

Package ‘cthreshER’

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Type Package

Title Continuous Threshold Expectile Regression

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Description Estimation and inference methods for the continuous threshold expectile regression. It can fit the continuous threshold expectile regression and test the existence of change point, for the paper, ``Feipeng Zhang and Qunhua Li (2016). A continuous threshold expectile regression, submitted."`

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LazyData TRUE

RoxygenNote 5.0.1

Depends R (>= 3.1.0), Matrix

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NeedsCompilation no

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Contents

cterFit	2
cterSimData	3
cterTest	4
data_bbsalaries	5

Index	7
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`cterFit`*Fit the continuous threshold expectile regression*

Description

The grid search algorithm for the continuous threshold expectile regression

Usage

```
cterFit(y, x, z, tau = 0.5, max.iter = 100, tol = 1e-04)
```

Arguments

<code>y</code>	A vector of response
<code>x</code>	A scalar covariate with threshold
<code>z</code>	A vector of covariates
<code>tau</code>	the expectile level, 0.5 for default
<code>max.iter</code>	the maximum iteration steps, 100 for default
<code>tol</code>	tolerance value, 1e-4 for default

Value

A list with the elements

<code>coef.est</code>	The estimated regression coefficients with intercept.
<code>threshold.est</code>	The estimated threshold.
<code>coef.se</code>	The estimated standard error of the regression coefficients.
<code>threshold.se</code>	The estimated standard error of the threshold.
<code>iter</code>	The iteration steps.

Author(s)

Feipeng Zhang and Qunhua Li

Examples

```
## simulated data
ptm <- proc.time()
n <- 200
t0 <- 1.5
bet0 <- c(1, 3, -2, 1)
tau <- 0.3
modtype <- 1
errtype <- 1
dat <- cterSimData(n, bet0, t0, tau, modtype, errtype)
```

```

y <- dat[, 1]
x <- dat[, 2]
z <- dat[, 3]
fit <- cterFit(y, x, z, tau)

## The example of Baseball pitcher salary
data(data_bbsalaries)
y <- data_bbsalaries$y
x <- data_bbsalaries$x
z <- NULL
tau <- 0.5
fit <- cterFit(y, x, z, tau)
proc.time() - ptm

```

cterSimData

Simulated data from the continuous threshold expectile regression

Description

The function for simulating data from the continuous threshold expectile regression

Usage

```
cterSimData(n, bet0, t0, tau = 0.5, modtype = 1, errtype = 1)
```

Arguments

n	sample size.
bet0	the vecotr of true regression coefficients.
t0	the true location of threshold.
tau	the expectile level, 0.5 for default.
modtype	type of model, 1 = IID for default, 2 = Heteroscedasticity, modtype = 1, $Y = beta_0 + beta_1X + beta_2(X - t)_+gammaZ + e$, modtype = 1, $Y = beta_0 + beta_1X + beta_2(X - t)_+gammaZ + (1 + 0.2Z)e$,
errtype	type of error, 1 for default, errtype = 1 for $N(0, 1)$, errtype = 2 for t_4 , errtype = 3 for $0.9 N(0, 1) + 0.1 t_4$.

Value

A matrix with the elements

y	The response variable.
x	The scalar covariate with threshold.
z	A vector of covariates.

Author(s)

Feipeng Zhang and Qunhua Li

Examples

```
## simulated data
ptm <- proc.time()
n <- 200
t0 <- 1.5
bet0 <- c(1, 3, -2, 1)
tau <- 0.5
modtype <- 1
errtype <- 1
dat <- cterSimData(n, bet0, t0, tau, modtype, errtype)
head(dat)
proc.time() - ptm
```

cterTest	<i>test the existence of change point in the continuous threshold expectile regression</i>
----------	--

Description

This function for calculating the test statistics and p-value by wild bootstrap.

Usage

```
cterTest(y, x, z, tau = 0.5, NB = 1000)
```

Arguments

y	A vector of response
x	A scalar covariate with threshold
z	A vector of covariates
tau	the expectile level, 0.5 for default
NB	resampling times, 1000 for default

Value

A list with the elements

Tn	The statistic based on original data.
Tn.NB	The statistics by wild bootstrap.
p.value	The p-value by wild bootstrap.

Author(s)

Feipeng Zhang and Qunhua Li

Examples

```
## simulated data
ptm <- proc.time()
set.seed(1)
n <- 200
t0 <- 1.5
bet0 <- c(1, 3, 0, 1)
tau <- 0.3
modtype <- 1
errtype <- 1
dat <- cterSimData(n, bet0, t0, tau, modtype, errtype)
y <- dat[, 1]
x <- dat[, 2]
z <- dat[, 3]
fit.test <- cterTest(y, x, z, tau, NB = 30)
fit.test$p.value

## The example of Baseball pitcher salary
data(data_bbsalaries)
y <- data_bbsalaries$y
x <- data_bbsalaries$x
z <- NULL
tau <- 0.5
fit.test <- cterTest(y, x, z, tau, NB = 30)
fit.test$p.value
proc.time() - ptm
```

data_bbsalaries

Baseball pitcher salary data

Description

Salaries of 176 piters for the 1987 season. The variables are as follows:

Usage

```
data(data_bbsalaries)
```

Format

A data frame with 176 observations on the following 2 variables.

y Log of the base salary in dollars

x Log of the number of years experience

Source

Hettmansperger, T.P. and McKean J.W. (2011), *Robust Nonparametric Statistical Methods*, 2nd ed., New York: Chapman-Hall.

References

Hettmansperger, T.P. and McKean J.W. (2011), Robust Nonparametric Statistical Methods, 2nd ed., New York: Chapman-Hall.

Examples

```
data(data_bbsalaries)
## maybe str(data_bbsalaries) ; plot(data_bbsalaries) ...
```

Index

- * **cterFit**
 - cterFit, 2
- * **cterSimData**
 - cterSimData, 3
- * **cterTest**
 - cterTest, 4
- * **datasets**
 - data_bbsalaries, 5

cterFit, 2
cterSimData, 3
cterTest, 4

data_bbsalaries, 5