Package 'AgroR'

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Type Package

Title Experimental statistics

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Description Package for the analysis of completely randomized experimental designs (DIC), randomized blocks (DBC) and Latin square (DQL), experiments in double and triple factorial scheme (in DIC and DBC), experiments in subdivided plot scheme (in DIC and DBC) and joint analysis of experiments. The package performed the analysis of variance, ANOVA assumptions and multiple comparison test of means or regression. It can also be used to obtain measurements and graphs, in addition to correlating and other graphs used in agricultural sciences (Agronomy, animal science, food science and related areas)

Encoding UTF-8

RoxygenNote 7.1.1

Imports ggplot2, lmtest, laercio, nortest, ScottKnott, asbio, lme4, crayon, grid, gridExtra, stringr, Hmisc, emmeans, ARTool, multcomp, htmltools, httpuv, scales, ggrepel

Depends R (>= 4.0.0)

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GithubRef HEAD

GithubSHA1 2d632ada5409660df3416bcc5aaf3dc74907dd56

NeedsCompilation no

R topics documented:

`barplot_positive` *Graph: Positive barplot*

Description

Column chart with two variables that assume a positive response and represented by opposite sides, such as dry mass of the area and dry mass of the root

Usage

```
barplot_positive(
  a,
  b,
  ylab = "Response",
  var_name = c("Var1", "Var2"),
  fill_color = c("darkgreen", "brown")
)
```

Arguments

`a`	object of DIC, DBC or DQL functions
`b`	object of DIC, DBC or DQL functions
`ylab`	Y axis names

Author(s)

Gabriel Danilo Shimizu

See Also

radargraph, sk_graph, plot_TH, correlation, spider_graph, graph, line_plot

Examples

```
mspa=rnorm(100,10,1)
msr=rnorm(100,8,1)
trat=rep(paste("T",1:10),e=10)
a=DIC(trat,mspa)
b=DIC(trat,msr)
barplot_positive(a,b)
```

cloro *dataset: Sodium dichloroisocyanurate in soybean*

Description

An experiment was conducted in a greenhouse in pots at the State University of Londrina. The work has the objective of evaluating the application of sodium dichloroisocyanurate (DUP) in soybean in 4 periods of application in soybean inoculated or not with Rhizobium and its influence on the number of nodules. The experiment was conducted in a completely randomized design with five replications.

Usage

```
data(cloro)
```

Format

data.frame containing data set

`f1` categorical vector with factor 1

`f2` categorical vector with factor 2

`bloco` categorical vector with block

`resp` Numeric vector

See Also

enxofre, laranja, mirtilo, nitrogenio, pomegranate, porco, sensorial, simulate1, simulate2, simulate3, tomate, weather

Examples

```
data(cloro)
```

conjdbc *Analysis: Joint analysis of experiments in randomized block design*

Description

Function of the AgroR package for joint analysis of experiments conducted in a randomized qualitative or quantitative single-block design with balanced data.

Usage

```
conjdbc(
  tratamento,
  bloco,
  local,
  resposta,
  transf = 1,
  norm = "sw",
  homog = "bt",
  theme = theme_bw(),
  indep = "dw",
  mcomp = "tukey",
  quali = T,
  alpha.f = 0.05,
  alpha.t = 0.05,
  grau = NA,
  ylab = "Resposta",
  title = "",
  xlab = "",
  fill = "lightblue",
  angulo = 0,
  textsize = 12,
  dec = 3,
  family = "sans",
  errorbar = T
)
```

Arguments

`tratamento`	Numerical or complex vector with treatments
`bloco`	Numerical or complex vector with blocks
`local`	Numeric or complex vector with locations or times
`resposta`	Numerical vector containing the response of the experiment.
`transf`	Applies data transformation (default is 1; for log consider 0)
`norm`	error normality test (*default* is Shapiro-Wilk)
`homog`	homogeneity test of variances (*default* is Bartlett)
`indep`	error independence test (*default* is Durbin-Watson)
`mcomp`	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
`quali`	Defines whether the factor is quantitative or qualitative (*qualitative*)
`alpha.f`	Level of significance of the F test (*default* is 0.05)
`alpha.t`	Level of significance of the Tukey test (*default* is 0.05)
`grau`	Degree of polynomial in case of quantitative factor (*default* is 1)
`ylab`	Variable response name (Accepts the *expression*() function)
`title`	graph title
`xlab`	treatments name (Accepts the *expression*() function)
`fill`	Defines chart color (to generate different colors for different treatments, define fill = "trat")

angulo	x-axis scale text rotation
textsize	font size
dec	number of cells
family	font family
color	When the columns are different colors (Set fill-in argument as "trat")

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

References

FERREIRA, P. V. Estatística experimental aplicada à agronomia. Edufal, 2018.

Examples

```
library(AgroR)
data(mirtilo)
attach(mirtilo)
conjdbc(trat, bloco, exp, resp)
```

---

conjdic *Analysis: Joint analysis of experiments in completely randomized block design*

Description

Function of the AgroR package for joint analysis of experiments conducted in a randomized qualitative or quantitative single-block design with balanced data.

Usage

```
conjdic(
  tratamento,
  bloco,
  local,
  resposta,
  transf = 1,
  norm = "sw",
  homog = "bt",
  indep = "dw",
  mcomp = "tukey",
  quali = T,
  alpha.f = 0.05,
  alpha.t = 0.05,
  grau = NA,
```

```
  theme = theme_bw(),
  ylab = "Resposta",
  title = "",
  xlab = "",
  color = "rainbow",
  fill = "lightblue",
  angulo = 0,
  textsize = 12,
  dec = 3,
  family = "sans",
  errorbar = T
)
```

Arguments

tratamento	Numerical or complex vector with treatments
bloco	Numerical or complex vector with blocks
local	Numeric or complex vector with locations or times
resposta	Numerical vector containing the response of the experiment.
transf	Applies data transformation (default is 1; for log consider 0)
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
quali	Defines whether the factor is quantitative or qualitative (*qualitative*)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
grau	Degree of polynomial in case of quantitative factor (*default* is 1)
ylab	Variable response name (Accepts the *expression*() function)
title	graph title
xlab	treatments name (Accepts the *expression*() function)
color	When the columns are different colors (Set fill-in argument as "trat")
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
angulo	x-axis scale text rotation
textsize	font size
dec	number of cells
family	font family

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

References

FERREIRA, P. V. Estatística experimental aplicada à agronomia. Edufal, 2018.

Examples

```
library(AgroR)
data(mirtilo)
attach(mirtilo)
conjdic(trat, bloco, exp, resp)
```

`conjfat2.dbc` *Analysis: Joint analysis of experiments in randomized block design in a double factorial scheme*

Description

Function of the AgroR package for joint analysis of experiments conducted in a randomized block design in a double factorial scheme with qualitative or quantitative factor and balanced data.

Usage

```
conjfat2.dbc(
  fator1,
  fator2,
  local,
  bloco,
  resposta,
  transf = 1,
  norm = "sw",
  homog = "bt",
  indep = "dw",
  mcomp = "tukey",
  alpha.f = 0.05,
  alpha.t = 0.05,
  quali = c(T, T),
  grau = NA,
  geom = "point",
  theme = theme_bw(),
  ylab = "Resposta",
  xlab = "",
  color = "rainbow",
  fill = "lightblue",
  angulo = 0,
  textsize = 12,
  dec = 3,
  family = "sans",
  addmean = T,
  errorbar = T,
  CV = T,
  posi = "right"
)
```

Arguments

fator1	Numeric or complex vector with factor 1 levels
fator2	Numeric or complex vector with factor 2 levels
local	Numeric or complex vector with locations or times
bloco	Numerical or complex vector with blocks
resposta	Numerical vector containing the response of the experiment.
transf	Applies data transformation (default is 1; for log consider 0)
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
quali	Defines whether the factor is quantitative or qualitative (*qualitative*)
grau	Degree of polynomial in case of quantitative factor (*default* is 1)
geom	graph type (columns, boxes or segments)
theme	ggplot2 theme (*default* is theme_bw())
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
color	When the columns are different colors (Set fill-in argument as "trat")
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
angulo	x-axis scale text rotation
textsize	font size
dec	number of cells
family	font family
addmean	Plot the average value on the graph (*default* is TRUE)
errorbar	Plot the standard deviation bar on the graph (In the case of a segment and column graph) - *default* is TRUE
CV	Plotting the coefficient of variation and p-value of Anova (*default* is TRUE)

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

References

FERREIRA, P. V. Estatística experimental aplicada à agronomia. Edufal, 2018.

Examples

```
library(AgroR)
data(nitrogenio)
attach(nitrogenio)
conjfat2.dbc(Fert, Gen, Experimento, bloco, resp)
```

`conjfat2.dic` *Analysis: Joint analysis of experiments in randomized block design in a double factorial scheme*

Description

Function of the AgroR package for joint analysis of experiments conducted in a randomized block design in a double factorial scheme with qualitative or quantitative factor and balanced data.

Usage

```
conjfat2.dic(
  fator1,
  fator2,
  local,
  bloco,
  resposta,
  transf = 1,
  norm = "sw",
  homog = "bt",
  indep = "dw",
  mcomp = "tukey",
  alpha.f = 0.05,
  alpha.t = 0.05,
  quali = c(T, T),
  grau = NA,
  geom = "point",
  theme = theme_bw(),
  ylab = "Resposta",
  xlab = "",
  color = "rainbow",
  fill = "lightblue",
  angulo = 0,
  textsize = 12,
  dec = 3,
  family = "sans",
  addmean = T,
  errorbar = T,
  CV = T,
  posi = "right"
)
```

Arguments

fator1	Numeric or complex vector with factor 1 levels
fator2	Numeric or complex vector with factor 2 levels
local	Numeric or complex vector with locations or times
bloco	Numerical or complex vector with blocks
resposta	Numerical vector containing the response of the experiment.
transf	Applies data transformation (default is 1; for log consider 0)
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
quali	Defines whether the factor is quantitative or qualitative (*qualitative*)
grau	Degree of polynomial in case of quantitative factor (*default* is 1)
geom	graph type (columns, boxes or segments)
theme	ggplot2 theme (*default* is theme_bw())
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
color	When the columns are different colors (Set fill-in argument as "trat")
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
angulo	x-axis scale text rotation
textsize	font size
dec	number of cells
family	font family
addmean	Plot the average value on the graph (*default* is TRUE)
errorbar	Plot the standard deviation bar on the graph (In the case of a segment and column graph) - *default* is TRUE
CV	Plotting the coefficient of variation and p-value of Anova (*default* is TRUE)

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

References

FERREIRA, P. V. Estatística experimental aplicada à agronomia. Edufal, 2018.

Examples

```
library(AgroR)
data(nitrogenio)
attach(nitrogenio)
conjfat2.dic(Fert, Gen, Experimento, bloco, resp)
```

`correlation` *graph: Correlogram*

Description

graph: Correlogram

Usage

```
correlation(
  data,
  axissize = 12,
  legendsize = 12,
  legendposition = c(0.9, 0.2),
  legendtitle = "Correlation",
  method = "pearson"
)
```

Arguments

`data`	data.frame
`axissize`	default is 12
`legendsize`	default is 12
`legendposition`	default is c(0.9,0.2)
`legendtitle`	default is "Correlation"
`method`	default is Pearson

Author(s)

Gabriel Danilo Shimizu

Examples

```
data("pomegranate")
correlation(pomegranate[,-1])
```

croqui *utils: Experimental sketch*

Description

Experimental sketching function

Usage

```
croqui(trat, trat1 = NULL, r, design = "dic", pos = "linha", ncol = NA)
```

Arguments

trat	vector with factor A levels
trat1	vector with levels of factor B (Set to NULL if not factorial or psub)
r	number of repetitions
design	experimental design ("dic", "dbc", "dql","psubdic","psubdbc","fat2dic","fat2dbc")
pos	posicao da repeticao (linha ou coluna)
ncol	default is NA. Warning!!! Use only in a completely randomized design

Examples

```
Trat=paste("Treatments",1:6)
croqui(Trat,r=3)
set.seed(1)
croqui(Trat,r=3)
```

DBC *Analysis: randomized block design*

Description

This is a function of the AgroR package for statistical analysis of experiments conducted in a randomized block and balanced design with a factor considering the fixed model.

Usage

```
DBC(
  tratamento,
  bloco,
  resposta,
  norm = "sw",
  homog = "bt",
  indep = "dw",
  adit = "tukey",
  mcomp = "tukey",
  quali = T,
  alpha.f = 0.05,
```

```
  alpha.t = 0.05,
  transf = 1,
  test = "parametric",
  grau = 1,
  geom = "bar",
  theme = theme_bw(),
  outdec = ".",
  sup = NA,
  CV = TRUE,
  ylab = "Resposta",
  xlab = "",
  textsize = 12,
  fill = "lightblue",
  angle = 0,
  family = "sans",
  dec = 3,
  addmean = T,
  errorbar = T,
  posi = "top"
)
```

Arguments

tratamento	Numerical or complex vector with treatments
bloco	Numerical or complex vector with blocks
resposta	Numerical vector containing the response of the experiment.
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
adit	Factor additivity test (*default* is Tukey)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
quali	Defines whether the factor is quantitative or qualitative (*qualitative*)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
transf	Applies data transformation (default is 1; for log consider 0)
test	"parametric" - Parametric test or "noparametric" - non-parametric test
grau	Degree of polynomial in case of quantitative factor (*default* is 1)
geom	graph type (columns, boxes or segments)
theme	ggplot2 theme (*default* is theme_bw())
sup	Number of units above the standard deviation or average bar on the graph
CV	Plotting the coefficient of variation and p-value of Anova (*default* is TRUE)
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
textsize	font size
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")

angle	x-axis scale text rotation
family	font family
dec	number of cells
addmean	Plot the average value on the graph (*default* is TRUE)
errorbar	Plot the standard deviation bar on the graph (In the case of a segment and column graph) - *default* is TRUE

Details

The values of the variance analysis of the DBC single factor are returned, the test of normality of errors (Shapiro-Wilk, Lilliefors, Anderson-Darling, Cramer-von Mises, Pearson and Shapiro-Francia), the test of homogeneity of variances (Bartlett or Levene), the Durbin-Watson error independence test, the multiple comparison test (Tukey, Scott-Knott or Duncan) or adjustment of regression models up to grade 3 polynomial, in the case of quantitative treatments. Non-parametric analysis can be used by the Friedman test. Data transformation can be used, using the trans argument. The function also returns a column, box or segment chart for qualitative treatments. The function also returns a graph of standardized residues.

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

References

Principles and procedures of statistics a biometrical approach Steel & Torry & Dickey. Third Edition 1997

Multiple comparisons theory and methods. Departament of statistics the Ohio State University. USA, 1996. Jason C. Hsu. Chapman Hall/CRC.

Practical Nonparametrics Statistics. W.J. Conover, 1999

Ramalho M.A.P., Ferreira D.F., Oliveira A.C. 2000. Experimentação em Genética e Melhoramento de Plantas. Editora UFLA.

Scott R.J., Knott M. 1974. A cluster analysis method for grouping mans in the analysis of variance. Biometrics, 30, 507-512.

See Also

DIC, DQL

Examples

```
library(AgroR)
data(laranja)
attach(laranja)
DBC(trat, bloco, resp)
DBC(tratamento, bloco, resp, test="noparametric")
```

DBCT *Analysis: randomized block design evaluated over time*

Description

Function of the AgroR package for analysis of experiments conducted in a balanced qualitative, single-factorial randomized block design with multiple assessments over time, however without considering time as a factor.

Usage

```
DBCT(
  tratamento,
  bloco,
  tempo,
  resposta,
  theme = theme_bw(),
  geom = "point",
  fill = "gray",
  xlab = "Response",
  ylab = "Independent",
  mcomp = "tukey",
  textsize = 12,
  error = TRUE,
  family = "sans",
  sup = 0,
  addmean = F,
  posi = c(0.1, 0.8),
  legend = "Legend",
  dec = 3
)
```

Arguments

bloco	Numerical or complex vector with blocks
tempo	Numerical or complex vector with times
geom	graph type (columns, boxes or segments)
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
xlab	treatments name (Accepts the *expression*() function)
ylab	Variable response name (Accepts the *expression*() function)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
textsize	font size
family	font family
dec	number of cells
trat	Numerical or complex vector with treatments
resp	Numerical vector containing the response of the experiment.

alpha.t	Level of significance of the Tukey test (*default* is 0.05)
alpha.f	Level of significance of the F test (*default* is 0.05)
color	When the columns are different colors (Set fill-in argument as "trat")
angulo	x-axis scale text rotation
title	graph title

Details

The p-value of the analysis of variance, the normality test for Shapiro-Wilk errors, the Bartlett homogeneity test of variances, the independence of Durbin-Watson errors and the multiple comparison test (Tukey, Scott-Knott, LSD or Duncan).

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

See Also

DBC, DICT, DQLT

Examples

```
data(simulate2)
attach(simulate2)
DBCT(trat, bloco, tempo, resp)
```

`desc` *descritive: Descriptive analysis*

Description

descritive: Descriptive analysis

Usage

```
desc(tratamento, resposta, ylab = "Resposta", xlab = "Tratamento", ylim = NA)
```

Arguments

tratamento	Numerical or complex vector with treatments
resposta	Numerical vector containing the response of the experiment.
ylab	Variable response name (Accepts the *expression*() function)
xlab	x name (Accepts the *expression*() function)

Author(s)

Gabriel Danilo Shimizu

See Also

desc2fat, tabledesc,dispvar

Examples

```
library(AgroR)
data("pomegranate")
attach(pomegranate)
desc(trat,WL)
```

---

desc2fat *descritive: Descriptive analysis (Two factors)*

Description

descritive: Descriptive analysis (Two factors)

Usage

```
desc2fat(fator1, fator2, resposta, ylab = "Response", theme = theme_bw())
```

Arguments

fator1	Numeric or complex vector with factor 1 levels
fator2	Numeric or complex vector with factor 2 levels
resposta	Numerical vector containing the response of the experiment.
ylab	Variable response name (Accepts the *expression*() function)
xlab	x name (Accepts the *expression*() function)

Author(s)

Gabriel Danilo Shimizu

Examples

```
library(AgroR)
data(cloro)
attach(cloro)
desc2fat(f1,f2,resp)
```

desc3fat *descritive: Descriptive analysis (Three factors)*

Description

descritive: Descriptive analysis (Three factors)

Usage

```
desc3fat(
  fator1,
  fator2,
  fator3,
  resposta,
  legend.title = "Legend",
  xlab = "xlab",
  ylab = "ylab",
  theme = theme_bw(),
  plot = "interaction"
)
```

Arguments

fator1	Numeric or complex vector with factor 1 levels
fator2	Numeric or complex vector with factor 2 levels
fator3	Numeric or complex vector with factor 3 levels
resposta	Numerical vector containing the response of the experiment.
legend.title	legend title
xlab	x name (Accepts the *expression*() function)
ylab	Variable response name (Accepts the *expression*() function)
theme	ggplot theme
plot	"interaction" or "box"

Author(s)

Gabriel Danilo Shimizu

Examples

```
library(AgroR)
data(enxofre)
attach(enxofre)
desc3fat(f1, f2, f3, resp)
```

DIC *Analysis: completely randomized design*

Description

Statistical analysis of experiments conducted in a completely randomized and balanced design with a factor considering the fixed model.

Usage

```
DIC(
  tratamento,
  resposta,
  norm = "sw",
  homog = "bt",
  indep = "dw",
  mcomp = "tukey",
  quali = T,
  alpha.f = 0.05,
  alpha.t = 0.05,
  grau = 1,
  transf = 1,
  test = "parametric",
  p.adj = "holm",
  geom = "bar",
  theme = theme_bw(),
  outdec = ".",
  sup = NA,
  CV = TRUE,
  ylab = "Response",
  xlab = "",
  fill = "lightblue",
  angle = 0,
  family = "sans",
  textsize = 12,
  dec = 3,
  addmean = T,
  errorbar = T,
  posi = "top"
)
```

Arguments

tratamento	Numerical or complex vector with treatments
resposta	Numerical vector containing the response of the experiment.
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)

quali	Defines whether the factor is quantitative or qualitative (*qualitative*)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
grau	Degree of polynomial in case of quantitative factor (*default* is 1)
transf	Applies data transformation (*default* is 1; for log consider 0)
test	"parametric" - Parametric test or "noparametric" - non-parametric test
p.adj	Method for adjusting p values ("none","holm","hommel", "hochberg", "bonferroni", "BH", "BY", "fdr")
geom	graph type (columns, boxes or segments)
theme	ggplot2 theme (*default* is theme_bw())
sup	Number of units above the standard deviation or average bar on the graph
CV	Plotting the coefficient of variation and p-value of Anova (*default* is TRUE)
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
angle	x-axis scale text rotation
family	font family
textsize	font size
dec	number of cells
addmean	Plot the average value on the graph (*default* is TRUE)
errorbar	Plot the standard deviation bar on the graph (In the case of a segment and column graph) - *default* is TRUE
color	When the columns are different colors (Set fill-in argument as "trat")

Details

Function of the AgroR package for analysis of experiments conducted in a fully randomized, quantitative or qualitative balanced design. The function returns the table of analysis of variance, the assumptions of normality of errors, homogeneity of variances and independence of errors. When the treatment is qualitative, the user can define the multiple comparison test (Tukey, Scott-Knott or Duncan). Data transformation can also be performed by the package, the trans argument represents the lambda value that the user intends to use. Non-parametric Kruskal-Wallis test can also be used, defining the test = "noparametric" argument. Chart type can be defined by the geom = argument. Quantitative treatments can be defined by the quali = F argument, as well as the degree of the polynomial, by the "degree =" argument

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

References

Principles and procedures of statistics a biometrical approach Steel & Torry & Dickey. Third Edition 1997

Multiple comparisons theory and methods. Departament of statistics the Ohio State University. USA, 1996. Jason C. Hsu. Chapman Hall/CRC.

Practical Nonparametrics Statistics. W.J. Conover, 1999

Ramalho M.A.P., Ferreira D.F., Oliveira A.C. 2000. Experimentação em Genética e Melhoramento de Plantas. Editora UFLA.

Scott R.J., Knott M. 1974. A cluster analysis method for grouping mans in the analysis of variance. Biometrics, 30, 507-512.

See Also

DBC DQL

Examples

```
library(AgroR)
data(pomagranate)
attach(pomegranate)
DIC(trat, WL) # tukey
DIC(trat, WL, mcomp = "sk")
DIC(trat, WL, mcomp = "duncan")
DIC(trat, WL, test = "noparametric")
DIC(trat, WL, transf = 0)
DIC(trat, WL, geom="point")
DIC(trat, WL, ylab = "Perda de massa (%)", xlab="Tratamentos")
```

DICT *Analysis: completely randomized design evaluated over time*

Description

Function of the AgroR package for the analysis of experiments conducted in a completely randomized, qualitative, uniform qualitative design with multiple assessments over time, however without considering time as a factor.

Usage

```
DICT(
  tratamento,
  tempo,
  resposta,
  mcomp = "tukey",
  theme = theme_bw(),
  geom = "point",
  xlab = "Independent",
  ylab = "Response",
  dec = 3,
  fill = "gray",
```

```
  error = TRUE,
  textsize = 12,
  family = "sans",
  sup = 0,
  addmean = F,
  legend = "Legend",
  ylim = NA,
  posi = c(0.1, 0.8)
)
```

Arguments

tempo	Numerical or complex vector with times
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
geom	graph type (columns, boxes or segments)
xlab	treatments name (Accepts the *expression*() function)
ylab	Variable response name (Accepts the *expression*() function)
dec	number of cells
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
textsize	font size
family	font family
trat	Numerical or complex vector with treatments
resp	Numerical vector containing the response of the experiment.
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
alpha.f	Level of significance of the F test (*default* is 0.05)
color	When the columns are different colors (Set fill-in argument as "trat")
angulo	x-axis scale text rotation
title	graph title

Details

The p-value of the analysis of variance, the normality test for Shapiro-Wilk errors, the Bartlett homogeneity test of variances, the independence of Durbin-Watson errors and the multiple comparison test (Tukey, Scott-Knott, LSD or Duncan).

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

See Also

DIC, DBCT, DQLT

Examples

```
data(simulate1)
attach(simulate1)
DICT(trat, tempo, resp)
```

`dispvar` *descritive: Boxplot with standardized data*

Description

descritive: Boxplot with standardized data

Usage

```
dispvar(
  data,
  Tratamentos = NULL,
  theme = theme_bw(),
  ylab = "Standard mean",
  xlab = "Variable",
  family = "serif",
  textsize = 12,
  fill = "lightblue"
)
```

Arguments

`data`	data.frame containing the response of the experiment.
`theme`	ggplot2 theme (*default* is theme_bw())
`ylab`	Variable response name (Accepts the *expression*() function)
`xlab`	treatments name (Accepts the *expression*() function)
`family`	font family
`textsize`	font size
`fill`	Defines chart color
`tratamento`	Numerical or complex vector with treatments
`dec`	number of cells

Author(s)

Gabriel Danilo Shimizu

Examples

```
library(AgroR)
data("pomegranate")
dispvar(pomegranate[,-1])
trat=pomegranate$trat
dispvar(data, trat)
```

DQL *Analysis: Latin square design*

Description

This is a function of the AgroR package for statistical analysis of experiments conducted in Latin Square and balanced design with a factor considering the fixed model.

Usage

```
DQL(
  tratamento,
  linha,
  coluna,
  resposta,
  norm = "sw",
  homog = "bt",
  indep = "dw",
  adit = "tukey",
  mcomp = "tukey",
  alpha.f = 0.05,
  alpha.t = 0.05,
  quali = T,
  transf = 1,
  grau = 1,
  geom = "bar",
  theme = theme_bw(),
  outdec = ".",
  sup = NA,
  CV = TRUE,
  ylab = "Response",
  xlab = "",
  textsize = 12,
  fill = "lightblue",
  angle = 0,
  family = "sans",
  dec = 3,
  addmean = T,
  errorbar = T,
  posi = "top"
)
```

Arguments

tratamento	Numerical or complex vector with treatments (Declare as factor)
linha	Numerical or complex vector with lines (Declare as factor)
coluna	Numerical or complex vector with columns (Declare as factor)
resposta	Numerical vector containing the response of the experiment.
norm	error normality test (*default* is Shapiro-Wilk)

homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
adit	Factor additivity test (*default* is Tukey)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
quali	Defines whether the factor is quantitative or qualitative (*qualitative*)
transf	Applies data transformation (default is 1; for log consider 0)
grau	Degree of polynomial in case of quantitative factor (*default* is 1)
geom	graph type (columns, boxes or segments)
theme	ggplot2 theme (*default* is theme_bw())
sup	Number of units above the standard deviation or average bar on the graph
CV	Plotting the coefficient of variation and p-value of Anova (*default* is TRUE)
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
textsize	font size
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
angle	x-axis scale text rotation
family	font family
dec	number of cells
addmean	Plot the average value on the graph (*default* is TRUE)
errorbar	Plot the standard deviation bar on the graph (In the case of a segment and column graph) - *default* is TRUE
title	graph title
color	When the columns are different colors (Set fill-in argument as "trat")

Details

The values of the variance analysis of the DQL single factor are returned, the test of normality of errors (Shapiro-Wilk, Lilliefors, Anderson-Darling, Cramer-von Mises, Pearson and Shapiro-Francia), the test of homogeneity of variances (Bartlett or Levene), the Durbin-Watson error independence test, the multiple comparison test (Tukey, Scott-Knott or Duncan) or adjustment of regression models up to grade 3 polynomial, in the case of quantitative treatments. Non-parametric analysis can be used by the Friedman test. Data transformation can be used, using the trans argument. The function also returns a column, box or segment chart for qualitative treatments. The function also returns a graph of standardized residues.

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

References

Principles and procedures of statistics a biometrical approach Steel & Torry & Dickey. Third Edition 1997

Multiple comparisons theory and methods. Departament of statistics the Ohio State University. USA, 1996. Jason C. Hsu. Chapman Hall/CRC.

Ramalho M.A.P., Ferreira D.F., Oliveira A.C. 2000. Experimentação em Genética e Melhoramento de Plantas. Editora UFLA.

Scott R.J., Knott M. 1974. A cluster analysis method for grouping mans in the analysis of variance. Biometrics, 30, 507-512.

See Also

DIC, DBC

Examples

```
library(AgroR)
data(porco)
attach(porco)
DQL(trat, linhas, colunas, resp)
```

DQLT *Analysis: Latin square design evaluated over time*

Description

Function of the AgroR package for the analysis of experiments conducted in a balanced qualitative single-square Latin design with multiple assessments over time, however without considering time as a factor.

Usage

```
DQLT(
  tratamento,
  linha,
  coluna,
  tempo,
  resposta,
  mcomp = "tukey",
  error = TRUE,
  xlab = "Independent",
  ylab = "Response",
  textsize = 12,
  family = "sans",
  sup = 0,
  addmean = F,
  posi = c(0.1, 0.8),
  geom = "point",
  fill = "gray",
  legend = "Legend",
```

```
  ylim = NA,
  dec = 3,
  theme = theme_bw()
)
```

Arguments

linha	Numerical or complex vector with line
coluna	Numerical or complex vector with column
tempo	Numerical or complex vector with times
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
xlab	treatments name (Accepts the *expression*() function)
ylab	Variable response name (Accepts the *expression*() function)
textsize	font size
family	font family
geom	graph type (columns, boxes or segments)
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
dec	number of cells
trat	Numerical or complex vector with treatments
resp	Numerical vector containing the response of the experiment.
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
alpha.f	Level of significance of the F test (*default* is 0.05)
color	When the columns are different colors (Set fill-in argument as "trat")
angulo	x-axis scale text rotation
title	graph title

Details

The p-value of the analysis of variance, the normality test for Shapiro-Wilk errors, the Bartlett homogeneity test of variances, the independence of Durbin-Watson errors and the multiple comparison test (Tukey, Scott-Knott, LSD or Duncan).

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

See Also

DQL, DICT, DBCT

Examples

```
data(simulate3)
attach(simulate3)
DQLT(trat, linhas, colunas, tempo, resp)
```

enxofre *dataset: sulfur*

Description

dataset: sulfur

Usage

```
data(enxofre)
```

Format

data.frame containing data set

`f1` categorical vector with factor 1

`f2` categorical vector with factor 2

`f2` categorical vector with factor 3

`bloco` categorical vector with block

`resp` Numeric vector

See Also

cloro,laranja,mirtilo,nitrogenio,pomegranate,porco,sensorial,simulate1,simulate2,simulate3,tomate,weather

Examples

```
data(enxofre)
```

FAT2DBC *Analysis: DBC experiments in double factorial*

Description

Analysis: DBC experiments in double factorial

Usage

```
FAT2DBC(
  fator1,
  fator2,
  bloco,
  resposta,
  transf = 1,
  norm = "sw",
  homog = "bt",
  indep = "dw",
  mcomp = "tukey",
  alpha.f = 0.05,
```

```
  alpha.t = 0.05,
  quali = c(T, T),
  grau = NA,
  geom = "bar",
  theme = theme_bw(),
  outdec = ".",
  ylab = "Response",
  xlab = "",
  legend = "Legend",
  color = "rainbow",
  fill = "lightblue",
  angle = 0,
  textsize = 12,
  dec = 3,
  family = "sans",
  point = "mean_se",
  addmean = T,
  errorbar = T,
  CV = T,
  sup = NA,
  color1 = NA,
  posi = "right",
  decimal = ".",
  ylim = NA
)
```

Arguments

fator1	Numeric or complex vector with factor 1 levels
fator2	Numeric or complex vector with factor 2 levels
bloco	Numerical or complex vector with blocks
resposta	Numerical vector containing the response of the experiment.
transf	Applies data transformation (default is 1; for log consider 0)
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
quali	Defines whether the factor is quantitative or qualitative (*qualitative*)
grau	Degree of polynomial in case of quantitative factor (*default* is 1)
geom	graph type (columns, boxes or segments)
theme	ggplot2 theme (*default* is theme_bw())
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
legend	legend title name
color	When the columns are different colors (Set fill-in argument as "trat")

fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
angle	x-axis scale text rotation
textsize	font size
dec	number of cells
family	font family
addmean	Plot the average value on the graph (*default* is TRUE)
errorbar	Plot the standard deviation bar on the graph (In the case of a segment and column graph) - *default* is TRUE
CV	Plotting the coefficient of variation and p-value of Anova (*default* is TRUE)
sup	Number of units above the standard deviation or average bar on the graph
color1	color of groups for regression
title	graph title

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

See Also

FAT2DBC.art

Examples

```
library(AgroR)
data(cloro)
attach(cloro)
FAT2DIC(f1, f2, bloco, resp)
```

FAT2DBC.art *Analysis: Analysis of Variance of Aligned Rank Transformed Data in FAT2DBC*

Description

Apply the aligned rank transform to a factorial model (with optional grouping terms). Usually done in preparation for a nonparametric analyses of variance on models with numeric or ordinal responses, which can be done by following up with anova.art.

Usage

```
FAT2DBC.art(
  fator1,
  fator2,
  bloco,
  resposta,
  decreasing = T,
  xlab = "Fator",
  ylab = "Response",
  legend.title = "Fator",
  theme = theme_bw()
)
```

Arguments

fator1	Numeric or complex vector with factor 1 levels
fator2	Numeric or complex vector with factor 2 levels
bloco	Numerical or complex vector with blocks
resposta	Numerical vector containing the response of the experiment.
xlab	treatments name (Accepts the *expression*() function)
ylab	Variable response name (Accepts the *expression*() function)
legend.title	legend title name

Author(s)

Gabriel Danilo Shimizu

See Also

FAT2DBC

Examples

```
resposta=c(339,332,163,230,300,163,172,123,083,161,196,252,346,468,258,
335,235,217,174,222,284,136,225,098,110,482,438,492,453,446,
171,069,095,046,079,032,038,063,048,160)
fator1=as.factor(rep(c("IN","NI"),e=20))
fator2=as.factor(rep(c("Plantio","V1+15","V3+15","R1+15"),e=5,2))
data=data.frame(resposta,fator1,fator2)
```

FAT2DIC *Analysis: DIC experiments in double factorial*

Description

Analysis: DIC experiments in double factorial

Usage

```
FAT2DIC(
  fator1,
  fator2,
  resposta,
  norm = "sw",
  homog = "bt",
  indep = "dw",
  mcomp = "tukey",
  alpha.f = 0.05,
  alpha.t = 0.05,
  quali = c(T, T),
  grau = NA,
  transf = 1,
  geom = "bar",
  theme = theme_bw(),
  outdec = ".",
  ylab = "Response",
  xlab = "",
  legend = "Legend",
  color1 = NA,
  color = "rainbow",
  fill = "lightblue",
  textsize = 12,
  addmean = T,
  errorbar = T,
  CV = T,
  dec = 3,
  angle = 0,
  posi = "right",
  decimal = ".",
  family = "sans",
  point = "mean_se",
  sup = NA,
  ylim = NA
)
```

Arguments

fator1	Numeric or complex vector with factor 1 levels
fator2	Numeric or complex vector with factor 2 levels
resposta	Numerical vector containing the response of the experiment.
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
quali	Defines whether the factor is quantitative or qualitative (*qualitative*)

grau	Degree of polynomial in case of quantitative factor (*default* is 1)
transf	Applies data transformation (default is 1; for log consider 0)
geom	graph type (columns, boxes or segments)
theme	ggplot2 theme (*default* is theme_bw())
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
legend	legend title name
color1	color of groups for regression
color	When the columns are different colors (Set fill-in argument as "trat")
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
textsize	font size
addmean	Plot the average value on the graph (*default* is TRUE)
errorbar	Plot the standard deviation bar on the graph (In the case of a segment and column graph) - *default* is TRUE
CV	Plotting the coefficient of variation and p-value of Anova (*default* is TRUE)
dec	number of cells
angle	x-axis scale text rotation
family	font family
sup	Number of units above the standard deviation or average bar on the graph

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

See Also

FAT2DIC.art

Examples

```
library(AgroR)
data(cloro)
attach(cloro)
FAT2DIC(f1, f2, resp)
```

FAT2DIC.art *Analysis: Analysis of Variance of Aligned Rank Transformed Data in FAT2DIC*

Description

Apply the aligned rank transform to a factorial model (with optional grouping terms). Usually done in preparation for a nonparametric analyses of variance on models with numeric or ordinal responses, which can be done by following up with anova.art.

Usage

```
FAT2DIC.art(
  fator1,
  fator2,
  resposta,
  decreasing = F,
  xlab = "Fator",
  ylab = "Response",
  legend.title = "Fator",
  theme = theme_bw()
)
```

Arguments

fator1	Numeric or complex vector with factor 1 levels
fator2	Numeric or complex vector with factor 2 levels
resposta	Numerical vector containing the response of the experiment.
xlab	treatments name (Accepts the *expression*() function)
ylab	Variable response name (Accepts the *expression*() function)
legend.title	legend title name

Author(s)

Gabriel Danilo Shimizu

See Also

FAT2DIC

Examples

```
resposta=c(339,332,163,230,300,163,172,123,083,161,196,252,346,468,258,
335,235,217,174,222,284,136,225,098,110,482,438,492,453,446,
171,069,095,046,079,032,038,063,048,160)
fator1=as.factor(rep(c("IN","NI"),e=20))
fator2=as.factor(rep(c("Plantio","V1+15","V3+15","R1+15"),e=5,2))
data=data.frame(resposta,fator1,fator2)
```

FAT3DBC *Analysis: DBC experiments in triple factorial*

Description

Analysis: DBC experiments in triple factorial

Usage

```
FAT3DBC(
  fator1,
  fator2,
  fator3,
  bloco,
  resposta,
  quali = c(TRUE, TRUE, TRUE),
  mcomp = "tukey",
  fac.names = c("F1", "F2", "F3"),
  interplot = F,
  transf = 1,
  norm = "sw",
  homog = "bt",
  indep = "dw",
  alpha.f = 0.05,
  alpha.t = 0.05,
  ylab = "Response",
  xlab = "",
  sup = NA,
  grau = NA,
  facet = F,
  fill = "lightblue",
  theme = theme_bw(),
  angulo = 0,
  errorbar = T,
  addmean = T,
  family = "sans",
  color = "rainbow",
  dec = 3,
  geom = "bar",
  title = "",
  gr = "identical",
  textsize = 12
)
```

Arguments

fator1	Vetor numerico ou complexo com os niveis do fator 1 (Declarar como fator)
fator2	Vetor numerico ou complexo com os niveis do fator 2 (Declarar como fator)
resposta	Vetor numerico com as respostas do experimento.
norm	error normality test (*default* is Shapiro-Wilk)

homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
ylab	Variable response name (Accepts the *expression*() function)

Author(s)

Gabriel Danilo Shimizu

Examples

```
library(AgroR)
data(enxofre)
attach(enxofre)
FAT3DBC(f1, f2, f3, bloco, resp)
```

FAT3DIC *Analysis: DIC experiments in triple factorial*

Description

Analysis: DIC experiments in triple factorial

Usage

```
FAT3DIC(
  fator1,
  fator2,
  fator3,
  resposta,
  quali = c(TRUE, TRUE, TRUE),
  mcomp = "tukey",
  fac.names = c("F1", "F2", "F3"),
  interplot = F,
  alpha.t = 0.05,
  alpha.f = 0.05,
  transf = 1,
  norm = "sw",
  homog = "bt",
  indep = "dw",
  ylab = "Response",
  xlab = "",
  sup = NA,
  grau = NA,
  facet = F,
  fill = "lightblue",
  theme = theme_bw(),
  angulo = 0,
  family = "sans",
```

```
  color = "rainbow",
  addmean = T,
  errorbar = T,
  dec = 3,
  geom = "bar",
  title = "",
  gr = "identical",
  textsize = 12
)
```

Arguments

fator1	Vetor numerico ou complexo com os niveis do fator 1 (Declarar como fator)
fator2	Vetor numerico ou complexo com os niveis do fator 2 (Declarar como fator)
resposta	Vetor numerico com as respostas do experimento.
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
alpha.f	Level of significance of the F test (*default* is 0.05)
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
ylab	Variable response name (Accepts the *expression*() function)

Author(s)

Gabriel Danilo Shimizu

Examples

```
library(AgroR)
data(enxofre)
attach(enxofre)
FAT3DIC(f1, f2, f3, resp)
```

---

laranja *dataset: Orange plants under different rootstocks*

Description

An experiment was conducted with the objective of studying the behavior of nine rootstocks for the Valencia orange tree. The data set refers to the 1973 evaluation (12 years old). The rootstocks are: T1: Tangerine Sunki; T2: National rough lemon; T3: Florida rough lemon; T4: Cleopatra tangerine; T5: Citranger-troyer; T6: Trifoliata; T7: Clove Tangerine; T8: Country orange; T9: Clove Lemon

Usage

```
data(laranja)
```

Format

data.frame containing data set

`f1` categorical vector with treatments

`bloco` categorical vector with block

`resp` Numeric vector

References

Exemplo do Livro Planejamento e Análise Estatística de Experimentos Agronômicos (2013) - Décio Barbin - pg. 72

See Also

cloro,enxofre,mirtilo,nitrogenio,pomegranate,porco,sensorial,simulate1,simulate2,simulate3,tomate,weather

Examples

```
data(laranja)
```

`line_plot` *graph: line chart*

Description

graph: line chart

Usage

```
line_plot(
  time,
  response,
  factor = NA,
  errorbar = "sd",
  ylab = "Response",
  xlab = "Time",
  legend.position = "right"
)
```

Arguments

`time`	vector containing the x-axis values
`response`	vector containing the y-axis values
`factor`	vector containing a categorical factor
`ylab`	y axis title
`xlab`	x axis title
`errobar`	error bars (sd or se)

Author(s)

Gabriel Danilo Shimizu

See Also

radargraph, sk_graph, plot_TH, correlation, spider_graph, graph

Examples

```
dose=c(0,0,0,2,2,2,4,4,4,6,6,6,8,8,8,10,10,10)
resp=seq(1,18,1)
time=c(dose,dose)
response=c(resp,resp+1)
factor=rep(c("A","B"),e=18)
line_plot(time,response,factor)
```

---

logistic_LL *Analysis: Logistic regression*

Description

Logistic models with three (LL.3()) or four (LL.4()) continuous data parameters

Usage

```
logistic_LL(
  trat,
  resp,
  npar = "LL.3()",
  ylab = "Response",
  xlab = "Independent",
  theme = theme_classic(),
  legend.position = c(0.3, 0.8)
)
```

Arguments

trat	Numerical or complex vector with treatments
resp	Numerical vector containing the response of the experiment.
npar	Number of model parameters
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
theme	ggplot2 theme (*default* is theme_bw())
legend.position	legend position (*default* is c(0.3,0.8))

Examples

```
resp=c(0,0.1,0.2,0.3,0.26,0.24,0.8,1,1.2,1.6,1.4,1.7,3,3.2,
       3.3,4.3,4.4,4.5,4.6,4.5,4.7,4.7,4.4,4.9,4.8,4.9,5)
trat=rep(c(1:9),e=3)
logistic_LL(trat,resp)
```

mirtilo *dataset: cutting blueberry*

Description

An experiment was carried out in order to evaluate the rooting (resp1) of blueberry cuttings as a function of the cutting size (Treatment Colume). This experiment was repeated three times (Location column) and a randomized block design with four replications was adopted.

Usage

```
data(mirtilo)
```

Format

data.frame containing data set

`trat` categorical vector with treatments

`exp` categorical vector with experiment

`bloco` categorical vector with block

`resp` Numeric vector

See Also

cloro,enxofre,laranja,nitrogenio,pomegranate,porco,sensorial,simulate1,simulate2,simulate3,tomate,weather

Examples

```
data(mirtilo)
attach(mirtilo)
```

multidata *Analysis of multiple variables in a command*

Description

Analysis of multiple variables in a command

Usage

```
multidata(
  data1,
  design = "DIC",
  ylab = NA,
  xlab = NA,
  quali = NA,
  test = NA,
  transf = NA,
  norm = "sw",
```

```
  homog = "bt",
  indep = "dw",
  mcomp = "tukey",
  alpha.f = 0.05,
  alpha.t = 0.05,
  grau = NA,
  p.adj = "none",
  geom = "bar",
  legend = "Legend",
  theme = theme_bw(),
  sup = NA,
  CV = TRUE,
  posi = "right",
  dec = 3,
  addmean = T,
  errorbar = T,
  fill = "lightblue",
  color = "rainbow",
  color1 = NA,
  angle = 0,
  textsize = 12,
  family = "sans"
)
```

Arguments

data1	data.frame containing numerical or complex vector with treatments and response of the experiment.
design	experimental design (DIC, DBC, DQL, FAT2DIC, FAT2DBC, PSUBDIC,PSUBDBC)
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
test	parametric or non-parametric testing
transf	Applies data transformation (*default* is 1; for log consider 0)
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
indep	error independence test (*default* is Durbin-Watson)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
p.adj	Method for adjusting p values ("none","holm","hommel", "hochberg", "bonferroni", "BH", "BY", "fdr")
geom	graph type (columns, boxes or segments)
theme	ggplot2 theme (*default* is theme_bw())
dec	number of cells
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
color	When the columns are different colors (Set fill-in argument as "trat")

angle	x-axis scale text rotation
textsize	font size
family	font family
saveplot	save the barplot (*default* is FALSE)
file	file name and extension to save (saveplot=T)
width	image width (saveplot=T)
height	image height (saveplot=T)
res	image resolution (saveplot=T)

Value

Function of the AgroR package for analysis of experiments conducted in a fully randomized, quantitative or qualitative balanced design. The function returns the table of analysis of variance, the assumptions of normality of errors, homogeneity of variances and independence of errors. When the treatment is qualitative, the user can define the multiple comparison test (Tukey, Scott-Knott or Duncan). Data transformation can also be performed by the package, the trans argument represents the lambda value that the user intends to use. Non-parametric Kruskal-Wallis test can also be used, defining the test = "noparametric" argument. Chart type can be defined by the geom = argument. Quantitative treatments can be defined by the quali = F argument, as well as the degree of the polynomial, by the "degree =" argument

Author(s)

Gabriel Danilo Shimizu

Examples

```
trat=rep(c(1,2,3,4,5),e=4)
dados=c(2,3,4,3.2,4,4.5,5,5.1,8,7,5,6.5,6,7,6.5,6.6,8,8,9.5,8.5)
data1=data.frame(trat,r1=dados,r2=dados,r3=dados,r4=dados)
multidata(data1, quali = c(F,F,F,F), grau = c(1,2,1,2))
trat=rep(c(1,2,3,4,5),e=4)
dados=c(seq(11:20),seq(20,11,-1))
bloco=as.factor(rep(c(paste("B",1:4)),5))
data1=data.frame(trat,bloco,r1=dados,r2=dados,r3=dados,r4=dados)
multidata(data1, design = "DBC")
```

---

nitrogenio *dataset: nitrogen*

Description

dataset: nitrogen

Usage

```
data(nitrogenio)
```

Format

data.frame containing a treatment column, a block column, a location column and two response columns

data.frame containing data set

`Experimento` categorical vector with experiment

`Fert` categorical vector with factor 1

`Gen` categorical vector with factor 2

`bloco` categorical vector with block

`resp` Numeric vector

See Also

cloro,enxofre,laranja,mirtilo,pomegranate,porco,sensorial,simulate1,simulate2,simulate3,tomate,weather

Examples

```
data(nitrogenio)
attach(nitrogenio)
```

`plot_interaction` *graph: Interaction plot*

Description

graph: Interaction plot

Usage

```
plot_interaction(a)
```

Arguments

a	FAT2DIC, FAT2DBC, PSUBDIC or PSUBDBC object

Examples

```
resposta=c(339,332,163,230,300,163,172,123,083,161,196,252,346,468,258,
335,235,217,174,222,284,136,225,098,110,482,438,492,453,446,
171,069,095,046,079,032,038,063,048,160)
fator1=rep(c("IN","NI"),e=20)
fator2=rep(c("Plantio","V1+15","V3+15","R1+15"),e=5,2)
a=FAT2DIC(fator1,fator2,resposta)
plot_interaction(a)
```

plot_TH *Graph: Climate chart of temperature and humidity*

Description

The plot_TH function allows the user to build a column/line graph with climatic parameters of temperature (maximum, minimum and average) and relative humidity (UR). This chart is widely used in scientific work in agrarian science

Usage

```
plot_TH(
  tempo,
  Tmed,
  Tmax,
  Tmin,
  UR,
  xlab = "Time",
  yname1 = expression("Humidity (%)"),
  yname2 = expression("Temperature ("^o * "C)"),
  colormax = "red",
  colormin = "blue",
  colormean = "darkgreen",
  fillbar = "gray80",
  limitsy1 = c(0, 100),
  x = "days",
  breaks = "1 months",
  textsize = 12,
  legendsize = 12,
  titlesize = 12,
  linesize = 1,
  date_format = "%m-%Y",
  sc = 2.5,
  legend.position = "bottom",
  theme = theme_bw()
)
```

Arguments

tempo	vector times
Tmed	vector with mean temperature
Tmax	vector with maximum temperature
Tmin	vector with minimum temperature
UR	humidity relative vector
xlab	x axis name
yname1	y axis name
yname2	secundary y-axis name
x	x scale type (days or data, default is "days")

breaks	range for x scale when x = "date" (default is 1 months)
textsize	axis text size
legendsize	legend text size
titlesize	axis title size
linesize	line size
date_format	date format for x="data"
sc	scale to y-axis secundary
legend.position	legend position
theme	ggplot2 theme

Author(s)

Gabriel Danilo Shimizu

See Also

radargraph, sk_graph, barplot_positive, correlation, spider_graph, graph, line_plot

Examples

```
library(AgroR)
data(weather)
attach(weather)
plot_TH(tempo, Tmed, Tmax, Tmin, UR)
```

---

polynomial *Analysis: Linear regression graph*

Description

Linear regression analysis of an experiment with a quantitative factor or isolated effect of a quantitative factor

Usage

```
polynomial(
  trat,
  resp,
  ylab = "Response",
  xlab = "independent",
  grau = NA,
  theme = theme_bw(),
  color = "gray",
  posi = "top",
  title = "",
  textsize = 12,
  se = FALSE,
  ylim = NA,
  family = "sans",
```

```
  pointsize = 3,
  decimal = "."
)
```

Arguments

ylab	Dependent variable name (Accepts the *expression*() function)
xlab	Independent variable name (Accepts the *expression*() function)
grau	degree of the polynomial (1,2 or 3)
color	graph color (*default* is rainbow)
se	adds confidence interval (*default* is FALSE)
resposta	Numerical vector containing the response of the experiment.
tratamento	Numerical vector with treatments (Declare as numeric)

Author(s)

Gabriel Danilo Shimizu

See Also

polynomial2

Examples

```
trat=c(0,0,0,2,2,2,4,4,4,6,6,6)+10
resp=c(12,14,15,23,24,25,50,54,56,80,90,40)
AgroR::polynomial(trat,resp, grau = 3)
```

---

polynomial2 *Analysis: Linear regression graph in double factorial*

Description

Linear regression analysis for significant interaction of an experiment with two factors, one quantitative and one qualitative

Usage

```
polynomial2(
  fator1,
  resp,
  fator2,
  color = NA,
  grau = NA,
  ylab = "Response",
  xlab = "independent",
  theme = theme_bw(),
  se = F,
  point = "mean_se",
  legend.title = "Tratamentos",
```

```
  posi = "top",
  decimal = ".",
  textsize = 12,
  ylim = NA,
  family = "sans"
)
```

Arguments

fator1	Numeric or complex vector with factor 1 levels
resp	Numerical vector containing the response of the experiment.
fator2	Numeric or complex vector with factor 2 levels
color	graph color (*default* is NA)
grau	degree of the polynomial (1,2 or 3)
ylab	Dependent variable name (Accepts the *expression*() function)
xlab	Independent variable name (Accepts the *expression*() function)
theme	ggplot2 theme (*default* is theme_bw())
se	adds confidence interval (*default* is FALSE)
legend.title	title legend
decimal	decimal separate
textsize	font size (*default* is 12)
family	font family (*default* is sans)

Author(s)

Gabriel Danilo Shimizu

See Also

polynomial

Examples

```
trat=c(0,0,0,2,2,2,4,4,4,6,6,6)
resp=c(8,7,5,23,24,25,30,34,36,80,90,80)
resp1=c(12,14,15,23,24,25,50,54,56,80,90,40)
resp2=c(12,14,15,3,4,5,50,54,56,80,90,40)
resp=c(resp,resp1,resp2)
fator1=rep(trat,3)
fator2=rep(c("A","B","C"),e=12)
bloco=rep(paste("B",1:3),12)
FAT2DIC(fator1,fator2,resp, quali=c(F,T), grau=c(1,2,3))
```

pomegranate *dataset: Pomegranate*

Description

An experiment was conducted with the objective of studying different products to reduce the loss of mass in postharvest of pomegranate fruits. The experiment was conducted in a completely randomized design with four replications. Treatments are: T1: External Wax; T2: External + Internal Wax; T3: External Orange Oil; T4: Internal + External Orange Oil; T5: External sodium hypochlorite; T6: Internal + External sodium hypochlorite

Usage

```
data(pomegranate)
```

Format

data.frame containing a qualitative treatment column (trat) and a response column.

See Also

cloro,enxofre,laranja,mirtilo,nitrogenio,porco,sensorial,simulate1,simulate2,simulate3,tomate,weather

Examples

```
data(pomegranate)
```

porco *dataset: Pig development and production*

Description

An experiment whose objective was to study the effect of castration age on the development and production of pigs, evaluating the weight of the piglets. Four treatments were studied: A - castration at 56 days of age; B - castration at 7 days of age; C - castration at 36 days of age; D - whole (not castrated); E - castration at 21 days of age. The Latin square design was used in order to control the variation between litters (lines) and the variation in the initial weight of the piglets (columns), with the experimental portion consisting of a piglet.

Usage

```
data(porco)
```

Format

data.frame containing data set

`trat` categorical vector with treatments

`linhas` categorical vector with lines

`colunas` categorical vector with columns

`resp` Numeric vector

See Also

cloro,enxofre,laranja,mirtilo,nitrogenio,pomegranate,sensorial,simulate1,simulate2,simulate3,tomate,weather

Examples

```
data(porco)
```

PSUBDBC *Analysis: DBC experiments in split-plot*

Description

Analysis: DBC experiments in split-plot

Usage

```
PSUBDBC(
  fator1,
  fator2,
  bloco,
  resposta,
  norm = "sw",
  homog = "bt",
  alpha.f = 0.05,
  alpha.t = 0.05,
  mcomp = "tukey",
  quali = c(T, T),
  grau = NA,
  transf = 1,
  geom = "bar",
  theme = theme_bw(),
  outdec = ".",
  ylab = "Response",
  xlab = "",
  title = "",
  color = "rainbow",
  color1 = NA,
  textsize = 12,
  dec = 3,
  legend = "Legend",
  errorbar = T,
  addmean = T,
  ylim = NA,
  point = "mean_se",
  fill = "lightblue",
  angle = 0,
  family = "sans",
  posi = "right",
  decimal = "."
)
```

Arguments

fator1	Numeric or complex vector with plot levels
fator2	Numeric or complex vector with subplot levels
bloco	Numeric or complex vector with blocks
resposta	Numeric vector with responses
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
quali	Defines whether the factor is quantitative or qualitative (*qualitative*)
grau	Degree of polynomial in case of quantitative factor (*default* is 1)
transf	Applies data transformation (default is 1; for log consider 0)
geom	graph type (columns, boxes or segments)
theme	ggplot2 theme (*default* is theme_bw())
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
color	When the columns are different colors (Set fill-in argument as "trat")
color1	color of groups for regression
textsize	font size (*default* is 12)
dec	number of cells (*default* is 3)
legend	legend title name
errorbar	Plot the standard deviation bar on the graph (In the case of a segment and column graph) - *default* is TRUE
addmean	Plot the average value on the graph (*default* is TRUE)
ylim	y-axis limit
point	point type for regression ("mean_se","mean_sd","mean" or "all")
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
angle	x-axis scale text rotation
family	font family (*default* is sans)
posi	legend position
decimal	decimal point separation

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

Examples

```
library(AgroR)
data(tomate)
attach(tomate)
PSUBDBC(parc, subp, bloco, resp)
```

PSUBDIC *Analysis: DIC experiments in split-plot*

Description

Analysis: DIC experiments in split-plot

Usage

```
PSUBDIC(
  fator1,
  fator2,
  bloco,
  resposta,
  norm = "sw",
  homog = "bt",
  mcomp = "tukey",
  alpha.f = 0.05,
  alpha.t = 0.05,
  quali = c(T, T),
  transf = 1,
  grau = NA,
  geom = "bar",
  theme = theme_bw(),
  outdec = ".",
  ylab = "Response",
  xlab = "",
  fill = "lightblue",
  angle = 0,
  family = "sans",
  color = "rainbow",
  color1 = NA,
  legend = "Legend",
  errorbar = T,
  addmean = T,
  textsize = 12,
  dec = 3,
  ylim = NA,
  posi = "right",
  decimal = ".",
  point = "mean_se"
)
```

Arguments

fator1	Numeric or complex vector with plot levels
fator2	Numeric or complex vector with subplot levels
bloco	Numeric or complex vector with blocks
resposta	Numeric vector with responses
norm	error normality test (*default* is Shapiro-Wilk)
homog	homogeneity test of variances (*default* is Bartlett)
mcomp	Multiple comparison test (Tukey (*default*), Scott-Knott and Duncan)
alpha.f	Level of significance of the F test (*default* is 0.05)
alpha.t	Level of significance of the Tukey test (*default* is 0.05)
quali	Defines whether the factor is quantitative or qualitative (*qualitative*)
transf	Applies data transformation (default is 1; for log consider 0)
grau	Degree of polynomial in case of quantitative factor (*default* is 1)
geom	graph type (columns, boxes or segments)
theme	ggplot2 theme (*default* is theme_bw())
ylab	Variable response name (Accepts the *expression*() function)
xlab	treatments name (Accepts the *expression*() function)
fill	Defines chart color (to generate different colors for different treatments, define fill = "trat")
angle	x-axis scale text rotation
family	font family (*default* is sans)
color	When the columns are different colors (Set fill-in argument as "trat")
color1	color of groups for regression
legend	legend title name
errorbar	Plot the standard deviation bar on the graph (In the case of a segment and column graph) - *default* is TRUE
addmean	Plot the average value on the graph (*default* is TRUE)
textsize	font size (*default* is 12)
dec	number of cells (*default* is 3)
ylim	y-axis limit
posi	legend position
decimal	decimal point separation
point	point type for regression ("mean_se","mean_sd","mean" or "all")

Note

The ordering of the graph is according to the sequence in which the factor levels are arranged in the data sheet

Author(s)

Gabriel Danilo Shimizu

Examples

```
library(AgroR)
data(tomate)
attach(tomate)
PSUBDIC(parc, subp, bloco, resp)
```

PSUBSUBDBC *Analysis: DBC experiments in split-split-plot*

Description

Analysis: DBC experiments in split-split-plot

Usage

```
PSUBSUBDBC(fator1, fator2, fator3, bloco, resposta)
```

Arguments

fator1	Vetor numerico ou complexo com os niveis da parcela (Declarar como fator)
fator2	Vetor numerico ou complexo com os niveis da subparcela (Declarar como fator)
fator3	Vetor numerico ou complexo com os niveis da subsubparcela (Declarar como fator)
bloco	Vetor numerico ou complexo com os blocos (Declarar como fator)
resposta	Vetor numerico com as respostas do experimento.

Author(s)

Gabriel Danilo Shimizu

Examples

```
Falta exemplo
```

PSUBSUBDIC *Analysis: DIC experiments in split-split-plot*

Description

Analysis: DIC experiments in split-split-plot

Usage

```
PSUBSUBDIC(fator1, fator2, fator3, bloco, resposta)
```

Arguments

fator1	Vetor numerico ou complexo com os niveis da parcela (Declarar como fator)
fator2	Vetor numerico ou complexo com os niveis da subparcela (Declarar como fator)
fator3	Vetor numerico ou complexo com os niveis da subsubparcela (Declarar como fator)
bloco	Vetor numerico ou complexo com os blocos (Declarar como fator)
resposta	Vetor numerico com as respostas do experimento.

Author(s)

Gabriel Danilo Shimizu

Examples

```
Falta exemplo
```

---

question *utils: Question*

Description

Choosing the function based on the description of the experiment

Usage

```
question()
```

Details

This function allows the user to identify the analyzes that are or are not implemented in the package, according to the response provided by the user.

Value

Returns the possible command to perform the analysis

Author(s)

Gabriel Danilo Shimizu

Examples

```
library(AgroR)
question()
```

radargraph *graph: Circular column chart*

Description

Circular column chart of an experiment with a factor of interest or isolated effect of a factor

Usage

```
radargraph(a)
```

Arguments

model	DIC, DBC or DQL object

See Also

barplot_positive, sk_graph, plot_TH, correlation, spider_graph, graph, line_plot

Examples

```
trat=rep(c(1,2,"T3",4,5),e=4)
dados=c(2,3,4,3.2,4,4.5,5,5.1,8,7,5,7.5,6,7,6.5,6.6,8,8,9.5,8.5)
a=DIC(trat,dados, mcomp = "sk")
radargraph(a)
```

sensorial *dataset: sensorial*

Description

set of data from a sensory analysis with six participants in which different combinations (blend) of the grape cultivar bordo and niagara were evaluated. Color (CR), aroma (AR), flavor (SB), body (CP) and global (GB) were evaluated. The data.frame presents the averages of the evaluators.

Usage

```
data(sensorial)
```

Format

data.frame containing data set

`Blend` categorical vector with treatment

`variable` categorical vector with variables

`resp` Numeric vector

See Also

cloro, enxofre, laranja, mirtilo, nitrogenio, pomegranate, porco, simulate1, simulate2, simulate3, tomate, weather

Examples

```
data(sensorial)
attach(sensorial)
```

---

simulate1 *dataset: Simulated data dict*

Description

dataset: Simulated data dict

Usage

```
data(simulate1)
```

Format

data.frame containing a treatment column, a block column, a location column and two response columns

See Also

cloro,enxofre,laranja,mirtilo,nitrogenio,pomegranate,porco,sensorial,simulate2,simulate3,tomate,weather

Examples

```
data(simulate1)
attach(simulate1)
```

---

simulate2 *dataset: simulated data dbct*

Description

dataset: simulated data dbct

Usage

```
data(simulate2)
```

Format

data.frame containing a treatment column, a block column, a location column and two response columns

See Also

cloro,enxofre,laranja,mirtilo,nitrogenio,pomegranate,porco,sensorial,simulate1,simulate3,tomate,weather

Examples

```
data(simulate2)
attach(simulate2)
```

simulate3 *dataset: simulated data dqlt*

Description

dataset: simulated data dqlt

Usage

```
data(simulate3)
```

Format

data.frame containing a treatment column, a block column, a location column and two response columns

See Also

cloro, enxofre, laranja, mirtilo, nitrogenio, pomegranate, porco, sensorial, simulate1, simulate2, tomate, weather

Examples

```
data(simulate3)
attach(simulate3)
```

sk_graph *Graph: Scott-Knott graphics*

Description

This is a function of the bar graph for the Scott-Knott test

Usage

```
sk_graph(model, dec = 3, transf = F)
```

Arguments

model	DIC, DBC or DQL object

Author(s)

Gabriel Danilo Shimizu

See Also

radargraph, barplot_positive, plot_TH, correlation, spider_graph, graph, line_plot

Examples

```
trat=rep(c(1,2,"T3",4,5),e=4)
dados=c(2,3,4,3.2,4,4.5,5,5.1,8,7,5,7.5,6,7,6.5,6.6,8,8,9.5,8.5)
a=DIC(trat,dados, mcomp = "sk")
sk_graph(a)
```

`spider_graph` *Graph: Spider graph for sensorial analysis*

Description

Spider chart or radar chart. Usually used for graphical representation of acceptability in sensory tests

Usage

```
spider_graph(
  resp,
  vari,
  blend,
  legend.title = "",
  xlab = "",
  ylab = "",
  ymin = 0
)
```

Arguments

`resp`	vector containing notes
`vari`	vector containing the variables
`blend`	vector containing treatments
`legend.title`	caption title
`xlab`	x axis title
`ylab`	y axis title
`ymin`	minimum value of y

Author(s)

Gabriel Danilo Shimizu

See Also

radargraph, sk_graph, plot_TH, correlation, barplot_positive, graph, line_plot

Examples

```
library(AgroR)
data(sensorial)
attach(sensorial)
spider_graph(resp, variable, Blend)
```

tabledesc *descritive: Table descritive analysis*

Description

Function for generating a data.frame with averages or other descriptive measures grouped by a categorical variable

Usage

```
tabledesc(data, fun = mean)
```

Arguments

data	data.frame containing the first column with the categorical variable and the remaining response columns
fun	function of descriptive statistics (default is mean)

Author(s)

Gabriel Danilo Shimizu

Examples

```
dados=data.frame(trat=rep(paste("T",1:20),e=5),
                 x1=rnorm(100,10,1),
                 x2=rnorm(100,10,1),
                 x3=rnorm(100,10,1),
                 x4=rnorm(100,10,1))
tabledesc(dados)
```

test_two *Analysis: Test for two samples*

Description

Test for two samples (paired and unpaired t test, paired and unpaired Wilcoxon test)

Usage

```
test_two(
  trat,
  resp,
  paired = FALSE,
  test = "t",
  alternative = c("two.sided", "less", "greater"),
  conf.level = 0.95,
  var.equal = FALSE
)
```

Arguments

trat	categorical vector with the two treatments
resp	numeric vector with the response
paired	a logical indicating whether you want a paired t-test.
test	test used (t for test t or w for Wilcoxon test)
alternative	a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less". You can specify just the initial letter.
conf.level	confidence level of the interval.
var.equal	a logical variable indicating whether to treat the two variances as being equal. If TRUE then the pooled variance is used to estimate the variance otherwise the Welch (or Satterthwaite) approximation to the degrees of freedom is used.

Details

alternative = "greater" is the alternative that x has a larger mean than y. For the one-sample case: that the mean is positive.

If paired is TRUE then both x and y must be specified and they must be the same length. Missing values are silently removed (in pairs if paired is TRUE). If var.equal is TRUE then the pooled estimate of the variance is used. By default, if var.equal is FALSE then the variance is estimated separately for both groups and the Welch modification to the degrees of freedom is used.

If the input data are effectively constant (compared to the larger of the two means) an error is generated.

Examples

```
resp=rnorm(100,100,5)
trat=rep(c("A","B"),e=50)
test_two(trat,resp)
test_two(trat,resp,paired = T)
```

---

tomate *dataset: tomate dataset*

Description

An experiment conducted in a randomized block design in a split plot scheme was developed in order to evaluate the efficiency of bacterial isolates in the development of tomato cultivars. The experiment counted a total of 24 trays; each block (in a total of four blocks), composed of 6 trays, in which each tray contained a treatment (6 isolates). Each tray was seeded with 4 different genotypes, each genotype occupying 28 cells per tray. The trays were randomized inside each block and the genotypes were randomized inside each tray.

Usage

```
data(tomate)
```

Format

data.frame containing data set

`parc` categorical vector with plot

`subp` categorical vector with split-plot

`bloco` categorical vector with block

`resp` Numeric vector

See Also

cloro, enxofre, laranja, mirtilo, nitrogenio, pomegranate, porco, sensorial, simulate1, simulate2, simulate3, weather

Examples

```
data(tomate)
attach(tomate)
```

---

transf *utils: Data transformation (Box-Cox, 1964)*

Description

utils: Data transformation (Box-Cox, 1964)

Usage

```
transf(
  response,
  fator1,
  fator2 = NA,
  fator3 = NA,
  bloco = NA,
  linha = NA,
  coluna = NA
)
```

Arguments

`response`	Numerical vector containing the response of the experiment.
`fator1`	numeric or complex vector with factor 1 levels
`fator2`	numeric or complex vector with factor 2 levels
`fator3`	numeric or complex vector with factor 3 levels
`bloco`	Numerical or complex vector with blocks
`linha`	Numerical or complex vector with lines
`coluna`	Numerical or complex vector with columns

Author(s)

Gabriel Danilo Shimizu

Examples

```
data(data1)
attach(data1)
transf(dados,trat)
```

`weather` *dataset: weather chart*

Description

dataset: weather chart

Usage

```
data(weather)
```

Format

data.frame containing a treatment column, a block column, a location column and two response columns

See Also

cloro, enxofre, laranja, mirtilo, nitrogenio, pomegranate, porco, sensorial, simulate1, simulate2, simulate3, tomate

Examples

```
data(weather)
attach(weather)
```

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