

Package ‘distrMetrics’

November 12, 2022

Version 2.8.1

Date 2022-11-12

Title Distribution Classes for Distributions from Rmetrics

Description S4-distribution classes based on package distr for distributions from packages 'fBasics' and 'fGarch'.

Depends R(>= 3.4), 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 $)`}

VCS/SVNRevision 1380

NeedsCompilation no

Author Peter Ruckdeschel [cre, cph, aut]

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

Repository CRAN

Date/Publication 2022-11-12 22:30:08 UTC

R topics documented:

distrMetrics-package	2
SNorm	3
SNorm-class	4
SNormParameter-class	6

SSTd	7
SSTd-class	8
SSTdParameter-class	9
STd	10

Index	12
--------------	-----------

distrRmetrics-package *distrRmetrics – Distribution Classes for Distributions from Rmetrics.*

Description

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

Details

Package: distrRmetrics
 Version: 2.8.1
 Date: 2022-11-12
 Depends: R(>= 3.4), 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: <https://distr.r-forge.r-project.org/>
 VCS/SVNRevision: 1380

Classes

```
#####
Distribution Classes
#####
[*]: there is a generating function with the same name
"Distribution" (from distr)
|>"AbscontDistribution" (from distr)
|>|"SNorm" [*]
|>|"SSTd" [*]
```

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

P. Ruckdeschel, M. Kohl, T. Stabla, F. Camphausen (2006): S4 Classes for Distributions, *R News*, 6(2), 2-6. https://CRAN.R-project.org/doc/Rnews/Rnews_2006-2.pdf 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 <https://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

[dsnrm](#), [AbscontDistribution-class](#)

Examples

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

SNorm-class

SNorm distribution

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

img Object of class "Reals".
 param Object of class "SNormParameter".
 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

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

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

[dsnrm](#), [AbscontDistribution-class](#)

Examples

```

(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 `new("SNormParameter", ...)`.

Slots

mean real number: location parameter of a SNorm distribution.

sd real number: scale parameter of a SNorm distribution.

name default name is "parameter of a SNorm distribution".

xi real number: shape parameter of a SNorm distribution.

Extends

Class "Parameter", directly.

Class "OptionalParameter", by class "Parameter".

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

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

SSTd*Generating function for SSTd-class*

Description

Generates an object of class "SSTd".

Usage

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

Arguments

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

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

xi signature(object = "SSTd"): wrapped access method for slot xi of slot param.
mean signature(object = "SSTd"): wrapped access method for slot mean of slot param.
nu signature(object = "SSTd"): wrapped access method for slot nu of slot param.
sd signature(x = "SSTd"): wrapped access method for slot sd of slot param.
xi<- signature(object = "SSTd"): wrapped replace method for slot xi of slot param.
mean<- signature(object = "SSTd"): wrapped replace method for slot mean of slot param.
nu<- signature(object = "SSTd"): wrapped replace method for slot nu of slot param.
sd<- signature(x = "SSTd"): wrapped replace method for slot sd of slot param.

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(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.
nu(ST) <- 4 # df of this distribution is now 4.
plot(ST)
```

SSTdParameter-class *Parameter of an 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 `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

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

 STd

Generating function for standardized T distribution class

Description

Generates a scaled object of class "Td"; the scale (sd) is chosen such that STd(nu=3, 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

- * **S4 distribution class**
 - SNorm-class, 4
 - SSTd-class, 8
 - * **S4 parameter class**
 - SNormParameter-class, 6
 - SSTdParameter-class, 9
 - * **SNorm distribution**
 - SNorm, 3
 - SNormParameter-class, 6
 - * **SNorm**
 - SNorm, 3
 - SNorm-class, 4
 - * **SSTd distribution**
 - SSTd, 7
 - SSTdParameter-class, 9
 - * **SSTd**
 - SSTd, 7
 - SSTd-class, 8
 - * **STd distribution**
 - STd, 10
 - * **STd**
 - STd, 10
 - * **absolutely continuous distribution**
 - SNorm, 3
 - SNorm-class, 4
 - SSTd, 7
 - SSTd-class, 8
 - STd, 10
 - * **distribution**
 - SNorm, 3
 - SNorm-class, 4
 - SNormParameter-class, 6
 - SSTd, 7
 - SSTd-class, 8
 - SSTdParameter-class, 9
 - STd, 10
 - * **extreme value distribution**
 - SNorm-class, 4
 - SSTd-class, 8
 - * **generating function**
 - SNorm, 3
 - SNormParameter-class, 6
 - SSTd, 7
 - SSTdParameter-class, 9
 - STd, 10
 - * **models**
 - SNormParameter-class, 6
 - SSTdParameter-class, 9
 - * **package**
 - distrMetrics-package, 2
 - * **parameter**
 - SNormParameter-class, 6
 - SSTdParameter-class, 9
- distrMetrics (distrMetrics-package), 2
- distrMetrics-package, 2
- dsnrm, 4, 5
- dsstd, 7, 9
- dstd, 11
- mean, SNorm-method (SNorm-class), 4
- mean, SNormParameter-method (SNormParameter-class), 6
- mean, SSTd-method (SSTd-class), 8
- mean, SSTdParameter-method (SSTdParameter-class), 9
- mean<-, SNorm-method (SNorm-class), 4
- mean<-, SSTd-method (SSTd-class), 8
- nu (SSTd-class), 8
- nu, SNorm-method (SNorm-class), 4
- 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), 4
- nu<- , SSTd-method (SSTd-class), 8
- nu<--methods (SSTd-class), 8

onlytypeStartupMessages, 3

sd, SNorm-method (SNorm-class), 4
sd, SNormParameter-method
 (SNormParameter-class), 6
sd, SSTd-method (SSTd-class), 8
sd, SSTdParameter-method
 (SSTdParameter-class), 9
sd<-, SNorm-method (SNorm-class), 4
sd<-, SSTd-method (SSTd-class), 8
SNorm, 3
SNorm-class, 4
SNormParameter-class, 6
SSTd, 7
SSTd-class, 8
SSTdParameter-class, 9
STd, 10
suppressStartupMessages, 3

xi (SSTd-class), 8
xi, SNorm-method (SNorm-class), 4
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), 4
xi<-, SSTd-method (SSTd-class), 8
xi<--methods (SSTd-class), 8