Package 'Keng'

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Title Knock Errors Off Nice Guesses

Version 2024.11.02

Description Miscellaneous functions and data used in Qingyao's psychological research and teaching. Keng currently could test the significance and compute the cut-off values of Pearson's r without raw data. Keng could also compare lm()'s fitted outputs using R-squared and PRE (Proportional Reduction in Error, also called partial R-squared or partial Eta-squared).

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Encoding UTF-8

RoxygenNote 7.3.2

Imports stats

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

URL https://github.com/qyaozh/Keng

BugReports https://github.com/qyaozh/Keng/issues

NeedsCompilation no

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Contents

`compare_lm` *Compare lm.fit using PRE and R-squared.*

Description

Compare lm.fit using PRE and R-squared.

Usage

```
compare_lm(
  fitC = NULL,
  fitA = NULL,
  n = NULL,
  PC = NULL,
  PA = NULL,
  SSEC = NULL,
  SSEA = NULL
)
```

Arguments

`fitC`	The result of `lm()` of the Compact model (Model C).
`fitA`	The result of `lm()` of the Augmented model (Model A).
`n`	Sample size of the Model C or Model A. Model C and Model A must use the same sample, and hence have the same sample size.
`PC`	The number of parameters in Model C.
`PA`	The number of parameters in Model A. PA must be larger than PC.
`SSEC`	The Sum of Squared Errors (SSE) of Model C.
`SSEA`	The Sum of Squared Errors of Model A.

Details

`compare_lm()` compare Model A with Model C using *PRE* (Proportional Reduction in Error) and R-squared. *PRE* is partial R-squared (called partial Eta-squared in Anova).There are two ways of using `compare_lm()`. The first is giving `compare_lm()` fitC and fitA. The second is giving *n*, *PC*, *PA*, *SSEC*, and *SSEA*. The first way is more convenient, and it minimizes precision loss by omitting copying-and-pasting. If fitC and fitA are not inferior to the intercept-only model, R-squared and Adjusted R-squared are also computed. Note that the *F*-tests for *PRE* and R-squared change are equivalent. Please refer to Judd et al. (2017) for more details about *PRE*.

Value

A data.frame including *SSE*, *PRE*, the *F*-test of *PRE* (*F*, *df1*, *df2*, *p*), and *PRE_adjusted*. If fitC and fitA are not inferior to the intercept-only model, R-squared and Adjusted R-squared will also be computed.

References

Judd, C. M., McClelland, G. H., & Ryan, C. S. (2017). *Data analysis: A model comparison approach to regression, ANOVA, and beyond*. Routledge.

Examples

```
x1 <- rnorm(193)
x2 <- rnorm(193)
y <- 0.3 + 0.2*x1 + 0.1*x2 + rnorm(193)
dat <- data.frame(y, x1, x2)
# Fix intercept to constant 1 using I().
fit1 <- lm(I(y - 1) ~ 0, dat)
# Free intercept.
fit2 <- lm(y ~ 1, dat)
compare_lm(fit1, fit2)
# One predictor.
fit3 <- lm(y ~ x1, dat)
compare_lm(fit2, fit3)
# Fix intercept to 0.3 using offset().
intercept <- rep(0.3, 193)
fit4 <- lm(y ~ 0 + x1 + offset(intercept), dat)
compare_lm(fit4, fit3)
# Two predictors.
fit5 <- lm(y ~ x1 + x2, dat)
compare_lm(fit2, fit5)
compare_lm(fit3, fit5)
# Fix slope of x2 to 0.05 using offset().
fit6 <- lm(y ~ x1 + offset(0.05*x2), dat)
compare_lm(fit6, fit5)
```

`cut_r` *Cut-off values of r given the sample size n.*

Description

Cut-off values of r given the sample size n.

Usage

```
cut_r(n)
```

Arguments

`n`	Sample size of the *r*.

Details

Given *n* and *p*, *t* and then *r* could be determined. The formula used could be found in `test_r()`'s documentation.

Value

A data.frame including the cut-off values of *r* at the significance levels of $p = 0.1, 0.05, 0.01, 0.001$. *r* with the absolute value larger than the cut-off value is significant at the corresponding significance level.

Examples

```
cut_r(193)
```

`test_r` *Test r using the t-test given r and n.*

Description

Test r using the t-test given r and n.

Usage

```
test_r(r, n)
```

Arguments

`r`	Pearson correlation.
`n`	Sample size of *r*.

Details

To test the significance of the *r* using one-sample *t*-test, the *SE* of the r is determined by the following formula: `SE = sqrt((1 - r^2)/(n - 2))`.

Value

A data.frame including *r*, *se* of *r*, *t*, and *p*.

Examples

```
test_r(0.2, 193)
```

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