

Package ‘ssmsn’

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Type Package

Title Scale-Shape Mixtures of Skew-Normal Distributions

Version 0.2.0

Date 2017-01-31

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Imports MCMCpack

Description

It provides the density and random number generator for the Scale-Shape Mixtures of Skew-Normal Distributions proposed by Jamalizadeh and Lin (2016) <[doi:10.1007/s00180-016-0691-1](https://doi.org/10.1007/s00180-016-0691-1)>.

License GPL (>= 2)

Repository CRAN

NeedsCompilation no

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Description

It provides the density and random number generator.

Details

Package: ssmsn
Type: Package
Version: 0.2
Date: 2017-01-31
License: GPL (>=2)

Author(s)

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References

Jamalizadeh, Ahad and Lin, Tsung-I (2016). A general class of scale-shape mixtures of skew-normal distributions: properties and estimation. *Computational Statistics*, 1-24.

See Also

[ssmsn](#),

Examples

```
#See examples for the ssmsn function linked above.
```

ssmsn

Scale-Shape Mixtures of Skew-Normal Distributions

Description

It provides the density and random number generator.

Usage

```
dssmsn(x, mu= NULL, sigma2= NULL, lambda= NULL, nu= NULL, family="skew.t.t")  
rssmsn(n, mu= NULL, sigma2= NULL, lambda= NULL, nu= NULL, family="skew.t.t")
```

Arguments

x	vector of observations.
n	numbers of observations.
mu	location parameter.
sigma2	scale parameter.

lambda	skewness parameter.
nu	degree freedom
family	distribution family to be used in fitting ("skew.t.t", "skew.generalized.laplace.normal", "skew.slash.normal")

Details

As discussed in Jamalizadeh and Lin (2016) the scale-shape mixture of skew-normal (SSMSN) distribution admits the following conditioning-type stochastic representation

$$Y = \mu + \sigma \tau_1^{-1/2} [Z_1 | (Z_2 < \lambda f^{-1/2} Z_1)],$$

where $f = \tau_1/\tau_2$ and (Z_1, Z_2) and (τ_1, τ_2) are independent. Alternatively the SSMSN distribution can be generated via the convolution-type stochastic representation, given by

$$Y = \mu + \sigma \left(\frac{\tau_1^{-1/2} f^{1/2}}{\sqrt{f + \lambda^2}} Z_2 + \frac{\lambda \tau_1^{-1/2}}{\sqrt{f + \lambda^2}} |Z_1| \right).$$

Value

dssmsn gives the density, rssmsn generates a random sample.

The length of the result is determined by n for rssmsn, and is the maximum of the lengths of the numerical arguments for the other functions dssmsn.

Author(s)

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References

Jamalizadeh, Ahad and Lin, Tsung-I (2016). A general class of scale-shape mixtures of skew-normal distributions: properties and estimation. Computational Statistics, 1-24.

Examples

```
rSTT <- rssmsn(n=1000,mu=-4,sigma2=1,lambda=1,nu=c(3,4),"skew.t.t");hist(rSTT)
rSGLN <- rssmsn(n=1000,mu=-4,sigma2=1,lambda=1,nu=3,"skew.generalized.laplace.normal");hist(rSGLN)
rSSN <- rssmsn(n=1000,mu=-4,sigma2=1,lambda=1,nu=3,"skew.slash.normal");hist(rSSN)

dSTT <- dssmsn(0.5,mu=-4,sigma2=1,lambda=1,nu=c(3,4),"skew.t.t")
dSGLN <- dssmsn(0.5,mu=-4,sigma2=1,lambda=1,nu=3,"skew.generalized.laplace.normal")
dSSN <- dssmsn(0.5,mu=-4,sigma2=1,lambda=1,nu=3,"skew.slash.normal")
```

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