Package 'betaSandwich'

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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="">. A description of the package and code examples are presented in Pesigan, Sun, and Cheung (2023) <doi:10.1080 00273171.2023.2201277="">.</doi:10.1080></doi:10.1007>				
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R topics documented:				
BetaADF BetaHC BetaN coef.betasandwich coef diffbetasandwich				

2 BetaADF

Beta	ADF	Estima Sampli Approd	ng C		_		-					_
Index												25
	vcov.diffbetasandv vcov.rsqbetasandv	wich		 	 			 		 	 	. 23
	summary.rsqbetas vcov.betasandwic											
	summary.diffbetas	lwich		 	 			 		 	 	. 19
	print.rsqbetasandv RSqBetaSandwicl	vich		 	 			 		 	 	. 17
	nas1982 print.betasandwic	h		 	 			 		 	 	. 15
	DiffBetaSandwich	1		 	 			 		 	 	. 13
	confint.betasandw confint.diffbetasan confint.rsqbetasan	ndwich .		 	 			 		 	 	. 11
	coef.rsqbetasandw											

Description

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

Usage

```
BetaADF(object, alpha = c(0.05, 0.01, 0.001))
```

Arguments

object Object of class 1m.

alpha Numeric vector. Significance level α .

Details

Note that while the calculation in BetaADF() is different from betaDelta::BetaDelta() with type = "adf", the results are numerically equivalent. BetaADF() is appropriate when sample sizes are moderate to large (n > 250). BetaHC() is recommended in most situations.

BetaADF 3

Value

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

call Function call.

args Function arguments.

lm_process Processed 1m object.

gamma_n Asymptotic covariance matrix of the sample covariance matrix assuming multivariate normality.

gamma hc Asymptotic covariance matrix HC correction.

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

Browne, M. W. (1984). Asymptotically distribution-free methods for the analysis of covariance structures. *British Journal of Mathematical and Statistical Psychology*, *37*(1), 62–83. doi:10.1111/j.20448317.1984.tb00789.x

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

Pesigan, I. J. A., Sun, R. W., & Cheung, S. F. (2023). betaDelta and betaSandwich: Confidence intervals for standardized regression coefficients in R. *Multivariate Behavioral Research*. doi:10.1080/00273171.2023.2201277

See Also

```
Other Beta Sandwich Functions: BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.diffbetasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

```
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)</pre>
```

4 BetaHC

BetaHC	Estimate Standardized Regression Coefficients and the Corresponding Robust Sampling Covariance Matrix Using the Heteroskedasticity Consistent Approach
	Consistent Approach

Description

Estimate Standardized Regression Coefficients and the Corresponding Robust Sampling Covariance Matrix Using the Heteroskedasticity Consistent Approach

Usage

```
BetaHC(
  object,
  type = "hc3",
  alpha = c(0.05, 0.01, 0.001),
  g1 = 1,
  g2 = 1.5,
  k = 0.7
)
```

Arguments

object	Object of class 1m.
type	Character string. Correction type. Possible values are "hc0", "hc1", "hc2", "hc3", "hc4", "hc4m", and "hc5".
alpha	Numeric vector. Significance level α .
g1	Numeric. g1 value for type = "hc4m".
g2	Numeric. g2 value for type = "hc4m".
k	Numeric. Constant k for type = "hc5" $0 \le k \le 1$.

Value

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

call Function call.

args Function arguments.

lm_process Processed 1m object.

gamma_n Asymptotic covariance matrix of the sample covariance matrix assuming multivariate normality.

gamma_hc Asymptotic covariance matrix HC correction.

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.

BetaN 5

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

Pesigan, I. J. A., Sun, R. W., & Cheung, S. F. (2023). betaDelta and betaSandwich: Confidence intervals for standardized regression coefficients in R. *Multivariate Behavioral Research*. doi:10.1080/00273171.2023.2201277

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.betasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

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)</pre>
```

BetaN

Estimate Standardized Regression Coefficients and the Corresponding Sampling Covariance Matrix Assuming Multivariate Normality

Description

Estimate Standardized Regression Coefficients and the Corresponding Sampling Covariance Matrix Assuming Multivariate Normality

Usage

```
BetaN(object, alpha = c(0.05, 0.01, 0.001))
```

Arguments

object Object of class 1m.

alpha Numeric vector. Significance level α .

6 BetaN

Details

Note that while the calculation in BetaN() is different from betaDelta::BetaDelta() with type = "mvn", the results are numerically equivalent. 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.

args Function arguments.

lm_process Processed 1m object.

gamma_n Asymptotic covariance matrix of the sample covariance matrix assuming multivariate normality.

gamma_hc Asymptotic covariance matrix HC correction.

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

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

Pesigan, I. J. A., Sun, R. W., & Cheung, S. F. (2023). betaDelta and betaSandwich: Confidence intervals for standardized regression coefficients in R. *Multivariate Behavioral Research*. doi:10.1080/00273171.2023.2201277

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.diffbetasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaN(object)
# Methods ------
print(std)
summary(std)</pre>
```

coef.betasandwich 7

```
coef(std)
vcov(std)
confint(std, level = 0.95)
```

coef.betasandwich

Standardized Regression Slopes

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

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.diffbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

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

8 coef.diffbetasandwich

coef.diffbetasandwich Differences of Standardized Regression Slopes

Description

Differences of Standardized Regression Slopes

Usage

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

Arguments

```
object Object of class diffbetasandwich.
... additional arguments.
```

Value

Returns a vector of differences of standardized regression slopes.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.betasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

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

coef.rsqbetasandwich 9

Description

Multiple Correlation Coefficients (R-Squared and Adjusted R-Squared)

Usage

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

Arguments

object Object of class rsqbetasandwich.
... additional arguments.

Value

Returns a vector of multiple correlation coefficients (R-squared and adjusted R-squared)

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.betasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

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

10 confint.betasandwich

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 consid-

ered.

level the confidence level required.

... additional arguments.

Value

Returns a matrix of confidence intervals.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.diffbetasandwich(), coef.rsqbetasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

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

confint.diffbetasandwich 11

```
confint.diffbetasandwich
```

Confidence Intervals for Differences of Standardized Regression Slopes

Description

Confidence Intervals for Differences of Standardized Regression Slopes

Usage

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

Arguments

object Object of class diffbetasandwich.

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 consid-

ered.

level the confidence level required.

... additional arguments.

Value

Returns a matrix of confidence intervals.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.diffbetasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.rsqbetasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

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

confint.rsqbetasandwich

Confidence Intervals for Multiple Correlation Coefficients (R-Squared and Adjusted R-Squared)

Description

Confidence Intervals for Multiple Correlation Coefficients (R-Squared and Adjusted R-Squared)

Usage

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

Arguments

object Object of class rsqbetasandwich.

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 consid-

ered.

level the confidence level required.

... additional arguments.

Value

Returns a matrix of confidence intervals.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.betasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

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

DiffBetaSandwich 13

DiffBetaSandwich	Estimate Differences of Standardized Slopes and the Corresponding Sampling Covariance Matrix

Description

Estimate Differences of Standardized Slopes and the Corresponding Sampling Covariance Matrix

Usage

```
DiffBetaSandwich(object, alpha = c(0.05, 0.01, 0.001))
```

Arguments

object Object of class betasandwich, that is, the output of the BetaHC(), BetaN(), or

BetaADF() functions.

alpha Numeric vector. Significance level α .

Value

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

call Function call.

fit The argument object.

vcov Sampling covariance matrix of differences of standardized slopes.

est Vector of differences of standardized slopes.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), RSqBetaSandwich(), coef.betasandwich(), coef.diffbetasandwich(), coef.fint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

```
object <- lm(QUALITY ~ NARTIC + PCTGRT + PCTSUPP, data = nas1982)
std <- BetaHC(object)
diff <- DiffBetaSandwich(std)
# Methods ------
print(diff)
summary(diff)</pre>
```

nas1982

```
coef(diff)
vcov(diff)
confint(diff, 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 15

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 = NULL, digits = 4, ...)
```

Arguments

X	Object of class betasandwich.
alpha	Numeric vector. Significance level α . If alpha = NULL, use the argument alpha used in x.
digits	Digits to print.
	additional arguments.

Value

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

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.diffbetasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.diffbetasandwich(), print.rsqbetasandwich summary.betasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich()
```

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

print.diffbetasandwich

```
print.diffbetasandwich
```

Print Method for an Object of Class diffbetasandwich

Description

Print Method for an Object of Class diffbetasandwich

Usage

```
## S3 method for class 'diffbetasandwich'
print(x, alpha = NULL, digits = 4, ...)
```

Arguments

X	Object of class diffbetasandwich.
alpha	Numeric vector. Significance level α . If alpha = NULL, use the argument alpha used in x.
digits	Digits to print.
	additional arguments.

Value

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

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.betasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

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

print.rsqbetasandwich 17

print.rsqbetasandwich Print Method for an Object of Class rsqbetasandwich

Description

Print Method for an Object of Class rsqbetasandwich

Usage

```
## S3 method for class 'rsqbetasandwich'
print(x, alpha = NULL, digits = 4, ...)
```

Arguments

```
    x Object of class rsqbetasandwich.
    alpha Numeric vector. Significance level α. If alpha = NULL, use the argument alpha used in x.
    digits Digits to print.
    additional arguments.
```

Value

Returns a matrix of multiple correlation coefficients (R-squared and adjusted R-squared), standard errors, test statistics, degrees of freedom, p-values, and confidence intervals.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.betasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), summary.betasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

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

18 RSqBetaSandwich

RSqBetaSandwich	Estimate Multiple Correlation Coefficients (R-squared and adjusted R-squared) and the Corresponding Sampling Covariance Matrix
	it squared) and the corresponding sampling corresponding

Description

Estimate Multiple Correlation Coefficients (R-squared and adjusted R-squared) and the Corresponding Sampling Covariance Matrix

Usage

```
RSqBetaSandwich(object, alpha = c(0.05, 0.01, 0.001))
```

Arguments

object Object of class betasandwich, that is, the output of the BetaHC(), BetaN(), or

BetaADF() functions.

alpha Numeric vector. Significance level α .

Value

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

call Function call.

fit The argument object.

vcov Sampling covariance matrix of multiple correlation coefficients (R-squared and adjusted R-squared).

est Vector of multiple correlation coefficients (R-squared and adjusted R-squared).

Author(s)

Ivan Jacob Agaloos Pesigan

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), coef.betasandwich(), coef.diffbetasandwich(), coef.diffbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

summary.betasandwich 19

Examples

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

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 = NULL, digits = 4, ...)
```

Arguments

object Object of class betasandwich.
 alpha Numeric vector. Significance level α. If alpha = NULL, use the argument alpha used in object.
 digits Digits to print.
 ... additional arguments.

Value

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

Author(s)

Ivan Jacob Agaloos Pesigan

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.betasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.diffbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

Examples

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

summary.diffbetasandwich

Summary Method for an Object of Class diffbetasandwich

Description

Summary Method for an Object of Class diffbetasandwich

Usage

```
## S3 method for class 'diffbetasandwich'
summary(object, alpha = NULL, digits = 4, ...)
```

Arguments

object Object of class diffbetasandwich.

alpha Numeric vector. Significance level α . If alpha = NULL, use the argument alpha used in object.

digits Digits to print.

... additional arguments.

Value

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

Author(s)

Ivan Jacob Agaloos Pesigan

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.betasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

Examples

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

summary.rsqbetasandwich

Summary Method for an Object of Class rsqbetasandwich

Description

Summary Method for an Object of Class rsqbetasandwich

Usage

```
## S3 method for class 'rsqbetasandwich'
summary(object, alpha = NULL, digits = 4, ...)
```

Arguments

object	Object of class rsqbetasandwich.
alpha	Numeric vector. Significance level $\alpha.$ If alpha = NULL, use the argument alpha used in object.
digits	Digits to print.
	additional arguments.

Value

Returns a matrix of multiple correlation coefficients (R-squared and adjusted R-squared), standard errors, test statistics, degrees of freedom, p-values, and confidence intervals.

Author(s)

Ivan Jacob Agaloos Pesigan

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.betasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.diffbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

22 vcov.betasandwich

Examples

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

vcov.betasandwich

Sampling Covariance Matrix of the Standardized Regression Slopes

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

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.diffbetasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.rsqbetasandwich(), vcov.diffbetasandwich(), vcov.rsqbetasandwich()
```

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

vcov.diffbetasandwich 23

vcov.diffbetasandwich Sampling Covariance Matrix of Differences of Standardized Regression Slopes

Description

Sampling Covariance Matrix of Differences of Standardized Regression Slopes

Usage

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

Arguments

object Object of class diffbetasandwich.
... additional arguments.

Value

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

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.diffbetasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.rsqbetasandwich()
```

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

24 vcov.rsqbetasandwich

vcov.rsqbetasandwich Sampling Covariance Matrix of Multiple Correlation Coefficients (R-Squared and Adjusted R-Squared)

Description

Sampling Covariance Matrix of Multiple Correlation Coefficients (R-Squared and Adjusted R-Squared)

Usage

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

Arguments

object Object of class rsqbetasandwich.
... additional arguments.

Value

Returns a matrix of the variance-covariance matrix of multiple correlation coefficients (R-squared and adjusted R-squared).

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Beta Sandwich Functions: BetaADF(), BetaHC(), BetaN(), DiffBetaSandwich(), RSqBetaSandwich(), coef.betasandwich(), coef.diffbetasandwich(), coef.rsqbetasandwich(), confint.betasandwich(), confint.diffbetasandwich(), confint.rsqbetasandwich(), print.betasandwich(), print.diffbetasandwich(), print.rsqbetasandwich(), summary.betasandwich(), summary.rsqbetasandwich(), vcov.betasandwich(), vcov.diffbetasandwich()
```

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

Index

Beta Sandwich Functions	print.diffbetasandwich, 16
BetaADF, 2	print.rsqbetasandwich, 17
BetaHC, 4	summary diffhotography on 20
BetaN, 5	summary and at a conduit ch, 20
coef.betasandwich, 7	summary.rsqbetasandwich, 21
coef.diffbetasandwich,8	vcov.betasandwich, 22
coef.rsqbetasandwich,9	vcov.diffbetasandwich, 23
confint.betasandwich, 10	vcov.rsqbetasandwich, 24
confint.diffbetasandwich, 11	* rsq
confint.rsqbetasandwich, 12	RSqBetaSandwich, 18
DiffBetaSandwich, 13	* std
print.betasandwich, 15	BetaADF, 2
print.diffbetasandwich, 16	BetaHC, 4
print.rsqbetasandwich, 17	BetaN, 5
RSqBetaSandwich, 18	2
summary.betasandwich, 19	BetaADF, 2, 5–13, 15–24
$\operatorname{summary.diffbetas}$ and wich , $\operatorname{20}$	BetaADF(), 2, 13, 18
summary.rsqbetasandwich, 21	betaDelta::BetaDelta(), 2, 6
vcov.betasandwich, 22	BetaHC, 3, 4, 6–13, 15–24
vcov.diffbetasandwich, 23	BetaHC(), 2, 6, 13, 18
vcov.rsqbetasandwich, 24	BetaN, 3, 5, 5, 7–13, 15–24
betaSandwich	BetaN(), 6, 13, 18
BetaADF, 2	
BetaHC, 4	coef.betasandwich, 3, 5, 6, 7, 8–13, 15–24
BetaN, 5	coef.diffbetasandwich, 3 , $5-7$, 8 , $9-13$,
DiffBetaSandwich, 13	15–24
RSqBetaSandwich, 18	coef.rsqbetasandwich, 3 , 5 – 8 , 9 , 10 – 13 ,
data	15–24
nas1982, 14	confint.betasandwich, <i>3</i> , <i>5</i> – <i>9</i> , 10, <i>11</i> – <i>13</i> ,
diff	15–24
DiffBetaSandwich, 13	confint.diffbetasandwich, <i>3</i> , <i>5–10</i> , 11, <i>12 13</i> , <i>15–24</i>
methods	confint.rsqbetasandwich, 3 , $5-11$, 12 , 13 ,
coef.betasandwich,7	15–24
coef.diffbetas and $wich,8$	
${\sf coef.rsqbetas}$ and ${\sf wich,9}$	DiffBetaSandwich, 3, 5–12, 13, 15–24
confint.betasandwich, 10	
confint.diffbetas and wich, 11	nas1982, 14
confint.rsqbetasandwich, 12	
print.betasandwich, 15	print.betasandwich, 3, 5-13, 15, 16-24

26 INDEX

```
print.diffbetasandwich, 3, 5–13, 15, 16, 17–24 print.rsqbetasandwich, 3, 5–13, 15, 16, 17, 18–24 RSqBetaSandwich, 3, 5–13, 15–17, 18, 19–24 summary.betasandwich, 3, 5–13, 15–18, 19, 20–24 summary.diffbetasandwich, 3, 5–13, 15–19, 20, 21–24 summary.rsqbetasandwich, 3, 5–13, 15–20, 21, 22–24 vcov.betasandwich, 3, 5–13, 15–21, 22, 23, 24 vcov.diffbetasandwich, 3, 5–13, 15–22, 23, 24 vcov.rsqbetasandwich, 3, 5–13, 15–23, 24
```