

# Package ‘betaDelta’

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**Title** Confidence Intervals for Standardized Regression Coefficients

**Version** 1.0.0

**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>

**License** MIT + file LICENSE

**Encoding** UTF-8

**LazyData** true

**Roxygen** list(markdown = TRUE)

**Depends** R (>= 3.5.0)

**Imports** methods

**Suggests** knitr, rmarkdown, testthat

**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

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

## Value

Returns an object of class `betadelta` 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

- 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)

```

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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)

```

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confint.betadelta	<i>Confidence Intervals for Standardized Regression Slopes</i>
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**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)
```

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nas1982	<i>1982 National Academy of Sciences Doctoral Programs Data</i>
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**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.

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print.betadelta	<i>Print Method for an Object of Class betadelta</i>
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**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)
```

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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)
```

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vcov.betadelta	<i>Sampling Covariance Matrix of the Standardized Regression Slopes</i>
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**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)
```

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