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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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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R topics documented:

hcci-package *Interval estimation for the parameters of linear models with heteroskedasticity of unknown form using bootstrap-t and percentile bootstrap and schemes of the double bootstrap.*

Description

This package calculates the interval estimates for the parameters of the models linares 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

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Author(s)

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References

Cribari-Neto, F. (2004). Asymptotic inference under heteroskedasticity of unknown form. Computational Statistics and Data Analysis, 45, 215-233.

Cribari-Neto, F.; Lima, M.G. (2009). Heteroskedasticity-consistent interval estimators. Journal of Statistical Computation and Simulation, 79, 787-803;

Cribari-Neto, F.; Souza, T.C.; Vasconcellos, K.L.P. (2007). Inference under heteros- kedasticity and leveraged data. Communications in Statistics, Theory and Methods, 36, 1877-1888. [Errata: 37, 2008, 3329-3330.]

Horn, S.D.; Horn, R.A.; Duncan, D.B. (1975). Estimating heteroskedastic variances in linear models. Journal of the American Statistical Association, 70, 380-385.

MacKinnon, J.G.; White, H. (1985). Some heteroskedasticity-consistent covariance matrix estimators with improved finite-sample properties. Journal of Econometrics, 29, 305-325.

McCullough, B.D; Vinod, H.D. (1998). Implementing the double bootstrap, 12, 79-95.

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica, 48, 817-838.

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

`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 $k = 0.7$.

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References

Cribari-Neto, F. (2004). Asymptotic inference under heteroskedasticity of unknown form. Computational Statistics and Data Analysis, 45, 215-233.

Cribari-Neto, F.; Souza, T.C.; Vasconcellos, K.L.P. (2007). Inference under heteros- kedasticity and leveraged data. Communications in Statistics, Theory and Methods, 36, 1877-1888. [Errata: 37, 2008, 3329-3330.]

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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)

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References

Booth, J.G. and Hall, P. (1994). Monte Carlo approximation and the iterated bootstrap. Biometrika, 81, 331-340.

Cribari-Neto, F.; Lima, M.G. (2009). Heteroskedasticity-consistent interval estimators. Journal of Statistical Computation and Simulation, 79, 787-803;

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

McCullough, B.D; Vinod, H.D. (1998). Implementing the double bootstrap, 12, 79-95.

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")
```

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schools *US Expenditures for Public Schools*

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

Cribari-Neto F. (2004), Asymptotic Inference Under Heteroskedasticity of Unknown Form, Computational Statistics \& Data Analysis, 45, 215-233.

Greene W.H. (1993), Econometric Analysis, 3nd edition. Macmillan Publishing Company, New York.

US Department of Commerce (1979), Statistical Abstract of the United States. US Government Printing Office, Washington, DC.

Tboot *Bootstrap-t Confidence Interval (Wild Bootstrap) - Linear Models Heteroskedasticity*

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.

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References

Booth, J.G. and Hall, P. (1994). Monte Carlo approximation and the iterated bootstrap. Biometrika, 81, 331-340.

Cribari-Neto, F.; Lima, M.G. (2009). Heteroskedasticity-consistent interval estimators. Journal of Statistical Computation and Simulation, 79, 787-803;

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

McCullough, B.D; Vinod, H.D. (1998). Implementing the double bootstrap, 12, 79-95.

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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