Package ‘distrRmetrics’

July 23, 2018

Version 2.7.0
Date 2018-07-08
Title Distribution Classes for Distributions from Rmetrics
Description S4-distribution classes based on package distr for distributions from packages 'fBasics' and 'fGarch'.
Depends R(>= 2.6.0), methods, distr(>= 2.4), fBasics(>= 270.73), fGarch(>= 270.73)
Suggests distrEx(>= 2.4), distrMod(>= 2.4)
Imports startupmsg
ByteCompile yes
License LGPL-3
Encoding latin1
URL http://distr.r-forge.r-project.org/
LastChangedDate {$LastChangedDate: 2011-11-18 13:15:04 +0100 (Fr, 18 Nov 2011) $}
LastChangedRevision {$LastChangedRevision: 758 $}
SVNRevision 1186
NeedsCompilation no
Author Peter Ruckdeschel [cre, cph, aut]
Maintainer Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>
Repository CRAN
Date/Publication 2018-07-23 11:50:09 UTC

R topics documented:

  distrRmetrics-package ........................................ 2
  SNorm .......................................................... 4
  SNorm-class .................................................... 5
  SNormParameter-class ........................................ 6
distrRmetrics-package  

**Description**

*distrRmetrics* provides infrastructure / (S4-)classes (based on package *distr*) for distributions contributed in the Rmetrics packages.

**Details**

Package: distrRmetrics  
Version: 2.7.0  
Date: 2018-07-08  
Depends: R(>= 2.6.0), methods, distr(>= 2.4), fBasics(>= 270.73), fGarch(>= 270.73)  
Suggests: distrEx(>= 2.4), distrMod(>= 2.4)  
Imports: startupmsg  
ByteCompile: yes  
License: LGPL-3  
URL: http://distr.r-forge.r-project.org/  
SVNRevision: 1186

**Classes**

# Distribution Classes

[*]: there is a generating function with the same name

"Distribution" (from distr)  
|>"AbscontDistribution" (from distr)  
|>|"SNorm" [*]  
|>|"STd" [*]

**Functions**

STd Functions to generate an "AbscontDistribution" object implementing a standardized T distribution
Slot accessors / -replacement functions

All slots are inspected / modified by corresponding accessors / -replacement functions.

Start-up-Banner

You may suppress the start-up banner/message completely by setting options("StartupBanner"="off") somewhere before loading this package by library or require in your R-code / R-session.

If option "StartupBanner" is not defined (default) or setting options("StartupBanner"=NULL) or options("StartupBanner"="complete") the complete start-up banner is displayed.

For any other value of option "StartupBanner" (i.e., not in c(NULL,"off","complete")) only the version information is displayed.

The same can be achieved by wrapping the library or require call into either suppressStartupMessages() or onlytypeStartupMessages(.,atypes="version").

As for general packageStartupMessage's, you may also suppress all the start-up banner by wrapping the library or require call into suppressPackageStartupMessages() from startupmsg-version 0.5 on.

Package versions

Note: The first two numbers of package versions do not necessarily reflect package-individual development, but rather are chosen for the distrXXX family as a whole in order to ease updating "depends" information.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>,
Maintainer: Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

References


A vignette for packages distr, distrSim, distrTEst, distrEx, distrTeach, distrMod, and distrRmetrics is included into the mere documentation package distrDoc and may be called by require("distrDoc");vignette("distr").

A homepage to this package is available under http://distr.r-forge.r-project.org/.
SNorm

Generating function for skewed normal class

Description

Generates an object of class "SNorm".

Usage

SNorm(mean = 0, sd = 1, xi = 1.5)

Arguments

mean real number: location parameter of the SNorm distribution.

sd positive real number: scale parameter of the SNorm distribution

xi positive real number: shape parameter of the SSTd distribution.

Value

Object of class "SNorm"

Note

This class is based on the code provided by the package fGarch by Diethelm Wuertz

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

See Also

dsnorm, AbscontDistribution-class

Examples

(SN <- SNorm(mean = 1, sd = 1, xi = 0.5))
plot(SN)
Description

The skew normal distribution.

Objects from the Class

Objects can be created by calls of the form new("SNorm", mean, sd, xi). More frequently they are created via the generating function SNorm.

Slots

\texttt{img} Object of class "Reals".
\texttt{param} Object of class "SNormParameter".
\texttt{r} rgpd
\texttt{d} dgpd
\texttt{p} pgpd, but vectorized and with special treatment of arguments \texttt{lower.tail} and \texttt{log.p}
\texttt{q} qgpd, but vectorized and with special treatment of arguments \texttt{lower.tail} and \texttt{log.p}
\texttt{gaps} (numeric) matrix or NULL
\texttt{.withArith} logical: used internally to issue warnings as to interpretation of arithmetics
\texttt{.withSim} logical: used internally to issue warnings as to accuracy
\texttt{.logExact} logical: used internally to flag the case where there are explicit formulae for the log version of density, cdf, and quantile function
\texttt{.lowerExact} logical: used internally to flag the case where there are explicit formulae for the lower tail version of cdf and quantile function

Extends

Class "AbscontDistribution", directly.
Class "UnivariateDistribution", by class "AbscontDistribution".
Class "Distribution", by class "AbscontDistribution".

Methods

\texttt{xi} signature(object = "SNorm"): wrapped access method for slot \texttt{xi} of slot \texttt{param}.
\texttt{mean} signature(object = "SNorm"): wrapped access method for slot \texttt{mean} of slot \texttt{param}.
\texttt{nu} signature(object = "SNorm"): wrapped access method for slot \texttt{nu} of slot \texttt{param}.
\texttt{sd} signature(x = "SNorm"): wrapped access method for slot \texttt{sd} of slot \texttt{param}.
\texttt{xi<-} signature(object = "SNorm"): wrapped replace method for slot \texttt{xi} of slot \texttt{param}.
\texttt{mean<-} signature(object = "SNorm"): wrapped replace method for slot \texttt{mean} of slot \texttt{param}.
\texttt{nu<-} signature(object = "SNorm"): wrapped replace method for slot \texttt{nu} of slot \texttt{param}.
\texttt{sd<-} signature(x = "SNorm"): wrapped replace method for slot \texttt{sd} of slot \texttt{param}.
Note

This class is based on the code provided by the package \texttt{fGarch} by Diethelm Wuertz.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

See Also

dsnorm, \texttt{AbscontDistribution-class}

Examples

```r
(SN <- SNorm(xi=2)) # SN is a skewed normal distribution with nu = 3.
set.seed(1)
r(SN)(1) # one random number generated from this distribution, e.g. -0.4037723
d(SN)(1) # Density of this distribution is 0.1914826 for x = 1.
p(SN)(1) # Probability that x < 1 is 0.8374454.
q(SN)(.1) # Probability that x < -1.137878 is 0.1.
## in RStudio or Jupyter IRKernel, use q.l(.)(.) instead of q(.)(.)
xi(SN) # shape of this distribution is 2.
xi(SN) <- 2.5 # shape of this distribution is now 2.5.
plot(SN)
```

SNormParameter-class  
Parameter of an SNorm distributions

Description

The class of the parameter of an SNorm distribution.

Objects from the Class

Objects can be created by calls of the form \texttt{new("SNormParameter", ...)}.

Slots

- \texttt{mean} real number: location parameter of a SNorm distribution.
- \texttt{sd} real number: scale parameter of a SNorm distribution.
- \texttt{name} default name is “parameter of a SNorm distribution”.
- \texttt{xi} real number: shape parameter of a SNorm distribution.

Extends

- Class "Parameter", directly.
- Class "OptionalParameter", by class "Parameter".
**SSTd**

**Methods**

- **mean** signature(object = "SNormParameter"): access method for slot mean.
- **sd** signature(object = "SNormParameter"): access method for slot sd.
- **xi** signature(object = "SNormParameter"): access method for slot xi.

**Author(s)**

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

**See Also**

- *SNorm-class, Parameter-class*

**Examples**

```r
P <- new("SNormParameter")
mean(P)
sd(P)
xi(P)
P
```

---

**Generating function for SSTd-class**

**Description**

Generates an object of class "SSTd".

**Usage**

```r
SSTd(mean = 0, sd = 1, nu = 5, xi = 1.5)
```

**Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>real number: location parameter of the SSTd distribution.</td>
</tr>
<tr>
<td>sd</td>
<td>positive real number: scale parameter of the SSTd distribution</td>
</tr>
<tr>
<td>xi</td>
<td>positive real number: shape parameter of the SSTd distribution.</td>
</tr>
<tr>
<td>nu</td>
<td>real number larger than 2: degree of freedom parameter of the SSTd distribution.</td>
</tr>
</tbody>
</table>

**Value**

Object of class "SSTd"

**Note**

This class is based on the code provided by the package *fGarch* by Diethelm Wuertz.
Author(s)
  Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

See Also
  dsstd, AbscontDistribution-class

Examples
  (ST <- SSTd(mean = 1, sd = 1, xi = 0.5))
  plot(ST)

---

SSTd-class  
SSTd distribution

Description
  The standardized skew Student-t distribution.

Objects from the Class
  Objects can be created by calls of the form new("SSTd", mean, sd, xi). More frequently they are created via the generating function SSTd.

Slots
  img  Object of class "Reals".
  param Object of class "SSTdParameter".
  r  rgpd
  d  dgpd
  p  pgpd, but vectorized and with special treatment of arguments lower.tail and log.p
  q  qgpd, but vectorized and with special treatment of arguments lower.tail and log.p
  gaps (numeric) matrix or NULL
  .withArith  logical: used internally to issue warnings as to interpretation of arithmetics
  .withSim  logical: used internally to issue warnings as to accuracy
  .logExact  logical: used internally to flag the case where there are explicit formulae for the log version of density, cdf, and quantile function
  .lowerExact  logical: used internally to flag the case where there are explicit formulae for the lower tail version of cdf and quantile function

Extends
  Class "AbscontDistribution", directly.
  Class "UnivariateDistribution", by class "AbscontDistribution".
  Class "Distribution", by class "AbscontDistribution".
Methods

\texttt{x1} signature(object = "SSTd"): wrapped access method for slot \texttt{x1} of slot \texttt{param}.
\texttt{mean} signature(object = "SSTd"): wrapped access method for slot \texttt{mean} of slot \texttt{param}.
\texttt{nu} signature(object = "SSTd"): wrapped access method for slot \texttt{nu} of slot \texttt{param}.
\texttt{sd} signature(x = "SSTd"): wrapped access method for slot \texttt{sd} of slot \texttt{param}.
\texttt{x1<-} signature(object = "SSTd"): wrapped replace method for slot \texttt{x1} of slot \texttt{param}.
\texttt{mean<-} signature(object = "SSTd"): wrapped replace method for slot \texttt{mean} of slot \texttt{param}.
\texttt{nu<-} signature(object = "SSTd"): wrapped replace method for slot \texttt{nu} of slot \texttt{param}.
\texttt{sd<-} signature(x = "SSTd"): wrapped replace method for slot \texttt{sd} of slot \texttt{param}.

Note

This class is based on the code provided by the package \texttt{fGarch} by Diethelm Wuertz

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

See Also

dsstd, \texttt{AbscontDistribution-class}

Examples

```r
(ST <- SStd(xi=2, nu = 3)) # ST is a skewed t distribution with xi = 2 and nu = 3.
set.seed(1)
r(ST)(1) # one random number generated from this distribution, e.g. -0.4432824
d(ST)(1) # Density of this distribution is 0.1204624 for x = 1.
p(ST)(1) # Probability that x < 1 is 0.9035449.
q(ST)(.1) # Probability that x < -0.4432824 is 0.1.
## in RStudio or Jupyter IRKernel, use q.l(.)(.) instead of q(.)(.)
nu(ST) # df of this distribution is 3.
u(ST) <- 4 # df of this distribution is now 4.
plot(ST)
```

---

\texttt{SSTdParameter-class} \hspace{1cm} Parameter of an \texttt{SSTd} distributions

Description

The class of the parameter of an SSTd distribution.

Objects from the Class

Objects can be created by calls of the form \texttt{new("SSTdParameter", ...).}
Slots

- **mean**: real number: location parameter of a SSTd distribution.
- **sd**: real number: scale parameter of a SSTd distribution.
- **xi**: real number: shape parameter of a SSTd distribution.
- **nu**: positive number: the degree of freedom parameter of a SSTd distribution.
- **name**: default name is “parameter of a SSTd distribution”.

Extends

Class "Parameter", directly.
Class "OptionalParameter", by class "Parameter".

Methods

- **mean**: signature(object = "SSTdParameter"): access method for slot mean.
- **sd**: signature(object = "SSTdParameter"): access method for slot sd.
- **xi**: signature(object = "SSTdParameter"): access method for slot xi.
- **nu**: signature(object = "SSTdParameter"): access method for slot nu.

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

See Also

- **SSTd-class, Parameter-class**

Examples

```r
P <- new("SSTdParameter")
mean(P)
sd(P)
xi(P)
nu(P)
P
```

Description

Generates a scaled object of class "Td"; the scale (sd) is chosen such that \(\text{Std}(\nu=3, \text{sd}=1)\) has variance 1 independently from the degrees of freedom \(\nu\). This object is of class "AffLinAbscontDistribution".
Usage

STd(mean = 0, sd = 1, nu = 5)

Arguments

mean    real number: location parameter of the STd distribution.
sd      positive real number: scale parameter of the STd distribution
nu      real number larger than 2: degree of freedom parameter of the STd distribution.

Value

Object of class "STd"

Note

This class is based on the code provided by the package fGarch by Diethelm Wuertz

Author(s)

Peter Ruckdeschel <peter.ruckdeschel@uni-oldenburg.de>

See Also

dstd, AbscontDistribution-class

Examples

(ST <- STd(mean = 1, sd = 1, nu = 3))
plot(ST)
Index

*Topic distribution
  SNorm, 4
  SNorm-class, 5
  SNormParameter-class, 6
  SStd, 7
  SStd-class, 8
  SStdParameter-class, 9
  Std, 10

*Topic models
  SNormParameter-class, 6
  SStdParameter-class, 9

*Topic package
  distrRmetrics-package, 2
  distrRmetrics(distrRmetrics-package), 2
  distrRmetrics-package, 2
  dsnorm, 4, 6
  dsstd, 8, 9
  dstd, 11

  mean, SNorm-method (SNorm-class), 5
  mean, SNormParameter-method
    (SNormParameter-class), 6
  mean, SStd-method (SStd-class), 8
  mean, SStdParameter-method
    (SStdParameter-class), 9
  mean<-, SNorm-method (SNorm-class), 5
  mean<-, SStd-method (SStd-class), 8
  nu (SStd-class), 8
  nu, SNorm-method (SNorm-class), 5
  nu, SStd-method (SStd-class), 8
  nu, SStdParameter-method
    (SStdParameter-class), 9
  nu-methods (SStd-class), 8
  nu<-(SStd-class), 8
  nu<-, SNorm-method (SNorm-class), 5
  nu<-, SStd-method (SStd-class), 8
  nu<--methods (SStd-class), 8
  onlytypeStartupMessages, 3

sd, SNorm-method (SNorm-class), 5
sd, SNormParameter-method
  (SNormParameter-class), 6
sd, SStd-method (SStd-class), 8
sd, SStdParameter-method
  (SStdParameter-class), 9
sd<-, SNorm-method (SNorm-class), 5
sd<-, SStd-method (SStd-class), 8
SNorm, 4
SNorm-class, 5
SNormParameter-class, 6
SStd, 7
SStd-class, 8
SStdParameter-class, 9
Std, 10
suppressStartupMessages, 3

xi (SStd-class), 8
xi, SNorm-method (SNorm-class), 5
xi, SNormParameter-method
  (SNormParameter-class), 6
xi, SStd-method (SStd-class), 8
xi, SStdParameter-method
  (SStdParameter-class), 9
xi-methods (SStd-class), 8
xi<-(SStd-class), 8
xi<-, SNorm-method (SNorm-class), 5
xi<-, SStd-method (SStd-class), 8
xi<--methods (SStd-class), 8