Package 'GlobalDeviance'

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Title Global Deviance Permutation Tests

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Depends snowfall

Description permutation based global test with deviance as test statistic

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GlobalDeviance

Description

Global Deviance Permutation Tests

Details

Package:	GlobalDeviance
Title:	Title: Global Deviance Permutation Tests
Version:	0.4
Date:	2013-09-20
Author:	Frederike Fuhlbrueck
Maintainer:	Frederike Fuhlbrueck <f.fuhlbrueck@googlemail.com>
Depends:	snowfall
Description:	permutation based global test with deviance as test statistic

Author(s)

Frederike Fuhlbrueck <f.fuhlbrueck@googlemail.com>

See Also

See expr.dev.test.

Combining_Functions   *Combining Functions*

Description

Combining Functions

Usage

```
fisher(p)

liptak(p)

tippett(p)

lancaster(p, r, s)
```

Arguments

p	Vector with p-values.
r	rate parameter forgamma distribution.
s	Scale parameter for gamma distribution.

Value

A vector p-values.

Author(s)

Frederike Fuhlbrueck <f.fuhlbrueck@googlemail.com>

See Also

See `expr.dev.test`.

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expr.dev.test	*Deviance Test*

Description

Deviance permuation test.

Usage

```
expr.dev.test(xx, formula.full, formula.red = NULL, D.red = NULL, model.dat,
test.vars, glm.family, perm = 100, method = c("chisqstat", "permutation"),
cf="fisher", adjust=FALSE, snowfall.args=list(parallel=FALSE),
snowfall.seed, save.stat.data = FALSE,
file.save = "GlobalDeviance_statistic_Tperm_and_Tobs.Rdata",
use.save.stat.data = FALSE,
file.use = "GlobalDeviance_statistic_Tperm_and_Tobs.Rdata")
```

Arguments

xx	Dataset (variables x observations/patients).
formula.full	Formula from the full model.
formula.red	Formula from the reduced model.
D.red	Designmatrix of the reduced model.
model.dat	Dataset with covariables (observations/patients x covariables).
test.vars	Variables or groups of variables to test.
glm.family	Family for the regression.
perm	Number of permutations.

`method`	Method for the calculation of the p-value.
`cf`	Combining function for the partial tests.
`adjust`	Method for p-value adjustment. Not implemented.
`snowfall.args`	A list with parameters for the initialisation of parallelizing with package `snowfall`.
`snowfall.seed`	Start seed.
`save.stat.data`	Logical value, default is `FALSE`. Save the permutation and original test statistic.
`file.save`	File name for saving.
`use.save.stat.data`	
	Logical value, default is `FALSE`. Use the saved permutation and original test statistic.
`file.use`	File name for data loading.

Value

A list

`method`	Method for the calculation of the p-value.
`number.of.variables`	
	Number of variables.
`number.of.permutations`	
	Number of permutations.
`formula.full`	Formula from the full model.
`formula.red`	Formula from the reduced model.
`test`	Test results.
`data.perm`	Permutation test statistic.
`data.original`	Original test statistic.
`test.vars`	Variables or groups of variables to test.

Author(s)

Frederike Fuhlbrueck <f.fuhlbrueck@googlemail.com>

See Also

See [PermTest](), [varwiselogLik]() and [Rossi]().

Examples

```
## Not run:
### Example 1: poisson random data
set.seed(6666)
n<-100
Y1<-c(rpois(n, 1))
Y2<-c(rpois(n/2, 1), rpois(n/2, 10))
A<-rnorm(n)
B<-c(rep(1, n/2), rep(0, n/2))      # group variable
```

```
C<-rpois(n, 1)

test.variables<-list("Y1", "Y2", c("Y1", "Y2"))
names(test.variables)<-c("Y1", "Y2", "Y1, Y2")

t.random<-expr.dev.test(xx=t(data.frame(Y1, Y2)), formula.full=~ A + B + C,
formula.red=~ A + C, model.dat=data.frame(A, B, C), test.vars=test.variables,
glm.family=poisson(link="log"), perm=1000, method="permutation", cf="fisher",
snowfall.args=list(parallel=TRUE), snowfall.seed=54321)

summary(t.random, digits=3)



### Example 2:  data set Rossi
data(Rossi)

# Covariables (patients x covariables)
model.dat<-Rossi[, c("arrest", "fin", "wexp")]
str(model.dat)

# data (variables/genes x patients)
xx<-rbind(t(t(t(Rossi[, c("prio", "n.work.weeks")]))), rpois(432, 1))
rownames(xx)<-c("prio", "n.work.weeks", "random")

formula.full<- ~ arrest + fin + wexp
formula.red<- ~ arrest + fin

test.vars<-list("prio", "n.work.weeks", "random", c("prio", "n.work.weeks"),
c("prio", "n.work.weeks", "random"))
names(test.vars)<-c("prio", "n.work.weeks", "random", "prio+n.work.weeks",
"prio+n.work.weeks+random")

set.seed(54321)

t.rossi1<-expr.dev.test(xx=xx, formula.full=formula.full, formula.red=formula.red,
D.red=NULL, model.dat, test.vars=test.vars, glm.family=poisson(link="log"),
perm=100, method="permutation", cf="fisher")

t.rossi2<-expr.dev.test(xx=xx, formula.full=formula.full, formula.red=formula.red,
D.red=NULL, model.dat, test.vars=test.vars, glm.family=poisson(link="log"),
perm=100, method="chisqstat", cf="fisher")

summary(t.rossi1, digits=2)

summary(t.rossi2, digits=3)


## End(Not run)
```

Functions_for_Permutation
                    Helper Functions for Permutation

Description

The functions adapted from packages `globaltest` and `GlobalAncova`.

Usage

```
.mchoose(counts)

.nPermsG(counts, grouping)

.nPerms(D.full, model.dat, formula.full)

.allpermsG(counts, grouping)

.allperms(nums)
```

Arguments

counts	Counts.
grouping	Indices for the group.
D.full	Designmatrix from the full model.
model.dat	Dataset with covariables.
formula.full	Formula from the full model.
nums	Indices to be permuted.

Details

The function `.mchoose` calculates the number of permutations.

The function `.nPermsG` calculates the number of permutations for multiple groups.

The function `.nPerms` calculates the number of permutations from the designmatrix.

The function `.allpermsG` lists all permutations for the multiple-group case.

The function `.allperms` lists all permutations for the continuos case.

Value

.mchoose	A number.
.nPermsG	A number.
.nPerms	Number of permutations (nPerms) and a vector which counts same rows of the designmatrix (counts).

`.allpermsG`	A matrix.
`.allperms`	A matrix (nums x nums!).

Author(s)

Frederike Fuhlbrueck <f.fuhlbrueck@googlemail.com>

Examples

```
## Not run:
### Examples
# Number of permutations
.mchoose(1:3)                   # or choose(sum(1:3), 1) * choose(sum(2:3), 2)

# Number of permutations for multiple groups
.nPermsG(1:3, c(1, 1, 2))

# Number of permutations from the designmatrix
D.full<-t(matrix(c(1:9, 1:3), 3, 4))
model.dat<-matrix(c(1,0,0,1,0,1,0,0), 4, 2)
colnames(model.dat)<-c("A", "B")
formula.full<-~A+B
.nPerms(D.full, model.dat, formula.full)

# All permutations for the multiple-group case
.allpermsG(c(2, 1, 2), c(1, 1, 2))

# All permutations for the continuos case
.allperms(1:3)

## End(Not run)
```

PermTest	*Permutation Test*

Description

The function performs a permuatation test with Deviance as test statistic.

Usage

```
PermTest(xx, formula.full, D.full, D.red, model.dat, glm.family, perm,
test.vars, cf, adjust, snowfall.args, snowfall.seed,
save.stat.data, file.save, use.save.stat.data, file.use)
```

Arguments

xx	Dataset (variables x patients).
formula.full	Formula from the full model.
D.full	Designmatrix of the full model.
D.red	Designmatrix of the reduced model.
model.dat	Dataset with covariables.
glm.family	Family for the regression.
perm	Number of permutations.
test.vars	Variables or groups of variables to test.
cf	Combining function for the partial tests.
adjust	Method for p-value adjustment.
snowfall.args	A list with parameters for the initialisation of parallelizing with package snowfall.
snowfall.seed	Start seed.
save.stat.data	Logical value, default is FALSE. Save the permutation and original test statistic.
file.save	File name for saving.
use.save.stat.data	
	Logical value, default is FALSE. Use the saved permutation and original test statistic.
file.use	File name for data loading.

Value

A list with

statistic	Original test data combined with cf.
df	Degree of freedom for each variable or group of test.vars.
p.value	Permutation p-value for each variable or group of test.vars.
data.perm	Permutation test data.
data.original	Original test data.

Author(s)

Frederike Fuhlbrueck <f.fuhlbrueck@googlemail.com>

See Also

See [ResamplelogLik](), [varwiselogLik]() and [expr.dev.test]().

ResamplelogLik   *log-Likelihood values of Permutations*

Description

log-Likelihood values from all permutations.

Usage

```
ResamplelogLik(xx, D.full, glm.family, nperm.used, covars, use.permMat, permMat,
snowfall.args, snowfall.seed)
```

Arguments

xx	Dataset (genes x patients).
D.full	Designmatrix.
glm.family	Family for the regression.
nperm.used	Number of permutations for the test.
covars	Columns for the test.
use.permMat	Use permutation matrix TRUE/FALSE.
permMat	Permutation matrix.
snowfall.args	A list with parameters for the initialisation of parallelizing with package snowfall.
snowfall.seed	Start seed.

Value

A list with log-Likelohood values for each permutated designmatrix.

Author(s)

Frederike Fuhlbrueck <f.fuhlbrueck@googlemail.com>

See Also

See Functions_for_Permutation.

Rossi	*Dataset* Rossi

Description

Dataset to test the package.

Usage

```
data(Rossi)
```

Format

A data frame with 432 observations on the following 63 variables.

week A numeric vector. Response (week of arrest after release)

arrest A numeric vector. Censoring indicator (1 = case, Study time: one year)

fin A numeric vector. Indicator for financial support.

age A numeric vector. Age in years.

race A numeric vector. Race (1=black, 0=white).

wexp A numeric vector. Indicator for work experience prior to arrest.

mar A numeric vector. Indicator for married person.

paro A numeric vector. Indicator for parolee.

prio A numeric vector. Number of previous convictions.

educ A numeric vector. Lebel of education (Scala 2-6 increasing)

emp1 52 numeric vectors. 0 = no work, 1 = work

emp2 A numeric vector.

emp3 A numeric vector.

emp4 A numeric vector.

emp5 A numeric vector.

emp6 A numeric vector.

emp7 A numeric vector.

emp8 A numeric vector.

emp9 A numeric vector.

emp10 A numeric vector.

emp11 A numeric vector.

emp12 A numeric vector.

emp13 A numeric vector.

emp14 A numeric vector.

emp15 A numeric vector.

emp16 A numeric vector.

emp17 A numeric vector.

emp18 A numeric vector.

emp19 A numeric vector.

emp20 A numeric vector.

emp21 A numeric vector.

emp22 A numeric vector.

emp23 A numeric vector.

emp24 A numeric vector.

emp25 A numeric vector.

emp26 A numeric vector.

emp27 A numeric vector.

emp28 A numeric vector.

emp29 A numeric vector.

emp30 A numeric vector.

emp31 A numeric vector.

emp32 A numeric vector.

emp33 A numeric vector.

emp34 A numeric vector.

emp35 A numeric vector.

emp36 A numeric vector.

emp37 A numeric vector.

emp38 A numeric vector.

emp39 A numeric vector.

emp40 A numeric vector.

emp41 A numeric vector.

emp42 A numeric vector.

emp43 A numeric vector.

emp44 A numeric vector.

emp45 A numeric vector.

emp46 A numeric vector.

emp47 A numeric vector.

emp48 A numeric vector.

emp49 A numeric vector.

emp50 A numeric vector.

emp51 A numeric vector.

emp52 A numeric vector.

n.work.weeks A numeric vector. Number of weeks with work.

References

Fox, John. An R and S-PLUS Companion to Applied Regression, Sage Publications, 2002.
<http://cran.r-project.org/doc/contrib/Fox-Companion/scripts.html>

Rossi, P., R. Berk, and K. Lenihan (1980). Money, work, and crime: experimental evidence. Quantitative studies in social relations. Academic Press.

Examples

```
## Not run:
### prepares the dataset 'Rossi' for the package 'GlobalDeviance'
setwd(...)

Rossi<-read.table("Rossi.txt", header=TRUE)

Rossi$n.work.weeks<-rowSums(Rossi[, grepl("emp[0-90-9]", names(Rossi))], na.rm=TRUE)

save(Rossi, file="Rossi.rda")



### load dataset 'Rossi'
data(Rossi)

str(Rossi)

names(Rossi)

# Covariables (patients x covariables)
model.dat<-Rossi[, c("arrest", "fin", "wexp")]
str(model.dat)

# data (variables/genes x patients)
xx<-rbind(t(t(t(Rossi[, c("prio", "n.work.weeks")])))), rpois(432, 1))
rownames(xx)<-c("prio", "n.work.weeks", "random")

formula.full<- ~ arrest + fin + wexp
formula.red<- ~ arrest + fin

test.vars<-list("prio", "n.work.weeks", "random", c("prio", "n.work.weeks"),
c("prio", "n.work.weeks", "random"))
names(test.vars)<-c("prio", "n.work.weeks", "random", "prio+n.work.weeks",
"prio+n.work.weeks+random")

set.seed(54321)

t.rossi1<-expr.dev.test(xx=xx, formula.full=formula.full, formula.red=formula.red,
model.dat=model.dat, test.vars=test.vars, glm.family=poisson(link="log"),
perm=100, method="permutation", cf="fisher")

t.rossi2<-expr.dev.test(xx=xx, formula.full=formula.full, formula.red=formula.red,
 model.dat=model.dat, test.vars=test.vars, glm.family=poisson(link="log"),
```

```
perm=100, method="chisqstat", cf="fisher")

summary(t.rossi1, digits=2)

summary(t.rossi2, digits=3)

## End(Not run)
```

---

summary.dev.test   *Summary function*

Description

Summary function

Usage

```
## S3 method for class 'dev.test'
summary(object, ...)
```

Arguments

object	Object of class dev.test
...	digits or something else.

Value

A text output.

Note

Type I Error is per default 0.05.

Author(s)

Frederike Fuhlbrueck <f.fuhlbrueck@googlemail.com>

See Also

See `expr.dev.test`.

---

varwiselogLik *Variablewise max. log-Likelihood*

Description

Variablewise max. log-Likelihood values for a model.

Usage

```
varwiselogLik(xx, D, glm.family)

varwiselogLik.regression(xx, D, glm.family)
```

Arguments

xx	Dataset (variables x observations/patients).
D	Designmatrix.
glm.family	Family for the regression.

Value

Tables with log-Likelihood values for each variable of xx.

varwiselogLik	A table with column deviance.
varwiselogLik.regression	
	A list with model fits.

Author(s)

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