Package 'SMNCensReg'

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Type Package

Title Fitting Univariate Censored Regression Model Under the Family of Scale Mixture of Normal Distributions

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Description Fit univariate right, left or interval censored regression model under the scale mixture of normal distributions.

Depends R (>= 3.1.2)

Imports Matrix, PerformanceAnalytics

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License GPL (>= 3.0)

NeedsCompilation no

Repository CRAN

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`CensReg.SMN` *Fit Univariate Right, Left or Interval Censored Linear Regression Model Under Scale Mixtures of Normal Distributions*

Description

Return EM algorithm output for right, left or interval censored regression model under SMN distributions (Normal, Student-t, Pearson VII, Slash or Contaminated Normal), built the corresponding envelope graph and compute some criteria for model selection, such as AIC, BIC and EDC.

Usage

```
CensReg.SMN(cc,x,y,LS=NULL,nu=3,delta=NULL,cens="left",dist="T",
show.envelope="FALSE", error=0.0001,iter.max=300)
```

Arguments

cc	Vector of censoring indicators. For each observation: 0 if non-censored, 1 if censored.
x	Matrix or vector of covariates.
y	Vector of responses in case of right/left censoring. Vector of lower limits if censoring is intervalar.
LS	Vector of upper limits if interval censoring. Must not be provided in case of left/right censoring.
nu	Initial value of the parameter of the scale variable of the SMN family. Must not be provided in case of Normal distribution. Must be a bidimensional vector in case of contaminated normal distribution (NormalC).
delta	Second parameter of Pearson VII, fixed. Must not be provided in case of Normal, Student-t or slash distribution.
cens	"left" for left censoring, "right" for right censoring, "interval" for interval censoring.
dist	Distribution to be used in fitting: "Normal" for Normal model, "T" for Student-t model, "PearsonVII" for Pearson VII model, "Slash" for slash model and "NormalC" for contaminated Normal model.
show.envelope	TRUE or FALSE. Indicates if envelope graph should be built for the fitted model (based on transformed Martingale residuals). Default is FALSE.
error	The convergence maximum error.
iter.max	The maximum number of iterations of the EM algorithm. Default=300.

Details

For the contaminated Normal distribution, each component of the bidimensional vector "nu" must lie on (0,1). For the Pearson VII distribution, delta is fixed as the provided value and is not estimated. The parameters beta and sigma2 are initialized with the minimum square estimators of the regression x vs y. If you want to fit a regression model for non-censored data, just set "cc" as a vector of zeros and "cens" as either "right" or "left".

Value

beta	EM estimates for the regression coefficients.
sigma2	EM estimates for the scale parameters.
logver	Returned the value of the log-likelihood under the fitted model.
count	Number of interations until convergence.
AIC	AIC criteria for model selection.
BIC	BIC criteria for model selection.
EDC	EDC criteria for model selection.
SE	Standard error estimates.

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References

Aldo M. Garay, Victor H. Lachos, Heleno Bolfarine, Celso R. Cabral. "Linear Censored Regression Models with Scale Mixture of Normal Distributions". Statistical Papers.(2017) 58:247–278.

Examples

```
##see examples in \code{\link{wage.rates}}
```

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wage.rates *Wage Rates of 753 Women*

Description

Wage rates of 753 married white women with left censoring.

Usage

```
data(wage.rates)
```

Format

A data frame with 753 observed wage rates of married white women in 1975. Some wage rates are set equal to zero, this means that those wives did not work in 1975, therefore, these observations are considered left censored at zero.

Source

Mroz, T.A. 1987. "The sesitivity of an empirical model of married women?s hours of work to economic and statistical assumptions".

Examples

```
##Load the data
data(wage.rates)

##Set the response y and covariate x
y <- wage.rates$wage
x <- cbind(1,wage.rates$age,wage.rates$educ,wage.rates$kidslt6,wage.rates$kidsge6)
cc<- c(rep(0,428),rep(1,325))

##Fits a left censored Student-t model to the data

T <- CensReg.SMN(cc,x,y,nu=3,cens="left",dist="T",show.envelope="TRUE")

##Fits a left censored Normal model to the data

Normal <- CensReg.SMN(cc,x,y,cens="left",dist="Normal",show.envelope="TRUE")
```

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