Package ‘SSMFSSN.EM’

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Type Package

Title EM algorithms for the multivaraite SSMFSSN distributions

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Description EM algorithms for the multivaraite SSMFSSN distributions

Encoding UTF-8

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NeedsCompilation no

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`cost` *Cost of living data (2016)*

Description

Cost of living dataset

Usage

```
data(cost)
```

Examples

```
data(cost)
y <- cbind(cost$Cost.of.Living.Index,cost$Cappuccino.regular)
EM.SSMFSSN(y, xi=colMeans(y), S=cov(y), la1=c(-1,2) , la2=c(-1,1), nu1=3, family="MFSST")
```

EM.SSMFSSN *EM.SSMFSSN*

Description

Fit the multivariate SSMFSSN distributions using EM-algorithm xi: the vector of location parameter. S: the cov-variance matrix. la1 and la2: the vector of shape parameters. nu1 and nu2: the flatness parameters. family: distribution family to be used in fitting ("MFSSN", "MFSSTN","MFSSLSN", "MFSSCN", "MFSST", "MFSSTT"). get.init: if TRUE, the initial values are generated. iter.max: the maximum number of iterations of the EM algorithm. Default= 100. tol: the covergence maximum error. Default= 10^-6. equal: if TRUE the nu1 and nu2 assumed equal.

Usage

```
EM.SSMFSSN(y, xi, S, la1, la2, nu1 , nu2, family="MFSSN", get.init = FALSE, iter.max=100,
 tol=10^-6, equal=FALSE)
```

Examples

```
#  Example 1:
# Simulating samples from MFSSTN distribution:
y <- r.SSMFSSN(n=100, xi=c(0,5), S=matrix(c(1,.4,.4,4),2,2), la1=c(-2,3) , la2=c(.5,-.5),
nu1=5, family="MFSSTN")
# n: the number of random samples
# EM output with specific initial values:
EM.SSMFSSN(y, xi=c(0,5), S=matrix(c(1,0.4,0.4,4),2,2), la1=c(-2,3) , la2=c(0.5,-0.5),
family="MFSSTN", get.init=FALSE,  iter.max=100, tol=10^-6)
# EM output without specific initial values:
EM.SSMFSSN(y, family="MFSSTN", get.init=TRUE)

# Example 2:
# Simulating samples from MFSSTT distribution:
y <- r.SSMFSSN(n=100, xi=c(0,5), S=matrix(c(1,0.4,0.4,4),2,2), la1=c(-2,3) , la2=c(0.5,-0.5),
nu1=5, nu2=10, family="MFSSTT")
EM output with specific initial values:
EM.SSMFSSN(y, xi=c(0,5), S=matrix(c(1,0.4,0.4,4),2,2), la1=c(-2,3) , la2=c(0.5,-0.5), nu1=5, nu2=10,
family="MFSSTT", get.init=FALSE, equal=F)

# Example 3:
# Simulating samples from MFSSCNe distribution:
y <- r.SSMFSSN(n=100, xi=c(0,5), S=matrix(c(1,0.4,0.4,4),2,2), la1=c(-2,3) , la2=c(0.5,-0.5),
nu1=0.3, nu2=0.3, family="MFSSCN")
# EM output assuming the equality for the flatness parameters :
EM.SSMFSSN(y, family="MFSSCN", get.init=TRUE, equal=T)

# Example 4: wind speed data
data(wind)
y <- wind
# EM output for MFSSN and MFSSTT distributions :
EM.SSMFSSN(y,xi=c(22,15,14), S=cov(y), la1=c(-1,1.2,1.3),la2=c(-.8,-.4,-.1))
EM.SSMFSSN(y,xi=c(19,15,13), S=cov(y), la1=c(.3,1.2,1.3) , la2=c(3,-.4,-.1), nu1=5, nu2=2,
family="MFSSTT" ,iter.max=500,tol=10^-9)
```

```
 # Example 5: Cost of living data (2016)
 data(cost)
 y <- cbind(cost$Cost.of.Living.Index,cost$Cappuccino.regular)
EM.SSMFSSN(y, xi=colMeans(y), S=cov(y), la1=c(-1,2) , la2=c(-1,1), nu1=3, family="MFSST")
```

r.SSMFSSN *r.SSMFSSN function*

Description

Generating random samples from multivariate SSMFSSN distributions n: number of samples. xi: the vector of location parameter. S: the cov-variance matrix. la1 and la2: the vector of shape parameters. nu1 and nu2: the flatness parameters. family: distribution family to be used in fitting ("MFSSN", "MFSSTN","MFSSLSN", "MFSSCN", "MFSST", "MFSSTT").

Usage

```
r.SSMFSSN(n , xi, S, la1, la2, nu1=NULL, nu2=NULL, family="MFSSN")
```

Examples

```
 # Example 1:
 # Simulating 100 samples from MFSSTN distribution:
 y <- r.SSMFSSN(n=100, xi=c(0,5), S=matrix(c(1,.4,.4,4),2,2), la1=c(-2,3),
 la2=c(.5,-.5), nu1=5, family="MFSSTN")

 # Example 2:
 # Simulating 100 samples from MFSSTT distribution:
 y <- r.SSMFSSN(n=100, xi=c(0,5), S=matrix(c(1,0.4,0.4,4),2,2), la1=c(-2,3),
 la2=c(0.5,-0.5), nu1=5, nu2=10, family="MFSSTT")

# Example 3:
 # Simulating 100 samples from MFSSCNe distribution:
 y <- r.SSMFSSN(n=100, xi=c(0,5), S=matrix(c(1,0.4,0.4,4),2,2), la1=c(-2,3),
 la2=c(0.5,-0.5), nu1=0.3, nu2=0.3, family="MFSSTT")
```

wind *Wind speed data*

Description

Wind speed dataset

Usage

```
data(wind)
```

Examples

```
data(wind)
y <- wind
# EM output for MFSSN and MFSSTT distributions :
EM.SSMFSSN(y,xi=c(22,15,14), S=cov(y), la1=c(-1,1.2,1.3),la2=c(-.8,-.4,-.1))
EM.SSMFSSN(y,xi=c(19,15,13), S=cov(y), la1=c(.3,1.2,1.3) , la2=c(3,-.4,-.1),
nu1=5, nu2=2, family="MFSSTT" ,iter.max=500,tol=10^-9)
```

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