Package ‘hcci’

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Type Package

Title Interval estimation for the parameters of linear models with heteroskedasticity (Wild Bootstrap)

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Date 2013-09-18

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Description This package calculates the interval estimates for the parameters of linear models heteroscedastic regression using bootstrap - (Wild Bootstrap) and double bootstrap-t (Wild Bootstrap). It is also possible to calculate confidence intervals using the percentile bootstrap and percentile bootstrap double. It is possible to calculate consistent estimates of the covariance matrix of the parameters of linear regression models with heteroskedasticity of unknown form. The package also provides function to calculate consistently the covariance matrix of the parameters of linear models with heteroskedasticity of unknown form.

Depends R (>= 2.10.0)

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License GPL (>= 2)

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**Description**

This package calculates the interval estimates for the parameters of the models linear heteroskedasticity regression using bootstrap-t (Wild Bootstrap) and double bootstrap-t (Wild Bootstrap). It is also possible to calculate confidence intervals using the percentile bootstrap and percentile bootstrap double. It is also possible to calculate consistent estimates of the covariance matrix of the parameters of linear regression models with heteroskedasticity of unknown form. The package also provides function to calculate consistently the covariance matrix of the parameters of linear models with heteroskedasticity of unknown form.

**Details**

```
Package: hcci
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**Author(s)**

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**References**


Wu, C.F.J. (1986). Jackknife, bootstrap and other resampling methods in regression analysis, 14, 1261-1295;

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**HC**

*Covariance Matrix - (HC0, HC2, HC3, HC4 and HC5)*

### Description

This function calculates the covariance structure for heteroskedasticity linear regression model.

### Usage

`HC(model, method=4, k=0.7)`

### Arguments

- `model` Any object of class `lm`;
- `method` Method HC that will be used to estimate the covariance structure. The argument method may be 0, 2, 3, 4 or 5;
- `k` Constant used by the method HC5. The suggestion of the authors is to use $k = 0.7$.

### Author(s)

Pedro Rafael Diniz Marinho <pedro.rafael.marinho@gmail.com>

### References


Examples

data(schools)
datas = schools[-50,]
y = datas$Expenditure
x = datas$Income/10000
model = lm(y ~ x)
HC(model, method=4)

Pboot

Percentile Bootstrap Confidence Interval (Wild Bootstrap) - Linear Models Heteroskedasticity

Description

This function calculates confidence intervals for the parameters in heteroskedasticity linear regression models. The intervals are estimated by bootstrap percentile.

Usage

Pboot(model, significance=0.05, double=FALSE, J=NULL, K=NULL, distribution="rademacher")

Arguments

model: Any object of class lm;
significance: Significance level of the test. By default, the level of significance is 0.05;
double: If double = TRUE will be calculated intervals bootstrap t and double bootstrap t. The default is double = FALSE;
J: Number of replicas of the first bootstrap;
K: Number of replicas of the second bootstrap;
distribution: Distribution of the random variable with mean zero and variance one. This random variable multiplies the error estimates in the generation of the samples. The argument distribution can be rademacher or normal (standard normal). The default is distribution = rademacher.

Author(s)

Pedro Rafael Diniz Marinho <pedro.rafael.marinho@gmail.com>

References

Wu, C.F.J. (1986). Jackknife, bootstrap and other resampling methods in regression analysis, 14, 1261-1295;

See Also

Tboot.

Examples

data(schools)
datas = schools[-50,]
y = datas$Expenditure
x = datas$Income/10000
model = lm(y ~ x)
Pboot(model=model, significance = 0.05, double = FALSE,
J=1000, K = 100, distribution = "rademacher")

Description

Per capita expenditure on public schools and per capita income by state in 1979.

Usage

data(schools)

Format

A data frame containing 51 observations of 2 variables.

Expenditure per capita expenditure on public schools,
Income per capita income.

References

Description

This function calculates confidence intervals for the parameters in heteroskedasticity linear regression models. Ranges are estimated by the bootstrap-t and double bootstrap-t.

Usage

`tboot(model, significance=0.05, hc=4, double=FALSE, J=NULL, K=NULL, distribution="rademacher")`

Arguments

- `model`: Any object of class `lm`;
- `significance`: Significance level of the test. By default, the level of significance is 0.05;
- `hc`: Method HC that will be used to estimate the covariance structure. The argument method may be 0, 2, 3, 4 or 5;
- `double`: If `double = TRUE` will be calculated intervals bootstrap-t and double bootstrap-t. The default is `double = FALSE`;
- `J`: Number of replicas of the first bootstrap;
- `K`: Number of replicas of the second bootstrap;
- `distribution`: Distribution of the random variable with mean zero and variance one. This random variable multiplies the error estimates in the generation of the samples. The argument `distribution` can be `rademacher` or `normal` (standard normal). The default is `distribution = rademacher`.

Author(s)

Pedro Rafael Diniz Marinho <pedro.rafael.marinho@gmail.com>

References

- Wu, C.F.J. (1986). Jackknife, bootstrap and other resampling methods in regression analysis, 14, 1261-1295;
Tboot

See Also

Pboot.

Examples

data(schools)
datas = schools[-50,]
y = datas$Expenditure
x = datas$Income/10000
model = lm(y ~ x)
Tboot(model=model, significance = 0.05, hc = 4, double = FALSE,
      J=1000, K = 100, distribution = "rademacher")
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