Package 'distrRmetrics'

April 23, 2016

Version 2.6

Date 2016-04-23

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 1095

NeedsCompilation no

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Repository CRAN

Date/Publication 2016-04-23 16:35:37

R topics documented:

`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:	2.6
Date:	2016-04-23
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:	1095

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)

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References

P. Ruckdeschel, M. Kohl, T. Stabla, F. Camphausen (2006): S4 Classes for Distributions, *R News*, *6*(2), 2-6. http://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
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)
```

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

dsnorm, 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.
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.
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)
```

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