Package ‘nlsmsn’

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Title  Fitting nonlinear models with scale mixture of skew-normal distributions.
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Description Fit univariate non-linear scale mixture of skew-normal(NL-SMSN) regression.
Depends R (>= 2.10.0)
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Oil  Oil palm yield

Description

   Growth and yield of palm oil
Usage

data(Oil)

Format

A data frame with 19 observations of oil characteristics

Author(s)

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Source


Examples

## Not run:
##Load the data
data(Oil)

##Define non linear function
nlf<-function(x,betas){
  resp<- betas[1]/(1 +betas[2]*exp(-betas[3]*x))
  return(resp)
}

##Set the response y and covariate x
y <- Oil$y
x <- Oil$x

##Set initial values
betas <- c(37,4.81,0.78)
sigma2 <- 2.95
shape <- -2
nu <- 3

## Skew.normal regression
analysis.sn <- smsn.nl(y=y, x=x, betas=betas, sigma2=sigma2,
                      shape = shape, nlf = nlf, criteria = TRUE,
                      family = "Skew.normal", iter.max = 200)

## Skew.t regression
analysis.st <- smsn.nl(y=y, x=x, betas=betas, sigma2=sigma2, shape = shape,
                       nu = nu, nlf = nlf, criteria = TRUE,
                       family = "Skew.t", iter.max = 200)

## End(Not run)
Fit univariate NL-SMSN regression

Description

Return EM algorithm output for NL-SMSN regression for both "Homoscedastic" and "Heteroscedastic" (univariate case, p=1).

Usage

```r
smsn.nl(y, x = NULL, z = NULL, betas = NULL, sigma2 = NULL, shape = NULL, rho = NULL, nu = NULL, nlf = NULL, rho.func = 1, reg.type = "Homoscedastic", criteria = FALSE, family = "Skew.t", error = 1e-05, iter.max = 100)
```

Arguments

- `y`: the response vector
- `x`: the independent covariates
- `z`: the independent covariates for sigma2. "Heteroscedastic" model ONLY!
- `betas`: regression coefficient(s) vector
- `sigma2`: initial value for the scale parameter
- `shape`: initial value for the skewness parameter
- `rho`: initial value for "Heteroscedastic" coefficient rho. "Heteroscedastic" model ONLY!
- `nu`: the parameter of the scale variable (vector or scalar) of the SMSN family (kurtosis parameter). For the "Skew.cn" must be a vector of length 2 and values in (0,1)
- `nlf`: non linear function for the regression
- `rho.func`: Choose the type of heteroscedasticity for sigma2. If rho.func == 1 ( f(z,rho) = exp(z*rho) ) and rho.func == 2 ( f(z,rho) = z^rho ).
- `reg.type`: the type of possible regression: "Homoscedastic" or "Ho"; "Heteroscedastic" or "He".
- `criteria`: if TRUE, loglik, AIC, BIC will be calculated
- `family`: distribution famility to be used in fitting ("t", "Skew.t", "Skew.cn", "Skew.slash", "Skew.normal", "Normal")
- `error`: the convergence maximum error
- `iter.max`: maximum iterations of the EM algorithm

Value

Estimated values of the location, scale, skewness, regression coefficients and "Heteroscedastic" coefficient (when reg.type = "He").
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References


Examples
### see examples in \code{\link{Oil}} and \code{\link{Ultrasonic}}

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Description
The data is a result of a ultrasonic calibration study performed by National Institute of Standard and Technology.

Usage
data(Ultrasonic)

Format
A data frame with 214 observations with y as the ultrasonic measurements and x the metal distance

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Source
### Not run:
```r
# Load the data
data(Ultrasonic)

# Define non linear function
nlf <- function(x, betas){
  resp <- exp(-betas[1]*x)/(betas[2] + betas[3]*x)
  return(resp)
}

# Set the response y and covariate x
y <- Ultrasonic$y
x <- Ultrasonic$x

# Set initial values
z <- x
betas <- c(0.1913, 0.0061, 0.0110)
rho <- -0.1
sigma2 <- 3.2726
shape <- 0.1698
nu <- 4

# Skew.normal regression
analysis.sn <- smsn.nl(y = y, x = x, z = z, betas = betas, sigma2 = sigma2, shape = shape,
rho = rho, nlf = nlf, rho.func = 2, reg.type = "Heteroscedastic",
criteria = TRUE, family = "Skew.normal", iter.max = 200)

# Skew.t regression
analysis.st <- smsn.nl(y = y, x = x, z = z, betas = betas, sigma2 = sigma2, shape = shape, nu = nu,
rho = rho, nlf = nlf, rho.func = 1, reg.type = "He",
criteria = TRUE, family = "Skew.t", iter.max = 200)

# End(Not run)
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