Package ‘lamme’

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the ABC procedure for model selection

Description

the AIC comparison with Modified Box-Cox Transformation (ABC) is a diagnostic procedure to help select among various additive and multiplicative models.

Usage

abc(y, g, x = 0)

Arguments

y the raw posttest scores of a continuous outcome variable.
g the categorical variable that denotes the group membership.
x (optional) the raw pretest scores of a continuous outcome variable.

Details

When only ‘y’ and ‘g’ are specified, the ABC procedure compares LANOVA and ANOVA models. When ‘x’ is also specified, the ABC procedure compares LANCVA, ANCOVA, ANCOHET, and ANCOVA with log-transformed y.

Value

AIC results of different models. The model with smallest AIC is preferred.

Examples

data("schoene")
attach(schoene)
abc(post_HRT,group,pre_HRT)
abc(post_HRT,group)

boot.es Boostrapped CI for Effect Size measures

Description

Compute the bias-corrected and expanded percentile bootstrapped confidence intervals for effect size estimates zetas and the overall signal-to-noise ratio. Additionally, if pretest scores are provided, bootstrapped CI on beta is also given.
Usage

\texttt{boot.es(y, g, x = 0, nrep = 1000, alpha = 0.05)}

Arguments

- \texttt{y}: the raw posttest scores of a continuous outcome variable.
- \texttt{g}: the categorical variable that denotes the group membership.
- \texttt{x}: (optional) the raw pretest scores of a continuous outcome variable.
- \texttt{nrep}: the number of boostrapped samples. (default=1000)
- \texttt{alpha}: the significance level (default=.05)

Value

A table of lower and upper limit from bias-corrected and accelerated and expanded percentile bootstrapped confidence interval. The first row is on the geometric mean of the control group (default group of comparison). After that, zeta estimates are given of the each respective group versus the control group (default group of comparison). Then, if pretest scores are given, CI on the beta estimate is given. Lastly, CI on the signal-to-noise ratio, an overall effect size measure, is provided.

- \texttt{BCa LL}: the lower limit of the Bias-Corrected and accelerated boostrapped Confidence Interval
- \texttt{BCa UL}: the upper limit of the Bias-Corrected and accelerated boostrapped Confidence Interval
- \texttt{exp LL}: the lower limit of the expanded percentile boostrapped Confidence Interval
- \texttt{exp UL}: the upper limit of the expanded percentile boostrapped Confidence Interval

References


Examples

\texttt{data(\textasciitilde schoene\textasciitilde)}
\texttt{attach(schoene)}
\texttt{boot.es(post_HRT, group, pre_HRT, 1000, .05)}
Description

Log-Analytic Methods for Multiplicative Effects

Details

The lamme package is designed to test and estimate multiplicative effects via log-analytic methods.

Usage

To access this package’s tutorial, type the following line into the console:

vignette("lamme-vignette")

Description

Logged ANCOVA

Mathematically, Lancova is the ANCOVA form of a log-log model where both the dependent variable and the covariate is log-transformed. Lancova can test and estimate multiplicative effects.

Usage

lancova(y, g, x, plot = F)

Arguments

- y: the raw posttest scores of a continuous outcome variable.
- g: the categorical variable that denotes the group membership
- x: the raw pretest scores of a continuous outcome variable.
- plot: a TRUE/FALSE variable that denotes if diagnostic plots are desired. (default=F)

Value

An summary object of the Lancova results. In residuals, the summary statistics are of sample multiplicative errors. In the coefficients table, the estimate of the intercept is the (control group) geometric mean estimate. The estimate for the pretest scores is the power parameter beta’s estimate. Other coefficient estimates are effect size measure zeta’s estimates. The standard error is on the logged scale. The confidence intervals are of significance level = .05 for the control group geometric mean and for the zeta estimates, respectively, of the intercept and other coefficients. The residual standard error is that of the logged scale residuals. Both R-squared and Adjusted R-squared are computed on the logged model. If ‘plot=TRUE’, diagnostic plots are provided.
**Description**

Mathematically, LANOVA is the ANOVA form of a log-log model where the dependent variable is log-transformed. LANOVA can test and estimate multiplicative effects.

**Usage**

```r
lanova(y, g, plot = F)
```

**Arguments**

- `y`: the raw scores of a continuous outcome variable.
- `g`: a categorical variable that denotes the group membership.
- `plot`: a TRUE/FALSE variable that denotes if diagnostic plots are desired. (default=F)

**Value**

An summary object of the LANOVA results. In residuals, the summary statistics are of sample multiplicative errors. In the coefficients table, the estimate of the intercept is the default group (control group) geometric mean estimate. Other coefficient estimates are effect size measure zeta’s estimates. The standard error is on the logged scale. The confidence intervals are of significance level = .05 for the control group geometric mean and for the zeta estimates, respectively, of the intercept and other coefficients. The residual standard error is that of the logged scale residuals. Both R-squared and Adjusted R-squared are computed on the logged model. If ‘plot=TRUE’, diagnostic plots are provided.

**Examples**

```r
# generate data
y1=rnorm(1000,5,1)+rnorm(1000)
y2=rnorm(1000,5.5,1)+rnorm(1000)
y3=rnorm(1000,6,1)+rnorm(1000)
y1=exp(y1)
y2=exp(y2)
y3=exp(y3)
dep=c(y1,y2,y3)
tc=rep(c(0,1,2),each=1000)
# applying lanova with the generated data
lanova(dep,tc)
```
**Description**

Compute the statistical power of the LANOVA test.

**Usage**

\[ pwr.lanova(k, n, r_sqrd, rho_sqrd, alpha = 0.05) \]

**Arguments**

- **k**
  the number of groups.
- **n**
  the number of observations per group.
- **r_sqrd**
  the expected explained variance (on the logged scale)
- **rho_sqrd**
  the pretest-posttest correlation
- **alpha**
  the significance level (default=.05)

**Value**

**power**
the statistical power of test

**References**


**Examples**

\[ pwr.lanova(3,40,.1,.4,.05) \]
Argument

- **k**: the number of groups.
- **n**: the number of observations per group.
- **r_sqr**: the expected explained variance (on the logged scale)
- **alpha**: the significance level (default=.05)

**Value**

- **power**: the statistical power of test

**References**


**Examples**

```r
pwr.lanova(3,4,.4,.05)
```

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**schoene**  

*Data on Interactive Cognitive-Motor Step Training*

**Description**

Data from a randomized controlled trial on Interactive cognitive-motor step training. 81 observations are included. The outcome variable included is the hand reaction time. The data come from a randomized pretest-posttest design with control and treatment groups.

**Usage**

```r
data(schoene)
```

**Format**

A dataframe with 81 rows and 3 variables:

- **group**: treatment or control group from experimental manipulation
- **pre_HRT**: prettest hand reaction time
- **post_HRT**: posttest hand reaction time

**References**

**Examples**

data(schoene)
head(schoene)
table(schoene$group)

---

**ss.lancova**  
*Sample Size Planning for LANCova*

**Description**

Compute the required per-group sample size for the LANCova test.

**Usage**

```
ss.lancova(k, rho_sqrd, r_sqrd, power = 0.8, alpha = 0.05)
```

**Arguments**

- `k`: the number of groups.
- `rho_sqrd`: the pretest-posttest correlation
- `r_sqrd`: the expected explained variance by the model (on the logged scale)
- `power`: the desired statistical power (default=.8)
- `alpha`: the significance level (default=.05)

**Value**

`n`: the per-group sample size requirement

**References**


**Examples**

```
ss.lancova(3,.5,.01,.14,.05)
```
**ss.lanova**  
*Sample Size Planning for LANOVA*

---

**Description**

Compute the required per-group sample size for the LANOVA test.

**Usage**

```r
ss.lanova(k, r_sqr, power = 0.8, alpha = 0.05)
```

**Arguments**

- **k**: the number of groups.
- **r_sqr**: the expected explained variance (on the logged scale)
- **power**: the desired statistical power (default=.8)
- **alpha**: the significance level (default=.05)

**Value**

- **n**: the per-group sample size requirement

**References**


**Examples**

```r
ss.lanova(3,.01,.05)
```
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