

Package ‘betaDelta’

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Title Confidence Intervals for Standardized Regression Coefficients

Version 1.0.0.9000

Description Generates confidence intervals for standardized regression coefficients using delta method standard errors for models fitted by `lm()` as described in Yuan and Chan (2011) <[doi:10.1007/s11336-011-9224-6](https://doi.org/10.1007/s11336-011-9224-6)> and Jones and Waller (2015) <[doi:10.1007/s11336-013-9380-y](https://doi.org/10.1007/s11336-013-9380-y)>.

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

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

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Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE)

Depends R (>= 3.5.0)

Imports methods

Suggests knitr, rmarkdown, testthat, betaSandwich

RoxygenNote 7.2.3

NeedsCompilation no

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BetaDelta	<i>Estimate Standardized Regression Coefficients and Sampling Covariance Matrix</i>
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Description

Estimate Standardized Regression Coefficients and Sampling Covariance Matrix

Usage

BetaDelta(object, type = "mvn")

Arguments

- object Object of class lm.
- type Character string. If type = "mvn", use the multivariate normal-theory approach. If type = "adf", use the asymptotic distribution-free approach.

Value

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

- call** Function call.
- lm** Object of class lm.
- lm_process** Pre-processed object of class lm.
- type** Standard error type.
- gamma** Asymptotic covariance matrix of the sample covariance matrix.
- acov** Asymptotic covariance matrix of the standardized slopes.
- vcov** Sampling covariance matrix of the standardized slopes.
- est** Vector of standardized slopes.

Author(s)

Ivan Jacob Agaloos Pesigan

References

- Jones, J. A., & Waller, N. G. (2015). The normal-theory and asymptotic distribution-free (ADF) covariance matrix of standardized regression coefficients: Theoretical extensions and finite sample behavior. *Psychometrika*, 80(2), 365–378. doi:10.1007/s113360139380y
- Yuan, K.-H., & Chan, W. (2011). Biases and standard errors of standardized regression coefficients. *Psychometrika*, 76(4), 670–690. doi:10.1007/s1133601192246

Examples

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaDelta(object)
# Methods -----
print(std)
summary(std)
coef(std)
vcov(std)
confint(std, level = 0.95)
## Differences of standardized regression coefficients -----
out <- dif(std)
print(out)
summary(out)
coef(out)
vcov(out)
confint(out, level = 0.95)
```

coef.betadelta	<i>Standardized Regression Slopes</i>
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Description

Standardized Regression Slopes

Usage

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

Arguments

object	Object of class betadelta.
...	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 <- BetaDelta(object)
coef(std)
```

coef.difbetadelta	<i>Differences of Standardized Regression Slopes</i>
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Description

Differences of Standardized Regression Slopes

Usage

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

Arguments

object	Object of class difbetadelta.
...	additional arguments.

Value

Returns a vector of differences of standardized regression slopes.

Author(s)

Ivan Jacob Agaloos Pesigan

Examples

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

confint.betadelta	<i>Confidence Intervals for Standardized Regression Slopes</i>
-------------------	--

Description

Confidence Intervals for Standardized Regression Slopes

Usage

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

Arguments

object	Object of class betadelta.
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 <- BetaDelta(object)
confint(std, level = 0.95)
```

confint.difbetadelta	<i>Confidence Intervals for Differences of Standardized Regression Slopes</i>
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Description

Confidence Intervals for Differences of Standardized Regression Slopes

Usage

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

Arguments

object	Object of class difbetadelta.
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 <- BetaDelta(object)
out <- dif(std)
confint(out, level = 0.95)
```

dif	<i>Differences of Regression Slopes</i>
-----	---

Description

Differences of Regression Slopes

Usage

```
dif(object, ...)

## S3 method for class 'betadelta'
dif(object, ...)
```

Arguments

object	Object used to select a method.
...	additional arguments.

Author(s)

Ivan Jacob Agaloos Pesigan

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.**NEACUL** Number of faculty members in the program.**NGRADES** 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.betadelta

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

Print Method for an Object of Class betadelta

Usage

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

Arguments

x	Object of class betadelta.
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 <- BetaDelta(object)
print(std)
```

print.difbetadelta	<i>Print Method for an Object of Class difbetadelta</i>
--------------------	---

Description

Print Method for an Object of Class difbetadelta

Usage

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

Arguments

x	Object of class difbetadelta.
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 <- BetaDelta(object)
out <- dif(std)
print(out)
```

summary.betadelta	<i>Summary Method for an Object of Class betadelta</i>
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Description

Summary Method for an Object of Class betadelta

Usage

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

Arguments

object	Object of class betadelta.
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 <- BetaDelta(object)
summary(std)
```

`summary.difbetadelta` *Summary Method for an Object of Class difbetadelta*

Description

Summary Method for an Object of Class difbetadelta

Usage

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

Arguments

<code>object</code>	Object of class difbetadelta.
<code>alpha</code>	Significance level.
<code>digits</code>	Digits to print.
<code>...</code>	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 <- BetaDelta(object)
out <- dif(std)
summary(out)
```

`vcov.betadelta` *Sampling Covariance Matrix of the Standardized Regression Slopes*

Description

Sampling Covariance Matrix of the Standardized Regression Slopes

Usage

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

Arguments

object Object of class betadelta.
 ... 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 <- BetaDelta(object)
vcov(std)
```

vcov.difbetadelta	<i>Sampling Covariance Matrix of Differences of Standardized Regression Slopes</i>
-------------------	--

Description

Sampling Covariance Matrix of Differences of Standardized Regression Slopes

Usage

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

Arguments

object Object of class difbetadelta.
 ... additional arguments.

Value

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

Author(s)

Ivan Jacob Agaloos Pesigan

Examples

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

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