

# Package ‘RegKink’

April 15, 2021

**Type** Package

**Version** 0.1.0

**Title** Regression Kink with a Time-Varying Threshold

**Description** An algorithm is proposed to estimate regression kink model proposed by the paper, Lixiong Yang and Jen-Je Su (2018) <doi:10.1016/j.jimonfin.2018.06.002>.

**Imports** MASS

**Depends** R (>= 3.5.0)

**License** GPL

**Encoding** UTF-8

**RoxygenNote** 7.1.1

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**NeedsCompilation** no

**Repository** CRAN

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neg.part                      *negative part of a variable*

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**Description**

This is a function computing the negative part of a variable.

**Usage**

```
neg.part(x)
```

**Arguments**

x                      A vector of response.

**Value**

ne                      The negative part of a variable.

**Examples**

```
pt1 <- proc.time()
##Simulated data
set.seed(12345)
n=200
x = rnorm(n)
obj <- neg.part(x)

proc.time() - pt1
```

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pos.part                      *positive part of a variable*

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**Description**

This is a function computing the positive part of a variable.

**Usage**

```
pos.part(x)
```

**Arguments**

x                      A vector of response.

**Value**

ps                    The positive part of a variable.

**Examples**

```
pt1 <- proc.time()
##Simulated data
set.seed(12345)
n=200
x = rnorm(n)
obj <- pos.part(x)

proc.time() - pt1
```

---

reg                    *linear regression*

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**Description**

This is a function computing OLS estimates of linear model.

**Usage**

```
reg(X,y)
```

**Arguments**

y                    A vector of response.  
X                    data matrix

**Value**

bols                The ols estimates of a linear regression model.

**Examples**

```
pt1 <- proc.time()
##Simulated data
set.seed(12345)
n=200
e = rnorm(n)
X = cbind(1,rnorm(n))
b0 =c(1,2)
y = X
obj <- reg(X,y)

proc.time() - pt1
```

rkt

*Estimation for regression kink with a time-varying threshold***Description**

This is a function estimating regression kink with a time-varying threshold.

**Usage**

```
rkt(y,x,z,q,r01,r02,r11,r12,stp1,stp2)
```

**Arguments**

y	A vector of response.
x	A vector of regressor
z	A data matrix of control variables
q	A vector of variable affecting threshold
r01	Lower bounder of parameter space for r0
r02	Upper bounder of parameter space for r0
r11	Lower bounder of parameter space for r1
r12	Upper bounder of parameter space for r1
stp1	Step used in grid search of r0
stp2	Step used in grid search of r1

**Value**

A list with the elements

bols	The OLS estimates when a kink effect is ignored.
bt	The regression coefficients when a kink effect is included in the model.
gammahat0	The estimated threshold of the constant one in threshold parameters.
gammahat1	The estimated threshold of the slop in threshold parameters.
sig	The sum of squred errors of the kink model.

**Examples**

```
sta <- proc.time()
##Simulated data
set.seed(12345)
n=200
x = rnorm(n)
q = rnorm(n)
rt = 0.2 - 0.5*q
```

```
z = rnorm(n)
x1 = cbind(neg.part(x-rt),pos.part(x-rt),z)
b0 =c(1,2,1)
y = b0[1]*x1[,1]+b0[2]*x1[,2]+b0[3]*x1[,3]+ rnorm(n)

# set grid search paramaters
r01 = 0
r02 = 2
stp1 = 0.1
r11 = -10
r12 = 5
stp2 = 0.1
# estimate the model with a state-dependent threshold
est1 <- rkt(y,x,z,q,r01,r02,r11,r12,stp1,stp2)

proc.time() - sta
```

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