Package 'robustreg'

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Title Robust Regression Functions

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Depends R (>= 2.3.0)

Description Linear regression functions using Huber and Bisquare psi functions

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Namespace auto

R topics documented:

`derivPsiBiSquare` *Derivative of Bisquare Psi Function*

Description

Calculates residual from the first derivative of Bisquare psi function

Usage

```
derivPsiBiSquare(r,c)
```

Arguments

`r`	Value to be evaluated by function
`c`	Tuning constant

Details

Calculates residual from the first derivative of Bisquare psi function

Value

r: Value to be evaluated by function

c: Tuning constant

Note

http://www.alpha-analysis.com/robustreg.html

Author(s)

Ian M. Johnson <ian@alpha-analysis.com>

References

Tukey

See Also

psiBiSquare()

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derivPsiHuber *Derivative of Huber Psi Function*

Description

Calculates residual from the first derivative of Huber psi function

Usage

```
derivPsiHuber(r,c)
```

Arguments

r	Value to be evaluated by function
c	Tuning constant

Details

Calculates residual from the first derivative of Huber psi function

Value

r: Value to be evaluated by function

c: Tuning constant

Note

http://www.alpha-analysis.com/robustreg.html

Author(s)

Ian M. Johnson <ian@alpha-analysis.com>

References

Huber

See Also

psiHuber()

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psiBiSquare *Bisquare Psi Function*

Description

Calculates residual from Bisquare psi function

Usage

```
psiBiSquare(r,c)
```

Arguments

r	Value to be evaluated by function
c	Tuning constant

Details

Calculates residual from Bisquare psi function

Value

r: Value to be evaluated by function

c: Tuning constant

Note

http://www.alpha-analysis.com/robustreg.html

Author(s)

Ian M. Johnson <ian@alpha-analysis.com>

References

Tukey

See Also

psiHuber()

Examples

```
a<-rnorm(1000)
psi<-psiBiSquare(a,4.685)
plot(a,psi)
```

---

psiHuber *Huber Psi Function*

Description

Calculates residual from Huber psi function

Usage

```
psiHuber(r,c)
```

Arguments

r	Value to be evaluated by function
c	Tuning constant

Details

Calculates residual from Huber psi function

Value

r: Value to be evaluated by function

c: Tuning constant

Note

http://www.alpha-analysis.com/robustreg.html

Author(s)

Ian M. Johnson <ian@alpha-analysis.com>

References

Huber

See Also

psiBiSquare()

Examples

```
a<-rnorm(1000)
psi<-psiHuber(a,1.345)
plot(a,psi)
```

robustRegBS *Robust Regression Function using Bisquare Psi Function*

Description

Using iteratively reweighted least squares (IRLS), the function calculates the optimal weights to perform m-estimator or bounded influence regression. Returns robust beta estimates and prints robust ANOVA table.

Usage

```
robustRegBS(y,X,tune=4.685,beta,m=TRUE,max.it=1000,tol=1e-10)
```

Arguments

y	A vector of dependent variables
X	A data frame or matrix of independent variables/regressors
tune	Tuning Constant. Default value of 4.685 is 95% asymptotically efficient against outliers
beta	Starting estimates of beta for algorithm
m	If TRUE, calculates m estimates of beta. If FALSE, calculates bounded influence estimates of beta
max.it	Maximum number of iterations to achieve convergence in IRLS algorithm
tol	Tolerance level in determining convergence

Details

M-estimates of beta should be used when evaluating least squares estimates of beta and diagnostics show outliers. Least squares estimates of beta should be used as starting points to achieve convergence.

Bounded influence estimates of beta should be used when evaluating least squares estimates of beta and diagnostics show large values of the "Hat Matrix" diagonals and outliers.

Note

http://www.alpha-analysis.com/robustreg.html

Author(s)

Ian M. Johnson <ian@alpha-analysis.com>

References

Tukey,

Birch, Robust F-Test, 1983

See Also

robustRegH()

Examples

```
data(stackloss)
X<-data.frame(stackloss$Air.Flow,stackloss$Water.Temp)
y<-stackloss$stack.loss

#calculate least squares estimates for starting point
m1<-lm(stack.loss~Air.Flow+Water.Temp,data=stackloss)$coefficients

robustRegBS(y,X,beta=m1)

#If X matrix contained large values of H matrix (high influence points)
robustRegBS(y,X,beta=m1,m=FALSE)
```

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robustRegH *Robust Regression Function using Huber Psi Function*

Description

Using iteratively reweighted least squares (IRLS), the function calculates the optimal weights to perform m-estimator or bounded influence regression. Returns robust beta estimates and prints robust ANOVA table

Usage

```
robustRegH(y,X,tune=1.345,beta,m=TRUE,max.it=1000,tol=1e-10)
```

Arguments

y	A vector of dependent variables
X	A data frame or matrix of independent variables/regressors
tune	Tuning Constant. Default value of 1.345 is 95% asymptotically efficient against outliers
beta	Starting estimates of beta for algorithm
m	If TRUE, calculates m estimates of beta. If FALSE, calculates bounded influence estimates of beta
max.it	Maximum number of iterations to achieve convergence in IRLS algorithm
tol	Tolerance level in determining convergence

Details

M-estimates of beta should be used when evaluating least squares estimates of beta and diagnostics show outliers. Least squares estimates of beta should be used as starting points to achieve convergence.

Bounded influence estimates of beta should be used when evaluating least squares estimates of beta and diagnostics show large values of the "Hat Matrix" diagonals and outliers.

Note

http://www.alpha-analysis.com/robustreg.html

Author(s)

Ian M. Johnson <ian@alpha-analysis.com>

References

Huber,

Birch, Robust F-Test, 1983

See Also

robustRegBS()

Examples

```
data(stackloss)
X<-data.frame(stackloss$Air.Flow,stackloss$Water.Temp)
y<-stackloss$stack.loss

#calculate least squares estimates for starting point
m1<-lm(stack.loss~Air.Flow+Water.Temp,data=stackloss)$coefficients

robustRegH(y,X,beta=m1)

#If X matrix contained large values of H matrix (high influence points)
robustRegH(y,X,beta=m1,m=FALSE)
```