

Package ‘betaSandwich’

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Title Robust Confidence Intervals for Standardized Regression Coefficients

Version 1.0.3.9000

Description Generates robust confidence intervals for standardized regression coefficients using heteroskedasticity-consistent standard errors for models fitted by `lm()` as described in Dudgeon (2017) <[doi:10.1007/s11336-017-9563-z](https://doi.org/10.1007/s11336-017-9563-z)>.

URL <https://github.com/jeksterslab/betaSandwich>,
<https://jeksterslab.github.io/betaSandwich/>

BugReports <https://github.com/jeksterslab/betaSandwich/issues>

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Roxygen list(markdown = TRUE)

Depends R (>= 3.5.0)

Imports methods

Suggests knitr, rmarkdown, testthat

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NeedsCompilation no

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| | |
|---------|---|
| BetaADF | <i>Estimate Standardized Regression Coefficients and Sampling Covariance Matrix Using the Asymptotic Distribution-Free Approach</i> |
|---------|---|

Description

Estimate Standardized Regression Coefficients and Sampling Covariance Matrix Using the Asymptotic Distribution-Free Approach

Usage

BetaADF(object)

Arguments

object Object of class lm.

Details

BetaADF() is appropriate when sample sizes are moderate to large ($n > 250$). BetaHC() is recommended in most situations.

Value

Returns an object of class betasandwich which is a list with the following elements:

- call** Function call.
- type** Standard error type.
- beta** Vector of standardized slopes.
- vcov** Sampling covariance matrix of the standardized slopes.
- n** Sample size.
- p** Number of regressors.
- df** $n - p - 1$ degrees of freedom

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

Other Beta Sandwich Functions: [BetaHC\(\)](#), [BetaN\(\)](#)

Examples

```

object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaADF(object)
# Methods -----
print(std)
summary(std)
coef(std)
vcov(std)
confint(std, level = 0.95)

```

| | |
|--------|--|
| BetaHC | <i>Estimate Standardized Regression Coefficients and Robust Sampling Covariance Matrix</i> |
|--------|--|

Description

Estimate Standardized Regression Coefficients and Robust Sampling Covariance Matrix

Usage

```
BetaHC(object, type = "hc3", g1 = 1, g2 = 1.5, k = 0.7)
```

Arguments

| | |
|---------------|--|
| object | Object of class <code>lm</code> . |
| type | Character string. Correction type. Possible values are "hc0", "hc1", "hc2", "hc3", "hc4", "hc4m", and "hc5". |
| g1 | Numeric. g1 value for type = "hc4m" or type = "hc5". |
| g2 | Numeric. g2 value for type = "hc4m". |
| k | Numeric. Constant for type = "hc5" |

Value

Returns an object of class `betasandwich` which is a list with the following elements:

call Function call.

type Standard error type.

beta Vector of standardized slopes.

vcov Sampling covariance matrix of the standardized slopes.

n Sample size.

p Number of regressors.

df $n - p - 1$ degrees of freedom

Author(s)

Ivan Jacob Agaloos Pesigan

References

Dudgeon, P. (2017). Some improvements in confidence intervals for standardized regression coefficients. *Psychometrika*, 82(4), 928–951. doi:[10.1007/s113360179563z](https://doi.org/10.1007/s113360179563z)

See Also

Other Beta Sandwich Functions: [BetaADF\(\)](#), [BetaN\(\)](#)

Examples

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaHC(object)
# Methods -----
print(std)
summary(std)
coef(std)
vcov(std)
confint(std, level = 0.95)
```

| | |
|-------|---|
| BetaN | <i>Estimate Standardized Regression Coefficients and Sampling Covariance Matrix Assuming Multivariate Normality</i> |
|-------|---|

Description

Estimate Standardized Regression Coefficients and Sampling Covariance Matrix Assuming Multivariate Normality

Usage

```
BetaN(object)
```

Arguments

`object` Object of class `lm`.

Details

`BetaN()` assumes multivariate normality. `BetaHC()` is recommended in most situations.

Value

Returns an object of class `betasandwich` which is a list with the following elements:

call Function call.

type Standard error type.

beta Vector of standardized slopes.

vcov Sampling covariance matrix of the standardized slopes.

n Sample size.
p Number of regressors.
df $n - p - 1$ degrees of freedom

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

Other Beta Sandwich Functions: [BetaADF\(\)](#), [BetaHC\(\)](#)

Examples

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaN(object)
# Methods -----
print(std)
summary(std)
coef(std)
vcov(std)
confint(std, level = 0.95)
```

| | |
|-------------------|---------------------------------------|
| coef.betasandwich | <i>Standardized Regression Slopes</i> |
|-------------------|---------------------------------------|

Description

Standardized Regression Slopes

Usage

```
## S3 method for class 'betasandwich'
coef(object, ...)
```

Arguments

object Object of class betasandwich.
... additional arguments.

Value

Returns a vector of standardized regression slopes.

Author(s)

Ivan Jacob Agaloos Pesigan

Examples

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaHC(object)
coef(std)
```

confint.betasandwich *Confidence Intervals for Standardized Regression Slopes*

Description

Confidence Intervals for Standardized Regression Slopes

Usage

```
## S3 method for class 'betasandwich'
confint(object, parm = NULL, level = 0.95, ...)
```

Arguments

| | |
|--------|---|
| object | Object of class betasandwich. |
| parm | a specification of which parameters are to be given confidence intervals, either a vector of numbers or a vector of names. If missing, all parameters are considered. |
| level | the confidence level required. |
| ... | additional arguments. |

Value

Returns a matrix of confidence intervals.

Author(s)

Ivan Jacob Agaloos Pesigan

Examples

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaHC(object)
confint(std, level = 0.95)
```

nas1982

*1982 National Academy of Sciences Doctoral Programs Data***Description**

1982 National Academy of Sciences Doctoral Programs Data

Usage

nas1982

Format

Ratings of 46 doctoral programs in psychology in the USA with the following variables:

QUALITY Program quality ratings.**NFACUL** Number of faculty members in the program.**NGRADS** Number of program graduates.**PCTSUPP** Percentage of program graduates who received support.**PCTGRT** Percent of faculty members holding research grants.**NARTIC** Number of published articles attributed to program faculty member.**PCTPUB** Percent of faculty with one or more published article.**References**

National Research Council. (1982). *An assessment of research-doctorate programs in the United States: Social and behavioral sciences*. doi:10.17226/9781. Reproduced with permission from the National Academy of Sciences, Courtesy of the National Academies Press, Washington, D.C.

print.betasandwich

*Print Method for an Object of Class betasandwich***Description**

Print Method for an Object of Class betasandwich

Usage

```
## S3 method for class 'betasandwich'
print(x, alpha = c(0.05, 0.01, 0.001), digits = 4, ...)
```

Arguments

| | |
|--------|-------------------------------|
| x | Object of class betasandwich. |
| alpha | Significance level. |
| digits | Digits to print. |
| ... | additional arguments. |

Value

Returns a matrix of standardized regression slopes, standard errors, test statistics, p-values, and confidence intervals.

Author(s)

Ivan Jacob Agaloos Pesigan

Examples

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaHC(object)
print(std)
```

summary.betasandwich *Summary Method for an Object of Class betasandwich*

Description

Summary Method for an Object of Class betasandwich

Usage

```
## S3 method for class 'betasandwich'
summary(object, alpha = c(0.05, 0.01, 0.001), digits = 4, ...)
```

Arguments

| | |
|--------|-------------------------------|
| object | Object of class betasandwich. |
| alpha | Significance level. |
| digits | Digits to print. |
| ... | additional arguments. |

Value

Returns a matrix of standardized regression slopes, standard errors, test statistics, p-values, and confidence intervals.

Author(s)

Ivan Jacob Agaloos Pesigan

Examples

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaHC(object)
summary(std)
```

| | |
|-------------------|---|
| vcov.betasandwich | <i>Sampling Covariance Matrix of the Standardized Regression Slopes</i> |
|-------------------|---|

Description

Sampling Covariance Matrix of the Standardized Regression Slopes

Usage

```
## S3 method for class 'betasandwich'
vcov(object, ...)
```

Arguments

| | |
|--------|-------------------------------|
| object | Object of class betasandwich. |
| ... | additional arguments. |

Value

Returns a matrix of the variance-covariance matrix of standardized slopes.

Author(s)

Ivan Jacob Agaloos Pesigan

Examples

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaHC(object)
vcov(std)
```

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