94
- pFUnitParser.AtBegin . . . 95
- pFUnitParser.AtMpiAssert . . . 95
- pFUnitParser.AtSuite . . . 96
- pFUnitParser.AtTest . . . 97
  - pFUnitParser.AtMpiTest . . . 96
- pFUnitParser.AtTestCase . . . 98
- pFUnitParser.AtTestParameter . . . 98

CodeUtilities.ArrayDescription . . . 90
GenerateAssertsOnArrays.AssertRealArrayArgument . . . 90
test_mod::countTestCases . . . 101
mods.pre.pre2.dataString . . . 101
CodeUtilities.declaration . . . 102
mods.pre.pre2.environment . . . 102
CodeUtilities.fortranSubroutineSignature . . . 102
abstracttestresult_mod::getErrors . . . 103
test_mod::getName . . . 103
abstracttestresult_mod::getSuccesses . . . 103
CodeUtilities.implementation . . . 104
CodeUtilities.interfaceBlock . . . 105
mods.pre.pre_If.interval . . . 105
testParser.MockWriter . . . 107
CodeUtilities.module . . . 107
MPITestCase
- test_parameters_mod::test_parameters . . . 115

MpiTestCase

mpitestcaseb_mod::mpitestcaseb . . . 108
mpitestcaseb_mod::mpitestcaseb . . . 108
testcasec_mod::testcasec . . . 117
testcasec_mod::testcasec . . . 117
MpiTestParameter
test_parameters_mod::pecase . . . 111
testcasec_mod::c_parameter . . . 99
testcasec_mod::c_parameter . . . 99
testcasec_mod::newc_parameter . . . 110
pFUnitParser.Parser . . . 110
testParser.MockParser . . . 106
mods.pre.pre2.procDirective . . . 112
mods.pre.pre2.includeDirective . . . 104
mods.pre.pre_If.IfDirective . . . 103
mods.pre.pre_Repeat.RepeatDirective . . . 112
CodeUtilities.routineUnit . . . 113
GenerateAssertsOnArrays.constraintASSERT . . . 100
GenerateAssertsOnArrays.IsWithinTolerance . . . 105
GenerateAssertsOnArrays.VECTOR_NORM . . . 125
testlistener_mod::startTest . . . 114
test_mod::test . . . 114
TestCase
mods.pre.interleavedp.TestInterleaved . . . 118
mods.pre.parseArgs.TestParseArgs . . . 119
mods.pre.pre2.TestPreprocessor . . . 123
mods.pre.pre_If.TestIfDirective . . . 117
mods.pre.pre_Repeat.TestRepeatDirective . . . 125
parseBrackets.TestRejoinBracketed . . . 124
parseDirectiveArgs.TestParseDirectiveArgs . . . 119
testParser.TestParseLine . . . 120
abstracttestresult_mod::wasSuccessful . . . 126
AbstractTestParameter
cases_mod::myparamtype . . . 109
test_restrictsphericalcoordinates_mod::latloncase . . . 106
testcaseb_mod::b_parameter . . . 99
testcaseb_mod::b_parameter . . . 99
Exception
pFUnitParser.MyError . . . 108
ParameterizedTestCase
cases_mod::mytestcase . . . 109
test_restrictsphericalcoordinates_mod::test_restrictsphericalcoordinates . . . 115
testcaseb_mod::testcaseb . . . 116
testcaseb_mod::testcaseb . . . 116
TestCase
test_linearinterpolator_mod::test_linearinterpolator . . . 114
testcasea_mod::testcasea . . . 116
testcasea_mod::testcasea . . . 116

Chapter 17

Data Type Index

17.1 Data Types List

Here are the data types with brief descriptions:

pFUnitParser.Action . . . 89
CodeUtilities.ArrayDescription . . . 90
GenerateAssertsOnArrays.AssertRealArrayArgument . . . 90
pFUnitParser.AtAfter . . . 91
pFUnitParser.AtAssert . . . 91
pFUnitParser.AtAssertAssociated . . . 92
pFUnitParser.AtAssertEqualUserDefined . . . 93
pFUnitParser.AtAssertEquivalent . . . 93
pFUnitParser.AtAssertNotAssociated . . . 94
pFUnitParser.AtBefore . . . 94
pFUnitParser.AtBegin . . . 95
pFUnitParser.AtMpiAssert . . . 95
pFUnitParser.AtMpiTest . . . 96
pFUnitParser.AtSuite . . . 96
pFUnitParser.AtTest . . . 97
pFUnitParser.AtTestCase . . . 98
pFUnitParser.AtTestParameter . . . 98
testcaseb_mod::b_parameter . . . 99
testcasec_mod::c_parameter . . . 99
GenerateAssertsOnArrays.constraintASSERT . . . 100
test_mod::countTestCases . . . 101
mods.pre.pre2.dataString . . . 101
CodeUtilities.declaration . . . 102
mods.pre.pre2.environment . . . 102
CodeUtilities.fortranSubroutineSignature . . . 102
abstracttestresult_mod::getErrors . . . 103
test_mod::getName . . . 103
abstracttestresult_mod::getSuccesses . . . 103
mods.pre.pre_If.IfDirective . . . 103
CodeUtilities.implementation . . . 104
mods.pre.pre2.includeDirective . . . 104
CodeUtilities.interfaceBlock . . . 105
mods.pre.pre_If.interval . . . 105
GenerateAssertsOnArrays.IsWithinTolerance . . . 105

test_restrictsphericalcoordinates_mod::latloncase . . . 106
testParser.MockParser . . . 106
testParser.MockWriter . . . 107
CodeUtilities.module . . . 107
mpitestcaseb_mod::mpitestcaseb . . . 108
pFUnitParser.MyError . . . 108
cases_mod::myparamtype . . . 109
cases_mod::mytestcase . . . 109
testcasec_mod::newc_parameter . . . 110
pFUnitParser.Parser . . . 110
test_parameters_mod::pecase . . . 111
mods.pre.pre2.procDirective . . . 112
mods.pre.pre_Repeat.RepeatDirective . . . 112
CodeUtilities.routineUnit . . . 113
testlistener_mod::startTest . . . 114
test_mod::test . . . 114
test_linearinterpolator_mod::test_linearinterpolator . . . 114
test_parameters_mod::test_parameters . . . 115
test_restrictsphericalcoordinates_mod::test_restrictsphericalcoordinates . . . 115
testcasea_mod::testcasea . . . 116
testcaseb_mod::testcaseb . . . 116
testcasec_mod::testcasec . . . 117
mods.pre.pre_If.TestIfDirective . . . 117
mods.pre.interleavedp.TestInterleaved . . . 118
mods.pre.parseArgs.TestParseArgs . . . 119
parseDirectiveArgs.TestParseDirectiveArgs . . . 119
testParser.TestParseLine . . . 120
mods.pre.pre2.TestPreprocessor . . . 123
parseBrackets.TestRejoinBracketed . . . 124
mods.pre.pre_Repeat.TestRepeatDirective . . . 125
GenerateAssertsOnArrays.VECTOR_NORM . . . 125
abstracttestresult_mod::wasSuccessful . . . 126

Chapter 18

Module Documentation

18.1 assert_mod Module Reference

<BriefDescription>

18.1.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.2 assertbasic_mod Module Reference

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

Functions/Subroutines

- subroutine **assertexceptionraisedmessage** (message, location)
- subroutine, public **assertsameshape** (shapeA, shapeB, message, location)
- logical function, public **conformable** (shapeA, shapeB)
- logical function, public **nonconformable** (shapeA, shapeB)
- subroutine **assertequalstring_** (expected, found, message, location, whitespace)
- 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)

18.2.1 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 assertEqual(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.

18.3 basetestrunner_mod Module Reference

<BriefDescription>

18.3.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.4 brokensetupcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(brokensetupcase) function, pointer, public **newbrokensetupcase** ()

18.4.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.5 brokentestcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- subroutine **teardown** (this)

18.5.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.6 debuglistener_mod Module Reference

<BriefDescription>

Functions/Subroutines

- subroutine **addfailure** (this, testName, exceptions)
- subroutine **starttest** (this, testName)

18.6.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.7 dynamictestcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(dynamictestcase) function, pointer, public **newdynamictestcase** (testMethod, name)

18.7.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.8 fixturetestcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(fixturetestcase) function, public **newfixturetestcase** ()
- subroutine, public **simpletestmethod** (this)
- subroutine, public **methoda** (this)
- subroutine, public **methodb** (this)

18.8.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.9 makeinfinity_mod Module Reference

<BriefDescription>

Functions/Subroutines

- real(r32) function, public **makeinf_32** ()
- real(r64) function, public **makeinf_64** ()

18.9.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC SIVO

Date

07 Nov 2013

Note

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

18.10 makenan_mod Module Reference

<BriefDescription>

Functions/Subroutines

- real(r32) function, public **makenan_32** ()
- real(r64) function, public **makenan_64** ()

18.10.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.11 mock_mod Module Reference

<BriefDescription>

18.11.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

12 May 2014

Note

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

18.12 mockcall_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(mockcall) function, public **newmockcall** (name)

Variables

- integer, parameter **maxlen_method_name** = 32

18.12.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.13 mocklistener_mod Module Reference

<BriefDescription>

Functions/Subroutines

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

18.13.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.14 mockrepository_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(mockrepository) function, pointer, public **newmockrepository** ()
- subroutine **expectcall** (this, obj, method)

Variables

- integer, parameter, public **max_len_method_name** = 32
- integer, parameter, public **max_len_call_registration** = 32
- class(mockrepository), pointer, public **mockrepositorypointer** => null()

18.14.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.15 mpicontext_mod Module Reference

<BriefDescription>

Functions/Subroutines

- subroutine **barrier** (this)

18.15.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.16 mpistubs_mod Module Reference

<BriefDescription>

Functions/Subroutines

- 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)

Variables

- integer, parameter, public **mpi_comm_world** = -1
- integer, parameter, public **mpi_comm_null** = -1
- integer, parameter, public **mpi_comm_success** = 0
- integer **nextcommunicator** = MPI_COMM_WORLD

18.16.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.17 mpitestcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- recursive subroutine **runbare** (this)
- integer function **getmpicommunicator** (this)
- integer function **getprocessrank** (this)

18.17.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.18 mpitestmethod_mod Module Reference

<BriefDescription>

18.18.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.19 parallelcontext_mod Module Reference

<BriefDescription>

18.19.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.20 parallelexception_mod Module Reference

<BriefDescription>

Functions/Subroutines

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

18.20.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.21 parameterizedtestcase_mod Module Reference

<BriefDescription>

Variables

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

18.21.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.22 params_mod Module Reference

<BriefDescription>

Variables

- 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 **i32** = INT32
- integer, parameter **i64** = INT64
- 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

18.22.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.23 pfunit Module Reference

<BriefDescription>

Functions/Subroutines

- integer function **run** ()

18.23.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.24 pfunit_mod Module Reference

<BriefDescription>

Functions/Subroutines

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

18.24.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.25 privateexception_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(exceptionlist) function, public **newexceptionlist** ()
- logical function **noexceptions** (this)

Variables

- integer, parameter, public **maxlen_message** = 80∗15
- integer, parameter, public **maxlen_file_name** = 255
- character(len=∗), parameter, public **null_message** = ''
- type(exception), parameter **null_exception** = Exception('NULL EXCEPTION', UNKNOWN_SOURCE_LOCAT↩ ION, .true.)

18.25.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.26 remoteproxytestcase_mod Module Reference

<BriefDescription>

Variables

- real, parameter **max_time_test** = 0.10

18.26.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.27 resultprinter_mod Module Reference

<BriefDescription>

Functions/Subroutines

- 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)
- subroutine **incrementcolumn** (this)

Variables

- integer, parameter **max_column** = 80
- logical, parameter **debug** = .false.

18.27.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.28 robustrunner_mod Module Reference

<BriefDescription>

Functions/Subroutines

- 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)

Variables

- integer, parameter **max_length_command** =80
- real, parameter **max_time_launch** = 5.00
- real, parameter **max_time_test** = 0.11

18.28.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.29 robusttestsuite_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testrunsucceeds** ()
- subroutine **testrunassertfailure** ()
- subroutine **testrunstops** ()

18.29.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.30 serialcontext_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(serialcontext) function, public **newserialcontext** ()

Variables

- type(serialcontext), parameter, public **the_serial_context** = SerialContext()

18.30.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.31 simpletestcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- type(simpletestcase) function, public **newsimpletestcase** (name, userMethod)
- subroutine, public **method1** (this)
- subroutine, public **method2** (this)
- subroutine, public **methodwith2exceptions** (this)
- subroutine **delete_** (this)

18.31.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.32 sourcelocation_mod Module Reference

<BriefDescription>

Variables

- integer, parameter **maxlen_file_name** = 255
- 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()

18.32.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.33 stringconversionutilities_mod Module Reference

A collection of utilities used throughout the framework.

Functions/Subroutines

- 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)

Variables

- integer, parameter, public **maxlen_string** = 80
- character(len=∗), parameter **r32fmtstr** = 'SP,G14.7'
- character(len=∗), parameter **r64fmtstr** = 'SP,G14.7'
- character(len=∗), parameter **r32fmt1** = '('//r32fmtStr//')'
- character(len=∗), parameter **r64fmt1** = '('//r64fmtStr//')'
- character(len=∗), parameter **c32fmt1** = '("z=(",'//r32fmt1//',",",'//r32fmt1//',")")'
- character(len=∗), parameter **c64fmt1** = '("z=(",'//r64fmt1//',",",'//r64fmt1//',")")'
- 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_DIFFERENC↩ ES_)

18.33.1 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...>

18.34 subsetrunner_mod Module Reference

<BriefDescription>

Functions/Subroutines

- subroutine **addfailure** (this, testName, exceptions)
- subroutine **starttest** (this, testName)

Variables

- integer, parameter **max_len_name** =80

18.34.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.35 surrogatetestcase_mod Module Reference

<BriefDescription>

18.35.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.36 sut_mod Module Reference

<BriefDescription>

18.36.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.37 test_assert_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testassertequalstringdiffer1st** ()

18.37.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.38 test_assertbasic_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testasserttruef** ()
- subroutine **testassertisfinite** ()
- subroutine **testassertexceptionraised** ()
- subroutine **testassertfail** ()

18.38.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.39 test_assertcomplex_mod Module Reference

<BriefDescription>

Functions/Subroutines

- 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)

Variables

- complex(kind=r32), parameter **good** = (42.0, 24.0)
- complex(kind=r32), parameter **bad** = (-666, -999)

18.39.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.40 test_assertinteger_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testassertequal_equal** ()

18.40.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.41 test_assertreal_mod Module Reference

<BriefDescription>

Functions/Subroutines

- 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)

Variables

- real(kind=r32), parameter **good** = 1
- real(kind=r32), parameter **bad** = -999

18.41.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.42 test_basicopenmp_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testrunwithopenmp** ()
- subroutine **testserializeexceptions** ()

18.42.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.43 test_exception_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testgetnumexceptions** ()
- subroutine **testcatchsucceed** ()
- subroutine **testgetlinenumber** ()
- subroutine **testgetfilename** ()

18.43.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

20 Mar 2015

Note

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

18.44 test_fixturetestcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testrunwithfixture** ()
- subroutine **testbrokentestcase** ()
- subroutine **testbrokensetupcase** ()

18.44.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.45 test_mockcall_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testexpectoneintegerargument**
- subroutine **testfailexpectoneintegerargument**

18.45.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.46 test_mod Module Reference

<BriefDescription>

Data Types

- interface countTestCases
- interface getName
- type test

18.46.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.47 test_mpicontext_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testnumprocesses1** (context)

18.47.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.48 test_mpiexception_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **test_anyexceptions_none** (this)
- subroutine **test_getnumexceptions** (this)
- subroutine **test_gather** (this)

18.48.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.49 test_mpiparameterizedtestcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- type(test_mpitestcase) function, public **newtest_mpitestcase** (name, userMethod, testParameter)
- subroutine **testtostring** (this)
- recursive subroutine **runmethod** (this)

18.49.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.50 test_mpitestcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- type(test_mpitestcase) function, public **newtest_mpitestcase** (name, userMethod, numProcesses)
- subroutine **testrunon2processors** (this)
- subroutine **brokenprocess1** (this)
- subroutine **brokenonprocess2** (this)
- subroutine **testfailon1** (this)
- subroutine **testfailon2** (this)
- subroutine **testtoofewprocs** (this)
- recursive subroutine **runmethod** (this)

18.50.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.51 test_robustrunner_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testrunvariety** ()

18.51.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.52 test_simpletestcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- type(testsuite) function **internalsuite** ()
- subroutine **testworks** ()
- subroutine **testfails** ()
- subroutine **testrunsuite** ()
- subroutine **testrunmethodshouldfail** ()

18.52.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.53 test_stringconversionutilities_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testtostringinteger1d** ()

18.53.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.54 test_testmethod_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testmethodwasrun** ()
- subroutine **testwasrun** ()

18.54.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.55 test_testresult_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testgetnumrun** ()
- subroutine **testgetnumfailed** ()
- subroutine **testaddlistenerend** ()
- subroutine **testaddlistenerstart** ()
- subroutine **testaddlistenerfailure** ()

18.55.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.56 test_testsuite_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testcounttestcases** ()
- subroutine **testcounttestcasesnesteda** ()
- subroutine **testcounttestcasesnestedb** ()
- subroutine **testcounttestcasesnestedc** ()
- subroutine **testgettestcases** ()
- subroutine **mytestmethod** ()

Variables

- character(len=80) **log**

18.56.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.57 test_unixprocess_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testisactive** ()

18.57.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

21 Mar 2015

Note

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

18.58 test_xmlprinter_mod Module Reference

Output test messages in junit.xsd-compatible XML.

Functions/Subroutines

- type(testsuite) function, public **suite** ()
- subroutine **testvalidxml** ()
- subroutine **comparexmlfiletoexpectation** (xmlFile)

18.58.1 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).

18.59 testcase_mod Module Reference

<BriefDescription>

Functions/Subroutines

- recursive subroutine **runbare** (this)
- recursive subroutine **runbare_surrogate** (this)

18.59.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.60 testfailure_mod Module Reference

<BriefDescription>

18.60.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.61 testlistener_mod Module Reference

<BriefDescription>

Data Types

- interface startTest

Functions/Subroutines

- subroutine **adderror** (this, testName, exceptions)
- subroutine **setdebug** (this)

18.61.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.62 testmethod_mod Module Reference

<BriefDescription>

Functions/Subroutines

- subroutine **setup** (this)

18.62.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.63 testresult_mod Module Reference

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

Functions/Subroutines

- type(testresult) function, public **newtestresult** (name)
- subroutine **adderror** (this, aTest, exceptions)
- subroutine **addsuccess** (this, aTest)
- integer function **failurecount** (this)
- subroutine **endtest** (this, aTest)
- subroutine **addlistener** (this, listener)

Variables

- integer, parameter **max_length_name** = 64

18.63.1 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...>

18.64 testrunner_mod Module Reference

<BriefDescription>

Functions/Subroutines

- type(testresult) function **run** (this, aTest, context)
- subroutine **starttest** (this, testName)
- subroutine **addfailure** (this, testName, exceptions)

18.64.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.65 testsuite_mod Module Reference

<BriefDescription>

Functions/Subroutines

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

18.65.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.66 throwfundamentaltypes_mod Module Reference

<BriefDescription>

Functions/Subroutines

- subroutine, public **thrownonconformable** (shapeExpected, shapeFound, location)
- character(len=maxlen_shape) function, public **locationformat** (iLocation)

18.66.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.67 unixpipeinterfaces_mod Module Reference

<BriefDescription>

Variables

- integer(c_int), parameter, public **close_failed** = -1

18.67.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.68 unixprocess_mod Module Reference

<BriefDescription>

Functions/Subroutines

- character(len=:) function, allocatable **makecommand** (baseCommand, runInBackground)
- logical function **isactive** (this)
- character(len=:) function, allocatable **getdelim** (this, delimeter)
- integer function **getpid** (this)

18.68.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

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

18.69 xmlprinter_mod Module Reference

<BriefDescription>

Functions/Subroutines

- 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)

18.69.1 Detailed Description

<BriefDescription>

Author

Halvor Lund, SINTEF Energy Research

Date

30 Jan 2014

Note

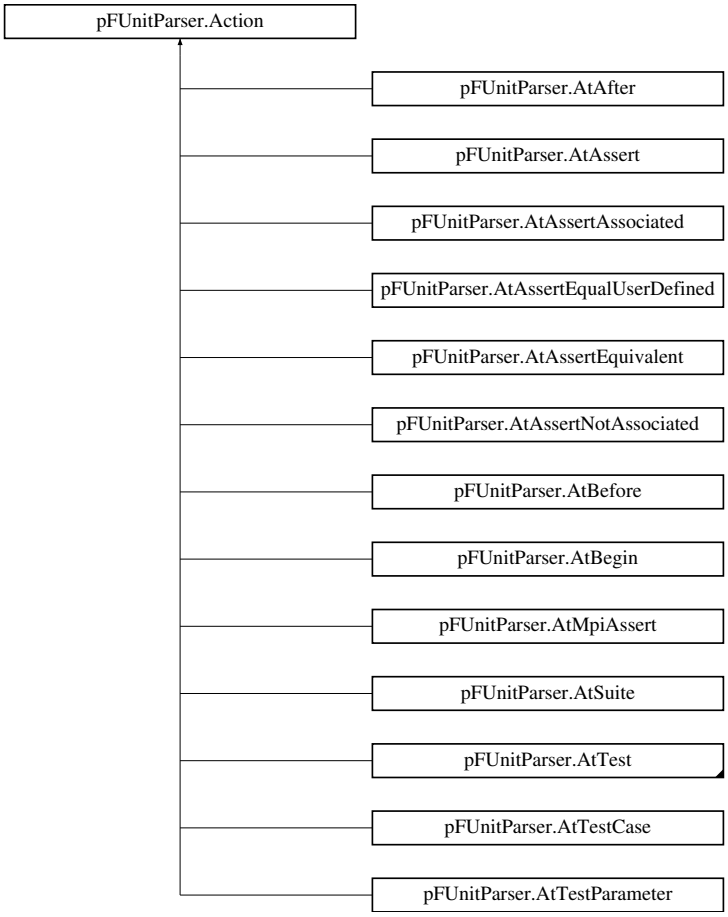
<A note here.> Need to improve the handling of nested quotes.

Chapter 19

Data Type Documentation

19.1 pFUnitParser.Action Class Reference

Inheritance diagram for pFUnitParser.Action:



Public Member Functions

- def **apply** (self, line)

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

- pFUnitParser.py

19.2 CodeUtilities.ArrayDescription Class Reference

Public Member Functions

- def **__init__** (self, fType, kind, rank)
- def **NAME** (self)
- def **DECLARE** (self, variableName)
- def **DECLARESCALAR** (self, variableName)
- def **KIND** (self)
- def **RANK** (self)
- def **FTYPE** (self)
- def **EXPANDSHAPE** (self, variableName)
- def **FailureMessageFork** (self, messageForRank1, messageOtherwise)

Public Attributes

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

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

- CodeUtilities.py

19.3 GenerateAssertsOnArrays.AssertRealArrayArgument Class Reference

Public Member Functions

- def **__init__** (self, aName, eft, ep, er, fft, fp, fr, tol)
- def **updateDescriptions** (self)
- def **getAssertionName** (self)
- def **getExpectedDescription** (self)
- def **getFoundDescription** (self)
- def **getTolerance** (self)

Public Attributes

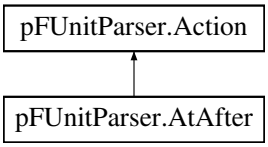
- **assertionName**
- **expectedFType**
- **expectedPrecision**
- **expectedRank**
- **foundFType**
- **foundPrecision**
- **foundRank**
- **tolerance**
- **expectedDescription**
- **foundDescription**

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

- GenerateAssertsOnArrays.py

19.4 pFUnitParser.AtAfter Class Reference

Inheritance diagram for pFUnitParser.AtAfter:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **action** (self, m, line)

Public Attributes

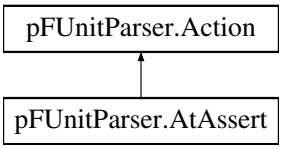
- **parser**

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

- pFUnitParser.py

19.5 pFUnitParser.AtAssert Class Reference

Inheritance diagram for pFUnitParser.AtAssert:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **appendSourceLocation** (self, fileHandle, fileName, lineNumber)
- def **action** (self, m, line)

Public Attributes

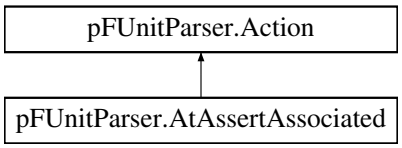
- **parser**

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

- pFUnitParser.py

19.6 pFUnitParser.AtAssertAssociated Class Reference

Inheritance diagram for pFUnitParser.AtAssertAssociated:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **appendSourceLocation** (self, fileHandle, fileName, lineNumber)
- def **action** (self, m, line)

Public Attributes

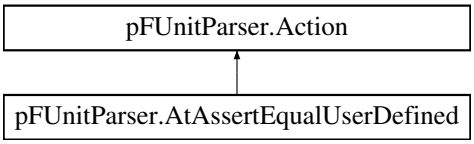
- **parser**

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

- pFUnitParser.py

19.7 pFUnitParser.AtAssertEqualUserDefined Class Reference

Inheritance diagram for pFUnitParser.AtAssertEqualUserDefined:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **appendSourceLocation** (self, fileHandle, fileName, lineNumber)
- def **action** (self, m, line)

Public Attributes

- **parser**

19.7.1 Detailed Description

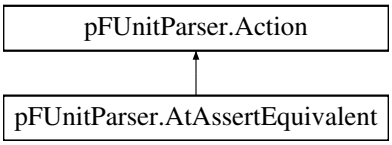
```
Convenience directive replacing (a,b) with a call to assertTrue(a==b)
and an error message, if none is provided when invoked.
```

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

- pFUnitParser.py

19.8 pFUnitParser.AtAssertEquivalent Class Reference

Inheritance diagram for pFUnitParser.AtAssertEquivalent:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **appendSourceLocation** (self, fileHandle, fileName, lineNumber)
- def **action** (self, m, line)

Public Attributes

- **parser**

19.8.1 Detailed Description

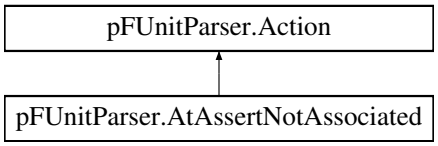
```
Convenience directive replacing (a,b) with a call to assertTrue(a.eqv.b)
and an error message, if none is provided when invoked.
```

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

- pFUnitParser.py

19.9 pFUnitParser.AtAssertNotAssociated Class Reference

Inheritance diagram for pFUnitParser.AtAssertNotAssociated:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **appendSourceLocation** (self, fileHandle, fileName, lineNumber)
- def **action** (self, m, line)

Public Attributes

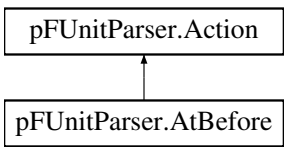
- **parser**
- **name**

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

- pFUnitParser.py

19.10 pFUnitParser.AtBefore Class Reference

Inheritance diagram for pFUnitParser.AtBefore:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **action** (self, m, line)

Public Attributes

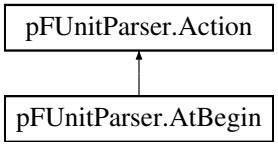
- **parser**

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

- pFUnitParser.py

19.11 pFUnitParser.AtBegin Class Reference

Inheritance diagram for pFUnitParser.AtBegin:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **action** (self, m, line)

Public Attributes

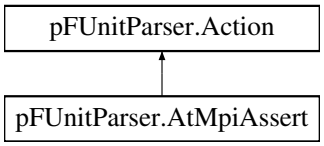
- **parser**

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

- pFUnitParser.py

19.12 pFUnitParser.AtMpiAssert Class Reference

Inheritance diagram for pFUnitParser.AtMpiAssert:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **appendSourceLocation** (self, fileHandle, fileName, lineNumber)
- def **action** (self, m, line)

Public Attributes

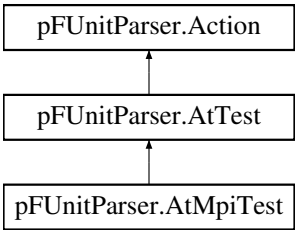
- **parser**

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

- pFUnitParser.py

19.13 pFUnitParser.AtMpiTest Class Reference

Inheritance diagram for pFUnitParser.AtMpiTest:



Public Member Functions

- def **__init__** (self, parser)

Public Attributes

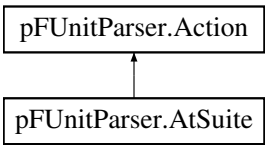
- **parser**
- **keyword**

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

- pFUnitParser.py

19.14 pFUnitParser.AtSuite Class Reference

Inheritance diagram for pFUnitParser.AtSuite:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **action** (self, m, line)

Public Attributes

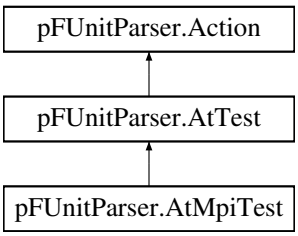
- **parser**

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

- pFUnitParser.py

19.15 pFUnitParser.AtTest Class Reference

Inheritance diagram for pFUnitParser.AtTest:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **action** (self, m, line)

Public Attributes

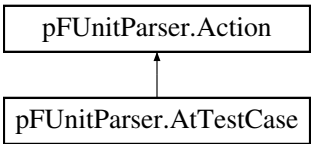
- **parser**
- **keyword**

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

- pFUnitParser.py

19.16 pFUnitParser.AtTestCase Class Reference

Inheritance diagram for pFUnitParser.AtTestCase:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **action** (self, m, line)

Public Attributes

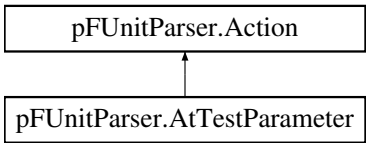
- **parser**

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

- pFUnitParser.py

19.17 pFUnitParser.AtTestParameter Class Reference

Inheritance diagram for pFUnitParser.AtTestParameter:



Public Member Functions

- def **__init__** (self, parser)
- def **match** (self, line)
- def **action** (self, m, line)

Public Attributes

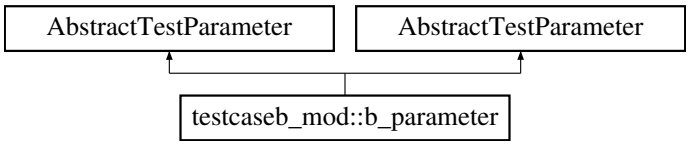
- **parser**

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

- pFUnitParser.py

19.18 testcaseb_mod::b_parameter Type Reference

Inheritance diagram for testcaseb_mod::b_parameter:



Public Member Functions

- procedure **tostring**
- procedure **tostring**

Public Attributes

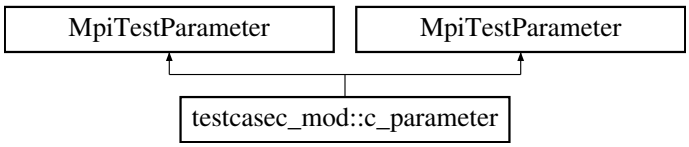
- real **phi**
- real **theta**

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

- ParameterizedTestCaseB.F90
- ParameterizedTestCaseB.pf

19.19 testcasec_mod::c_parameter Type Reference

Inheritance diagram for testcasec_mod::c_parameter:



Public Member Functions

- procedure **tostring**
- procedure **tostring**

Public Attributes

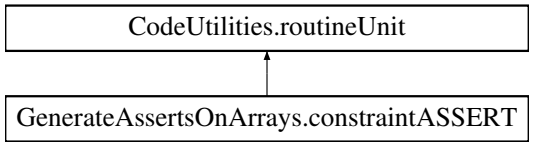
- real **phi**
- real **theta**

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

- MpiParameterizedTestCaseC.F90
- MpiParameterizedTestCaseC.pf

19.20 GenerateAssertsOnArrays.constraintASSERT Class Reference

Inheritance diagram for GenerateAssertsOnArrays.constraintASSERT:



Public Member Functions

- def __init__ (self, assertionName, expectedDescr, foundDescr, tolerance)

  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...

19.20.1 Constructor & Destructor Documentation

19.20.1.1 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.

19.20.2 Member Data Documentation

19.20.2.1 GenerateAssertsOnArrays.constraintASSERT.name1

Add in the extra module procedures...

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

19.20.2.2 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

19.21 test_mod::countTestCases Interface Reference

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

- Test.F90

19.22 mods.pre.pre2.dataString Class Reference

Public Member Functions

- def **__init__** (self, data)
- def **insert** (self, pos, insertData)
- def **getLength** (self)
- def **getPosition** (self)
- def **setPosition** (self, pos)
- def **getItem** (self, pos)
- def **getDataAtPosition** (self, pos)
- def **getData** (self)
- def **getSlice** (self, i0, i1)
- def **getSliceForward** (self, i0)
- def **removeSlice** (self, i0, i1)
- def **getCurrentData** (self)
- def **insertAtCurrent** (self, includeData)
- def **append** (self, appendData)
- def **advanceAndGetNextData** (self)
- def **validPosition** (self, position)
- def **findToEnd** (self, start, s)
- def **match** (self, sre, start, end)
- def **matchToEnd** (self, sre, start)
- def **searchToEnd** (self, sre, start)
- def **searchToPosition** (self, sre, start, position)
- def **finditerToEnd** (self, sre, start)
- def **finditerToPosition** (self, sre, start, position)

Public Attributes

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

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

- pre2.py

19.23 CodeUtilities.declaration Class Reference

Public Member Functions

- def **__init__** (self, name, simpleDeclaration)
- def **generate** (self)

Public Attributes

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

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

- CodeUtilities.py

19.24 mods.pre.pre2.environment Class Reference

Public Member Functions

- def **__init__**
- def **scan_and_proc** (self)

Public Attributes

- **input**
- **output**

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

- pre2.py

19.25 CodeUtilities.fortranSubroutineSignature Class Reference

Public Member Functions

- def **__init__** (self, name)
- def **setReturnFType** (self, ReturnFType)
- def **addArg** (self, arg, fType)
- def **generateInterfaceEntry** (self)
- def **generateImplementationSignature** (self)
- def **generateImplementationClose** (self)

Public Attributes

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

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

- CodeUtilities.py

19.26 abstracttestresult_mod::getErrors Interface Reference

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

- AbstractTestResult.F90

19.27 test_mod::getName Interface Reference

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

- Test.F90

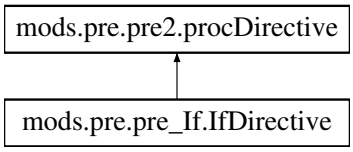
19.28 abstracttestresult_mod::getSuccesses Interface Reference

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

- AbstractTestResult.F90

19.29 mods.pre.pre_If.IfDirective Class Reference

Inheritance diagram for mods.pre.pre_If.IfDirective:



Public Member Functions

- def **evaluate** (self, data, pos)

Public Attributes

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

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

- pre_If.py

19.30 CodeUtilities.implementation Class Reference

Public Member Functions

- def **__init__** (self, name, source)
- def **generate** (self)

Public Attributes

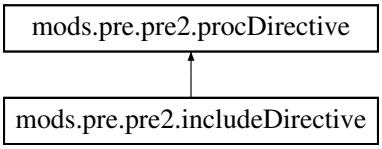
- **name**
- **source**

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

- CodeUtilities.py

19.31 mods.pre.pre2.includeDirective Class Reference

Inheritance diagram for mods.pre.pre2.includeDirective:



Public Member Functions

- def **evaluate** (self, data, pos)

Public Attributes

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

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

- pre2.py

19.32 CodeUtilities.interfaceBlock Class Reference

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

- CodeUtilities.py

19.33 mods.pre.pre_lf.interval Class Reference

Public Member Functions

- def **__init__** (self, start, end)
- def **getInterval** (self)
- def **setInterval** (self, start, end)
- def **getStart** (self)
- def **getEnd** (self)

Public Attributes

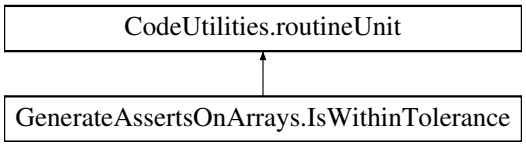
- **start**
- **end**
- **interval**

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

- pre_lf.py

19.34 GenerateAssertsOnArrays.IsWithinTolerance Class Reference

Inheritance diagram for GenerateAssertsOnArrays.IsWithinTolerance:



Public Member Functions

- def **__init__**

Public Attributes

- **rank**
- **precision**
- **name**
- **fType**

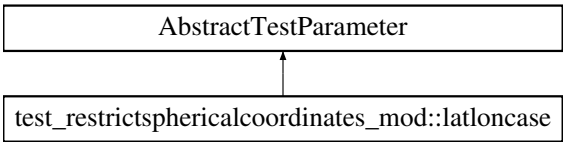
- **declaration**
- **declarations**

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

- GenerateAssertsOnArrays.py

19.35 test_restrictsphericalcoordinates_mod::latloncase Type Reference

Inheritance diagram for test_restrictsphericalcoordinates_mod::latloncase:



Public Member Functions

- procedure **tostring**

Public Attributes

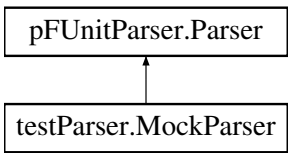
- real **lat**
- real **lon**
- real **restrictedlat**
- real **restrictedlon**

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

- Test_RestrictedSphericalCoordinates.pf

19.36 testParser.MockParser Class Reference

Inheritance diagram for testParser.MockParser:



Public Member Functions

- def **__init__** (self, lines)
- def **nextLine** (self)
- def **reset** (self)

Public Attributes

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

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

- testParser.py

19.37 testParser.MockWriter Class Reference

Public Member Functions

- def **__init__** (self, parser)
- def **write** (self, line)

Public Attributes

- **parser**

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

- testParser.py

19.38 CodeUtilities.module Class Reference

Public Member Functions

- def **__init__** (self, name)
- def **generate** (self)
- def **addDeclaration** (self, declaration)
- def **addImplementation** (self, implementation)
- def **addRoutineUnit**
- def **addInterfaceBlock**
- def **getName** (self)
- def **setFileName** (self, fName)
- def **getFileName** (self)

Public Attributes

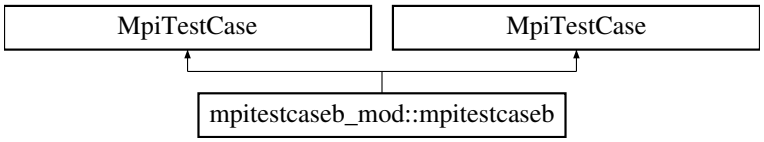
- **name**
- **declarations**
- **implementations**
- **generation**
- **fileName**

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

- CodeUtilities.py

19.39 mpitestcaseb_mod::mpitestcaseb Type Reference

Inheritance diagram for mpitestcaseb_mod::mpitestcaseb:



Public Member Functions

- procedure **setup**
- procedure **teardown**
- procedure **setup**
- procedure **teardown**

Public Attributes

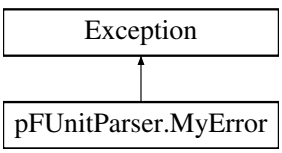
- integer **componenti**

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

- MpiTestCaseB.F90
- MpiTestCaseB.pf

19.40 pFUnitParser.MyError Class Reference

Inheritance diagram for pFUnitParser.MyError:



Public Member Functions

- def **__init__** (self, value)
- def **__str__** (self)

Public Attributes

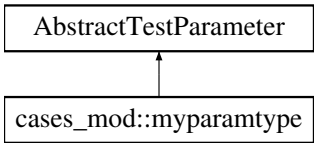
- **value**

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

- pFUnitParser.py

19.41 cases_mod::myparamtype Type Reference

Inheritance diagram for cases_mod::myparamtype:



Public Member Functions

- procedure **tostring**

Public Attributes

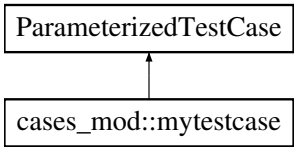
- integer **i**

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

- Test_Cases.pf

19.42 cases_mod::mytestcase Type Reference

Inheritance diagram for cases_mod::mytestcase:



Public Attributes

- integer **i**

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

- Test_Cases.pf

19.43 testcasec_mod::newc_parameter Interface Reference

Public Member Functions

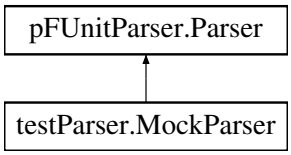
- type(c_parameter) function **newc_parameter_phitheta** (npes, phi, theta)
- elemental type(c_parameter) function **newc_parameter_case** (i)
- type(c_parameter) function **newc_parameter_phitheta** (npes, phi, theta)
- elemental type(c_parameter) function **newc_parameter_case** (i)

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

- MpiParameterizedTestCaseC.F90
- MpiParameterizedTestCaseC.pf

19.44 pFUnitParser.Parser Class Reference

Inheritance diagram for pFUnitParser.Parser:



Public Member Functions

- def **__init__** (self, inputFileName, outputFileName)
- def **commentLine** (self, line)
- def **run** (self)
- def **isComment** (self, line)
- def **nextLine** (self)
- def **printHeader** (self)
- def **printTail** (self)
- def **printWrapUserTestCase** (self)
- def **printRunMethod** (self)
- def **printParameterHeader** (self, type)
- def **printMakeSuite** (self)
- def **addSimpleTestMethod** (self, testMethod)
- def **addMpiTestMethod** (self, testMethod)

- def **addUserTestMethod** (self, testMethod)
- def **printMakeCustomTest** (self, isMpiTestCase)
- def **makeWrapperModule** (self)
- def **final** (self)

Public Attributes

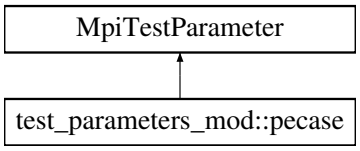
- **fileName**
- **inputFile**
- **outputFile**
- **defaultSuiteName**
- **suiteName**
- **currentLineNumber**
- **userModuleName**
- **userTestCase**
- **userTestMethods**
- **wrapModuleName**
- **actions**

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

- pFUnitParser.py

19.45 test_parameters_mod::pecase Type Reference

Inheritance diagram for test_parameters_mod::pecase:



Public Member Functions

- procedure **tostring**

Public Attributes

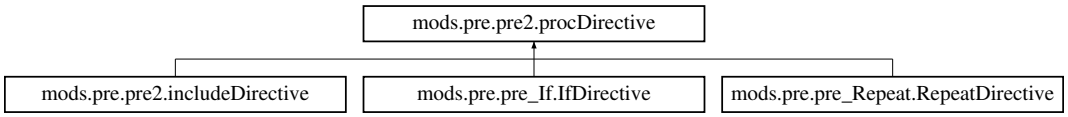
- integer **p1**
- integer **p2**

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

- parameterizedTests.pf

19.46 mods.pre.pre2.procDirective Class Reference

Inheritance diagram for mods.pre.pre2.procDirective:



Public Member Functions

- def **__init__** (self, name)
- def **getLength** (self)
- def **match** (self, name)
- def **evaluate** (self, data, pos)
- def **getNewPosition** (self)
- def addTokenRE
- def **searchTokenToEnd** (self, key, data, start)
- def **searchTokenToPosition** (self, key, data, start, end)
- def **finditerTokenToPosition** (self, key, data, start, end)
- def **makeTokenErrorMessage** (self, msg, key)

Public Attributes

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

19.46.1 Member Function Documentation

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

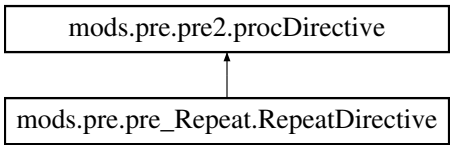
```
Add a token/create an RE with a prefix that by default ignores preceding whitespace.
Stores the RE in a dictionary for this directive.  Note this currently expects
complex tokens like <EndToken> not something as overloaded as a close paren.
```

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

- pre2.py

19.47 mods.pre.pre_Repeat.RepeatDirective Class Reference

Inheritance diagram for mods.pre.pre_Repeat.RepeatDirective:



Public Member Functions

- def **evaluate** (self, data, pos)

Public Attributes

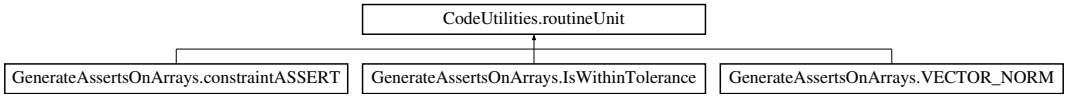
- **startPosition**
- **newPosition**

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

- pre_Repeat.py

19.48 CodeUtilities.routineUnit Class Reference

Inheritance diagram for CodeUtilities.routineUnit:



Public Member Functions

- def **__init__** (self, name, implementSource)
- def **setName** (self, name)
- def **getName** (self)
- def **setDeclaration** (self, declaration)
- def **addDeclaration** (self, declaration)
- def **setImplementation** (self, implementationSource)
- def **getDeclaration**
- def **getDeclarations**
- def **getImplementation** (self)
- def **clearDeclarations** (self)

Public Attributes

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

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

- CodeUtilities.py

19.49 testlistener_mod::startTest Interface Reference

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

- TestListener.F90

19.50 test_mod::test Type Reference

Public Member Functions

- procedure(countTestCases), deferred **counttestcases**
- procedure(run), deferred **run**
- procedure(getName), deferred **getname**
- procedure **setname**

Public Attributes

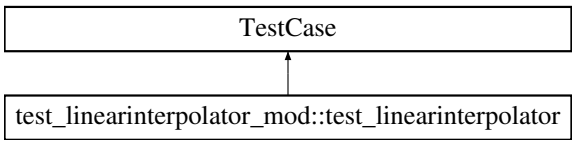
- integer **placeholder**

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

- Test.F90

19.51 test_linearinterpolator_mod::test_linearinterpolator Type Reference

Inheritance diagram for test_linearinterpolator_mod::test_linearinterpolator:



Public Member Functions

- procedure **setup**
- procedure **teardown**

Public Attributes

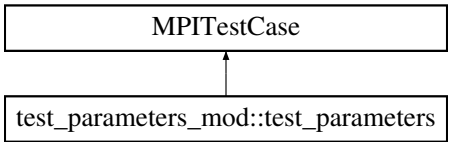
- type(linearinterpolator) **interpolator**

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

- Test_LinearInterpolator.pf

19.52 test_parameters_mod::test_parameters Type Reference

Inheritance diagram for test_parameters_mod::test_parameters:



Public Attributes

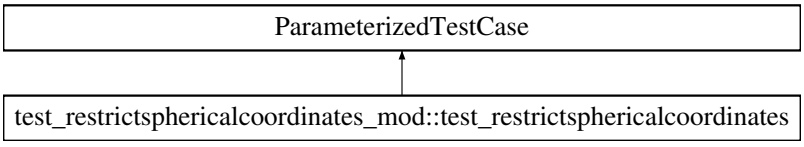
- integer **p1**
- integer **p2**

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

- parameterizedTests.pf

19.53 test_restrictsphericalcoordinates_mod::test_restrictsphericalcoordinates Type Reference

Inheritance diagram for test_restrictsphericalcoordinates_mod::test_restrictsphericalcoordinates:



Public Attributes

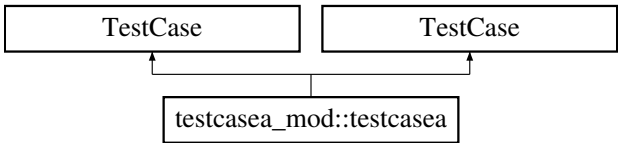
- real **lat**
- real **lon**
- real **restrictedlat**
- real **restrictedlon**
- type(sphericalcoordinates) **unrestricted**
- type(sphericalcoordinates) **restricted**

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

- Test_RestrictedSphericalCoordinates.pf

19.54 testcasea_mod::testcasea Type Reference

Inheritance diagram for testcasea_mod::testcasea:



Public Member Functions

- procedure **setup**
- procedure **teardown**
- procedure **setup**
- procedure **teardown**

Public Attributes

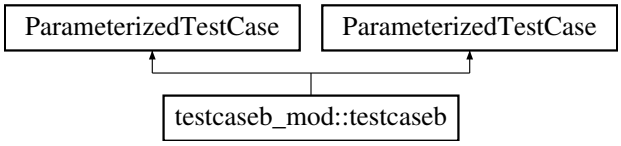
- integer **componenti**

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

- TestCaseA.F90
- TestCaseA.pf

19.55 testcaseb_mod::testcaseb Type Reference

Inheritance diagram for testcaseb_mod::testcaseb:



Public Member Functions

- procedure **setup**
- procedure **teardown**
- procedure **setup**
- procedure **teardown**

Public Attributes

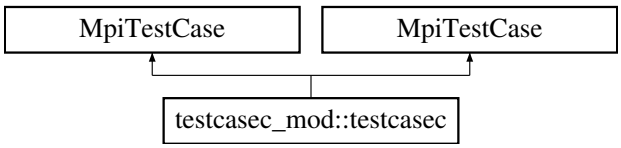
- integer, dimension(:), allocatable **table**
- real **phi**
- real **theta**

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

- ParameterizedTestCaseB.F90
- ParameterizedTestCaseB.pf

19.56 testcasec_mod::testcasec Type Reference

Inheritance diagram for testcasec_mod::testcasec:



Public Member Functions

- procedure **setup**
- procedure **teardown**
- procedure **setup**
- procedure **teardown**

Public Attributes

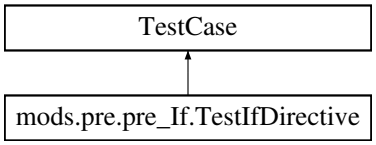
- integer, dimension(:), allocatable **table**
- real **phi**
- real **theta**

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

- MpiParameterizedTestCaseC.F90
- MpiParameterizedTestCaseC.pf

19.57 mods.pre.pre_If.TestIfDirective Class Reference

Inheritance diagram for mods.pre.pre_If.TestIfDirective:



Public Member Functions

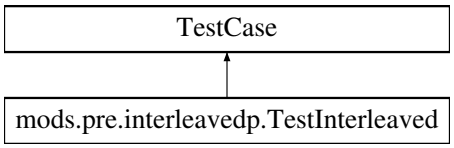
- def **testTokenNotFound1** (self)
- def **testNoTest** (self)
- def **testIFTestFalse** (self)
- def **testIFTestTrue1** (self)
- def **testIFTestTrue2** (self)
- def **testIFClearTokens** (self)
- def **testIFClearTokensUntilEnd1** (self)

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

- pre_If.py

19.58 mods.pre.interleavedp.TestInterleaved Class Reference

Inheritance diagram for mods.pre.interleavedp.TestInterleaved:



Public Member Functions

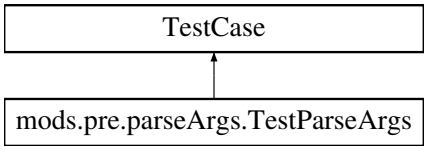
- def **test_InOrder** (self)
- def **test_NumberMismatch** (self)
- def **test_OrderMismatch1** (self)
- def **test_OrderMismatch2** (self)
- def **test_OrderMismatch3** (self)
- def **test_ElseMid1** (self)
- def **test_ElseMid2** (self)
- def **test_ElseMid3** (self)
- def **test_ElseMid4** (self)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

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

- interleavedp.py

19.59 mods.pre.parseArgs.TestParseArgs Class Reference

Inheritance diagram for mods.pre.parseArgs.TestParseArgs:



Public Member Functions

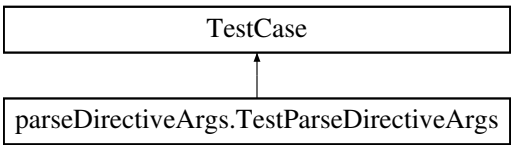
- def **test_ParseArgs_OneArgWithBrackets1** (self)
- def **test_ParseArgs_OneArgWithBrackets2** (self)
- def **test_ParseArgs_OneArgWithBrackets3** (self)
- def **test_ParseArgs_OneArgWithBrackets4** (self)
- def **test_ParseArgs_OneArgWithBrackets5** (self)
- def **test_ParseArgs_OneArgWithBrackets6** (self)
- def **test_ParseArgs_OneArgWithBrackets7** (self)
- def **test_ParseArgs_oneArg** (self)
- def **test_ParseArgs_twoArgs1** (self)
- def **test_ParseArgs_twoArgs2** (self)
- def **test_ParseArgs_oneArgArray1** (self)
- def **test_ParseArgs_TwoArgArray** (self)
- def **test_ParseArgs_ThreeArgs** (self)

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

- parseArgs.py

19.60 parseDirectiveArgs.TestParseDirectiveArgs Class Reference

Inheritance diagram for parseDirectiveArgs.TestParseDirectiveArgs:



Public Member Functions

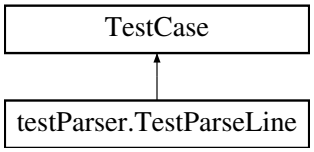
- def **test_args1** (self)
- def **test_args2** (self)
- def **test_args3** (self)
- def **test_args4** (self)
- def **test_args5** (self)

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

- parseDirectiveArgs.py

19.61 testParser.TestParseLine Class Reference

Inheritance diagram for testParser.TestParseLine:



Public Member Functions

- def **testCppSetLineAndFile** (self)
- def **testGetSubroutineName** (self)
- def **testGetSelfObjectName** (self)
- def **testGetTypeName** (self)
- def testAtTest (self)
- def testAtTestNoParens (self)
- def testAtTestFail (self)
- def testAtTestSkipComment (self)
- def testAtMpiTest (self)
- def testMatchAtTestCase (self)
- def testMatchAtAssertEqual (self)
- def testParseArgsFirstRest (self)
- def testParseArgsFirstSecondRest (self)
- def testMatchAtAssertAssociated (self)
- def testMatchAtAssertAssociatedOverloaded1 (self)
- def testMatchAtAssertAssociatedOverloaded2 (self)
- def testMatchAtAssertUnAssociated (self)
- def testMatchAtAssertUnAssociatedWith (self)
- def testMatchAtAssertNotassociated (self)
- def testMatchAtAssertNotassociatedWith (self)
- def testMatchAtAssertEqualUserDefined (self)
- def testMatchAtAssertEqualUserDefinedWithMessage (self)
- def testMatchAtAssertEquivalent (self)
- def testMatchAtAssertOther (self)
- def testMatchAtMpiAssert (self)
- def testMatchAtBefore (self)
- def testMatchAtAfter (self)
- def testMatchAtSuite (self)

19.61.1 Member Function Documentation

19.61.1.1 def testParser.TestParseLine.testAtMpiTest (*self*)

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

19.61.1.2 def testParser.TestParseLine.testAtTest (*self*)

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

19.61.1.3 def testParser.TestParseLine.testAtTestFail (*self*)

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

19.61.1.4 def testParser.TestParseLine.testAtTestNoParens (*self*)

```
Check that test procedure with no parens is accepted.
```

19.61.1.5 def testParser.TestParseLine.testAtTestSkipComment (*self*)

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

19.61.1.6 def testParser.TestParseLine.testMatchAtAfter (*self*)

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

19.61.1.7 def testParser.TestParseLine.testMatchAtAssertAssociated (*self*)

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

19.61.1.8 def testParser.TestParseLine.testMatchAtAssertAssociatedOverloaded1 (*self*)

```
Check that a line starting with '@assertAssociated' is detected
as an annotation. atAssertAssociated(a,b) implies a points to b.
Overriding the name @assertAssociated.
```

19.61.1.9 def testParser.TestParseLine.testMatchAtAssertAssociatedOverloaded2 (*self*)

```
Check that a line starting with '@assertAssociated' is detected
as an annotation. atAssertAssociated(a,b) implies a points to b.
Overriding the name @assertAssociated.
```

19.61.1.10 def testParser.TestParseLine.testMatchAtAssertEqual (*self*)

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

19.61.1.11 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.
```

19.61.1.12 def testParser.TestParseLine.testMatchAtAssertEqualUserDefinedWithMessage (*self*)

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

19.61.1.13 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.
```

19.61.1.14 def testParser.TestParseLine.testMatchAtAssertNotassociated (*self*)

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

19.61.1.15 def testParser.TestParseLine.testMatchAtAssertNotassociatedWith (*self*)

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

19.61.1.16 def testParser.TestParseLine.testMatchAtAssertOther (*self*)

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

19.61.1.17 def testParser.TestParseLine.testMatchAtAssertUnAssociated (*self*)

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

19.61.1.18 def testParser.TestParseLine.testMatchAtAssertUnAssociatedWith (*self*)

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

19.61.1.19 def testParser.TestParseLine.testMatchAtBefore (*self*)

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

19.61.1.20 def testParser.TestParseLine.testMatchAtMpiAssert (*self*)

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

19.61.1.21 def testParser.TestParseLine.testMatchAtSuite (*self*)

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

19.61.1.22 def testParser.TestParseLine.testMatchAtTestCase (*self*)

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

19.61.1.23 def testParser.TestParseLine.testParseArgsFirstRest (*self*)

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

19.61.1.24 def testParser.TestParseLine.testParseArgsFirstSecondRest (*self*)

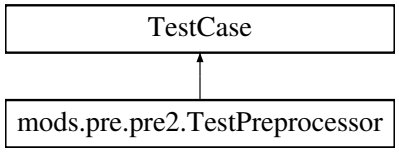
```
Test that the first-second-rest argument parsing is adequate.
```

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

- testParser.py

19.62 mods.pre.pre2.TestPreprocessor Class Reference

Inheritance diagram for mods.pre.pre2.TestPreprocessor:



Public Member Functions

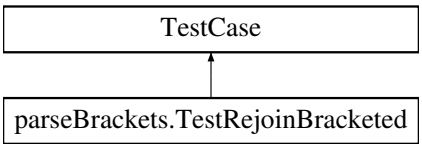
- def **setUp** (self)
- def **test_ALineOfText** (self)
- def **test_AStringLiteral** (self)
- def **test_INCLUDE** (self)
- def **test_INCLUDEWithTextBefore** (self)
- def **test_INCLUDEWithTextAfter** (self)
- def **test_INCLUDEWithTextBeforeAndAfter** (self)
- def **test_INCLUDEUsingFiles** (self)
- def **test_getPCArgsWith3Args** (self)
- def **test_getPCArgsWith5MixedArgs** (self)
- def **test_getPCArgsWith5ArgsWithCRs** (self)
- def **test_getPCArgsWith0Args** (self)
- def **test_getPCArgsWith1Args** (self)
- def **test_addTokenRE1** (self)
- def **test_addTokenRE2** (self)
- def **test_addTokenRE3** (self)
- def **test_addTokenRE4** (self)

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

- pre2.py

19.63 parseBrackets.TestRejoinBracketed Class Reference

Inheritance diagram for parseBrackets.TestRejoinBracketed:



Public Member Functions

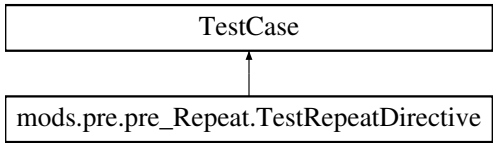
- def **testRejoinBracketed** (self)
- def **testParseBrackets** (self)

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

- parseBrackets.py

19.64 mods.pre.pre_Repeat.TestRepeatDirective Class Reference

Inheritance diagram for mods.pre.pre_Repeat.TestRepeatDirective:



Public Member Functions

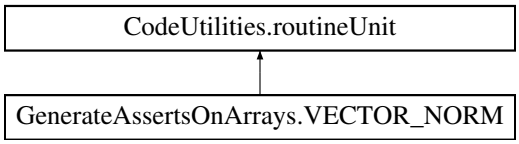
- def **test_copyBlock1** (self)
- def **test_copyBlock2** (self)
- def **test_copyBlock2Vars** (self)
- def **test_copyBlock2VarsMulti** (self)
- def **test_copyBlock2VarsMultiWithStrings** (self)
- def **test_copyNaiveRecursion** (self)
- def **test_copyNaiveRecursion1** (self)
- def **test_copyFunction1** (self)

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

- pre_Repeat.py

19.65 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

19.66 abstracttestresult_mod::wasSuccessful Interface Reference

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

- AbstractTestResult.F90

Index

__init__
    GenerateAssertsOnArrays::constraintASSERT, 100

abstracttestresult_mod::getErrors, 103
abstracttestresult_mod::getSuccesses, 103
abstracttestresult_mod::wasSuccessful, 126
addTokenRE
    mods::pre::pre2::procDirective, 112
assert_mod, 49
assertbasic_mod, 49

basetestrunner_mod, 50
brokensetupcase_mod, 51
brokentestcase_mod, 51

cases_mod::myparamtype, 109
cases_mod::mytestcase, 109
CodeUtilities.ArrayDescription, 90
CodeUtilities.declaration, 102
CodeUtilities.fortranSubroutineSignature, 102
CodeUtilities.implementation, 104
CodeUtilities.interfaceBlock, 105
CodeUtilities.module, 107
CodeUtilities.routineUnit, 113

debuglistener_mod, 52
dynamictestcase_mod, 52

fixturetestcase_mod, 53

GenerateAssertsOnArrays.AssertRealArrayArgument, 90
GenerateAssertsOnArrays.constraintASSERT, 100
GenerateAssertsOnArrays.IsWithinTolerance, 105
GenerateAssertsOnArrays.VECTOR_NORM, 125
GenerateAssertsOnArrays::constraintASSERT
    __init__, 100
    name1, 100
    tolerance, 100

makeinfinity_mod, 53
makenan_mod, 54
mock_mod, 54
mockcall_mod, 54
mocklistener_mod, 55
mockrepository_mod, 56
mods.pre.interleavedp.TestInterleaved, 118
mods.pre.parseArgs.TestParseArgs, 119
mods.pre.pre2.dataString, 101
mods.pre.pre2.environment, 102
mods.pre.pre2.includeDirective, 104
mods.pre.pre2.procDirective, 112
mods.pre.pre2.TestPreprocessor, 123
mods.pre.pre_If.IfDirective, 103
mods.pre.pre_If.interval, 105
mods.pre.pre_If.TestIfDirective, 117
mods.pre.pre_Repeat.RepeatDirective, 112
mods.pre.pre_Repeat.TestRepeatDirective, 125
mods::pre::pre2::procDirective
    addTokenRE, 112
mpicontext_mod, 56
mpistubs_mod, 57
mpitestcase_mod, 57
mpitestcaseb_mod::mpitestcaseb, 108
mpitestmethod_mod, 58

name1
    GenerateAssertsOnArrays::constraintASSERT, 100

pFUnitParser.Action, 89
pFUnitParser.AtAfter, 91
pFUnitParser.AtAssert, 91
pFUnitParser.AtAssertAssociated, 92
pFUnitParser.AtAssertEqualUserDefined, 93
pFUnitParser.AtAssertEquivalent, 93
pFUnitParser.AtAssertNotAssociated, 94
pFUnitParser.AtBefore, 94
pFUnitParser.AtBegin, 95
pFUnitParser.AtMpiAssert, 95
pFUnitParser.AtMpiTest, 96
pFUnitParser.AtSuite, 96
pFUnitParser.AtTest, 97
pFUnitParser.AtTestCase, 98
pFUnitParser.AtTestParameter, 98
pFUnitParser.MyError, 108
pFUnitParser.Parser, 110
parallelcontext_mod, 58
parallelexception_mod, 59
parameterizedtestcase_mod, 59
params_mod, 60
parseBrackets.TestRejoinBracketed, 124
parseDirectiveArgs.TestParseDirectiveArgs, 119
pfunit, 61
pfunit_mod, 61

privateexception_mod, 62

remoteproxytestcase_mod, 62
resultprinter_mod, 63
robustrunner_mod, 63
robusttestsuite_mod, 64

serialcontext_mod, 65
simpletestcase_mod, 65
sourcelocation_mod, 66
stringconversionutilities_mod, 66
subsetrunner_mod, 67
surrogatetestcase_mod, 68
sut_mod, 68

test_assert_mod, 69
test_assertbasic_mod, 69
test_assertcomplex_mod, 70
test_assertinteger_mod, 71
test_assertreal_mod, 71
test_basicopenmp_mod, 73
test_exception_mod, 73
test_fixturetestcase_mod, 74
test_linearinterpolator_mod::test_linearinterpolator, 114
test_mockcall_mod, 75
test_mod, 75
test_mod::countTestCases, 101
test_mod::getName, 103
test_mod::test, 114
test_mpicontext_mod, 76
test_mpiexception_mod, 76
test_mpiparameterizedtestcase_mod, 77
test_mpitestcase_mod, 77
test_parameters_mod::pecase, 111
test_parameters_mod::test_parameters, 115
test_restrictsphericalcoordinates_mod::latloncase, 106
test_restrictsphericalcoordinates_mod::test_restrictsphericalcoordinates, 115
test_robustrunner_mod, 78
test_simpletestcase_mod, 78
test_stringconversionutilities_mod, 79
test_testmethod_mod, 80
test_testresult_mod, 80
test_testsuite_mod, 81
test_unixprocess_mod, 81
test_xmlprinter_mod, 82
testAtMpiTest
    testParser::TestParseLine, 121
testAtTest
    testParser::TestParseLine, 121
testAtTestFail
    testParser::TestParseLine, 121
testAtTestNoParens
    testParser::TestParseLine, 121
testAtTestSkipComment
    testParser::TestParseLine, 121
testMatchAtAfter
    testParser::TestParseLine, 121
testMatchAtAssertAssociated
    testParser::TestParseLine, 121
testMatchAtAssertAssociatedOverloaded1
    testParser::TestParseLine, 121
testMatchAtAssertAssociatedOverloaded2
    testParser::TestParseLine, 121
testMatchAtAssertEqual
    testParser::TestParseLine, 121
testMatchAtAssertEqualUserDefined
    testParser::TestParseLine, 122
testMatchAtAssertEqualUserDefinedWithMessage
    testParser::TestParseLine, 122
testMatchAtAssertEquivalent
    testParser::TestParseLine, 122
testMatchAtAssertNotassociated
    testParser::TestParseLine, 122
testMatchAtAssertNotassociatedWith
    testParser::TestParseLine, 122
testMatchAtAssertOther
    testParser::TestParseLine, 122
testMatchAtAssertUnAssociated
    testParser::TestParseLine, 122
testMatchAtAssertUnAssociatedWith
    testParser::TestParseLine, 122
testMatchAtBefore
    testParser::TestParseLine, 122
testMatchAtMpiAssert
    testParser::TestParseLine, 123
testMatchAtSuite
    testParser::TestParseLine, 123
testMatchAtTestCase
    testParser::TestParseLine, 123
testParseArgsFirstRest
    testParser::TestParseLine, 123
testParseArgsFirstSecondRest
    testParser::TestParseLine, 123
testParser.MockParser, 106
testParser.MockWriter, 107
testParser.TestParseLine, 120
testParser::TestParseLine
    testAtMpiTest, 121
    testAtTest, 121
    testAtTestFail, 121
    testAtTestNoParens, 121
    testAtTestSkipComment, 121
    testMatchAtAfter, 121
    testMatchAtAssertAssociated, 121
    testMatchAtAssertAssociatedOverloaded1, 121
    testMatchAtAssertAssociatedOverloaded2, 121
    testMatchAtAssertEqual, 121
    testMatchAtAssertEqualUserDefined, 122

testMatchAtAssertEqualUserDefinedWithMessage, 122
testMatchAtAssertEquivalent, 122
testMatchAtAssertNotassociated, 122
testMatchAtAssertNotassociatedWith, 122
testMatchAtAssertOther, 122
testMatchAtAssertUnAssociated, 122
testMatchAtAssertUnAssociatedWith, 122
testMatchAtBefore, 122
testMatchAtMpiAssert, 123
testMatchAtSuite, 123
testMatchAtTestCase, 123
testParseArgsFirstRest, 123
testParseArgsFirstSecondRest, 123
testcase_mod, 83
testcasea_mod::testcasea, 116
testcaseb_mod::b_parameter, 99
testcaseb_mod::testcaseb, 116
testcasec_mod::c_parameter, 99
testcasec_mod::newc_parameter, 110
testcasec_mod::testcasec, 117
testfailure_mod, 83
testlistener_mod, 83
testlistener_mod::startTest, 114
testmethod_mod, 84
testresult_mod, 85
testrunner_mod, 85
testsuite_mod, 86
throwfundamentaltypes_mod, 86
tolerance
GenerateAssertsOnArrays::constraintASSERT, 100

unixpipeinterfaces_mod, 87
unixprocess_mod, 87

xmlprinter_mod, 88