Package 'ssmn'

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Type Package

Title Skew Scale Mixtures of Normal Distributions

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Imports mnormt, moments, truncdist, sn

Description Performs the EM algorithm for regression models using Skew Scale Mixtures of Normal Distributions.

License GPL (>= 2)

LazyData TRUE

NeedsCompilation no

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ssmn-package	*Skew Scale Mixtures of Normal Distributions*

Description

It provides the density, distribution function, quantile function, random number generator, likelihood function, direct and EM algorithm for Maximum Likelihood estimators for a given sample, all this for regression models using Skew Scale Mixtures of Normal Distributions.

Details

Package:	ssmn
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Version:	1.0
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License:	GPL (>=2)

Author(s)

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References

C.S. Ferreira; H. Bolfarine; V. H. Lachos (2011). Skew scale mixture of normal distributions: properties and estimation. Statistical Methodology, 8(2), 154-171.

C. S. Ferreira, V. H. Lachos, H. Bolfarine (2015). Inference and diagnostics in skew scale mixtures of normal regression models. Journal of Statistical Computation and Simulation, 85, 517-537.

See Also

ssmn

Examples

```
#See examples linked above.
```

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ais	*Australian institute of sport data*

Description

Data on 102 male and 100 female athletes collected at the Australian Institute of Sport.

Format

This data frame contains the following columns:

sex (0 = male or 1 = female)

Ht height (cm)

Wt weight (kg)

LBM lean body mass

RCC red cell count

WCC white cell count

Hc Hematocrit

Hg Hemoglobin

Fe input description

BMI body mass index, weight/(height)**2

SSF sum of skin folds

Bfat Percent body fat

sport Sport

References

S. Weisberg (2005). *Applied Linear Regression*, 3rd edition. New York: Wiley, Section 6.4

Examples

```
##Load the data
 library(ssmn)
 data(ais)
 attach(ais)

#Set the response y and covariate x
 x1     <- cbind(1,SSF,Ht)
 y      <- Bfat


##Fits a Skew Scale Mixtures of Normal Distributions to the data
fit.ssmn <- ssmn(y, x1, family="sn", method="EM", error = 1e-6, maxit=1000, show.envelope=FALSE)
```

```
#Show envelope
theta     <- c(fit.ssmn$beta,fit.ssmn$sigma2,fit.ssmn$lambda)
envel(y,x1,theta,family="sn",alpha=0.05)
```

| ssmn | *Skew Scale Mixtures of Normal Distributions* |

Description

It provides the density, distribution function, quantile function and random number generator for the Skew Scale Mixtures of Normal Distributions.

Usage

```
dssmn(x, location=0, scale=1, shape=0, nu= 1, gama=1, dp=NULL, family="sn")
pssmn(q, location=0, scale=1, shape=0, nu= 1, gama=1, dp=NULL, family="sn")
qssmn(p, location=0, scale=1, shape=0, nu= 1, gama=1, dp=NULL, family="sn")
rssmn(n, location=0, scale=1, shape=0, nu= 1, gama=1, dp=NULL, family="sn")
```

Arguments

x	the response vector of length n where n is the total of observations.
q	vector of quantiles.
p	vector of probabilities.
n	number of observations.
location	parameter of location.
scale	parameter of scale.
shape	parameter of shape.
nu	degrees of freedom for "stn", "ssl" and "sep". For "scn", nu parameter is considered as proportion of outliers.
gama	factor scale, but only used by family "scn".
dp	vector of parameters.
family	Distribution familily to be used in fitting ("sn", "stn", "ssl", "scn", "sep")

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ssmn.est	*EM algorithm for Skew Scale Mixtures of Normal Distributions*

Description

Performs the EM algorithm and envelope for regression models using Skew Scale Mixtures of Normal Distributions

Usage

```
ssmn(y, X, family="sn", method="EM", error = 1e-6, maxit=1000, show.envelope=FALSE)
envel(y,X, theta, family="sn", alpha=0.05)
```

Arguments

y	the response vector of length n where n is the total of observations.
X	the matrix of explanatory variables of dimension $nx(p+1)$ where n is the total of observations and p is the number of variables.
family	its defines the distribution to ber used: sn, stn, ssl, scn or sep.
method	the method to calculate the maximum likelihood estimates: EM algorithm or direct maximum likelihood estimates via Newton-Raphson.
maxit	Maximum number of iterations.
error	accuracy the convergence maximum error.
show.envelope	TRUE or FALSE. Indicates if envelope graph should be built for the fitted model. Default is FALSE.
alpha	1 - alpha is level of confidence.
theta	Estimated parameter vector

Value

The function returns a list with 8 elements detailed as

iter	number of iterations.
tetha	estimated parameter vector.
SE	Standard Error estimates.
table	Table containing the inference for the estimated parameters.
loglik	Log-likelihood value.
AIC	Akaike information criterion.
BIC	Bayesian information criterion.
time	processing time.

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