Package ‘statr’

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Type Package

Title Matt Galloway Personal R Package

Version 0.1.0

Description This is a personal R package. It contains a number of various R functions for organization and convenience purposes.

URL https://github.com/MGallow/statr

BugReports https://github.com/MGallow/statr/issues

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ByteCompile TRUE

NeedsCompilation yes

Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

Depends Rcpp (>= 0.12.10),
RcppArmadillo,
dplyr,
MASS,
alr4,
formatR,
devtools,
glasso,
magrittr

LinkingTo Rcpp,
RcppArmadillo,
RcppParallel

Suggests testthat

SystemRequirements GNU make

R topics documented:

bsearch *Bisection search*

Description

Minimizes a univariate strictly pseudoconvex function over the interval [a, b]. This is augmented code from Adam Rothman's STAT 8054 course (2017).

Usage

```
bsearch(dg, a, b, L = 1e-07, quiet = FALSE)
```

Arguments

`dg`	the derivative of the function to minimize, where dg(u, ...) is the function evaluated at u.
`a`	left endpoint of the initial interval of uncertainty.
`b`	right endpoint of the initial interval of uncertainty.
`L`	the maximum length of the final interval of uncertainty.
`quiet`	should the function stay quiet?
`...`	additional argument specifications for dg

Value

returns the midpoint of the final interval of uncertainty.

Examples

```
bsearch(dg, -10, 10, quiet = T)
```

data_gen *Normal Linear Data Generator*

Description

True beta values are generated from p independent draws from N(0, 1/p) distribution. X_-1 are n independent draws from (p - 1) multivariate normal N(0, Sigma) where Sigma has (j, k) entry theta^abs(j - k).

Y is then generated using the X = (1, X_-1) and true beta values with an iid error term that follows distribution N(0, var). We can specify the desired number of replications (reps).

Usage

```
data_gen(n, p, theta, var = 0.5, reps = 200)
```

Arguments

n	desired sample size
p	desired dimension
theta	parameter used to generate covariance matrix
var	variance of generated y values
reps	number of replications

Value

generated design matrix (X), response values (Y)(matrix if reps > 1), true beta values

Examples

```
data_gen(1000, 10, 0.5)
```

dense *Generate dense matrices*

Description

Generate p-dimensional matrices so that its inverse is dense.

Usage

```
dense(p = 8, base = 0.9, n = 100, X = FALSE)
```

Arguments

p	desired dimension
base	base multiplier

Examples

```
dense(p = 10, base = 0.9)
```

`derivative` *Derivative*

Description

Takes the approximate derivative for a given function

Usage

```
derivative(g, x, delta = 1e-07)
```

Arguments

`g`	the derivative of the function to minimize, where dg(u, ...) is the function evaluated at u.
`x`	value to evaluate the derivative at
`delta`	defaults to 10e-8

Examples

```
g = function(x){x^2}
derivative(x, g)
```

`diagnostic` *Diagnostic*

Description

This function simply streamlines the process of creating diagnostic plots with ggplot

Usage

```
diagnostic(data., x., y.)
```

Arguments

`data.`	data frame
`x.`	x-axis
`y.`	y-axis

Value

a residual plot and QQ plot

Examples

```
diagnostic(iris, Sepal.Length, Sepal.Width)
```

`dsearch` *Dichotomous search*

Description

Minimizes a univariate strictly quasiconvex function over the interval [a, b]. This is augmented code from Adam Rothman's STAT 8054 course (2017).

Usage

```
dsearch(g, a, b, L = 1e-07, eps = (L/2.1), quiet = FALSE)
```

Arguments

`g`	the function to minimize, where g(u, ...) is the function evaluated at u.
`a`	left endpoint of the initial interval of uncertainty.
`b`	right endpoint of the initial interval of uncertainty.
`L`	the maximum length of the final interval of uncertainty.
`eps`	search parameter, must be less than L/2
`quiet`	should the function stay quiet?
`...`	additional argument specifications for g

Value

returns the midpoint of the final interval of uncertainty.

Examples

```
dsearch(g, -10, 10, quiet = T)
```

`LDA` *Linear Discriminant Analysis*

Description

this function fit the LDA model

Usage

```
LDA(X, y, method = c("MLE", "diagonal", "ridge"), lam = NULL)
```

Arguments

`X`	n x p matrix where the ith row is the values of the predictor for the ith case
`y`	n entry response vector where the ith entry is the response category in 1, ..., C for the ith case

Value

returns a list with the parameter estimates

Examples

```
LDA(X, y, method = 'ridge', lam = seq(0.1, 2, 0.1))
```

multiplot *Multiple Plot*

Description

Taken from: http://www.cookbook-r.com/Graphs/Multiple_graphs_on_one_page_(ggplot2)/

Usage

```
multiplot(..., plotlist = NULL, file, cols = 1, layout = NULL)
```

Arguments

`...`	object can be passed in
`cols`	number of columns in layout
`layout`	a matrix specify the layout. If present, 'cols' is ignored

Value

plots

Examples

```
multiplot(p1, p2, cols = 1)
```

predict_QDA *Predict QDA*

Description

this function classifies test data using a fitted QDA model

Usage

```
predict_QDA(fit, Xtest)
```

Arguments

`fit`	this is a list with elements pi.hats, mu.hats, and Sigma.hats where pi.hats is a list of C response category sample proportions, mu.hats is a list of C p-dimensional sample mean proportions, Sigma.hats is a list of C p by p Sample covariance matrices
`Xtest`	this is a matrix with ntest rows and p column, each row is a test case

Value

returns a vector of ntest entries, where the ith entry is the estimated response category (some value in 1, ..., C) for the ith test case.

Examples

```
predict_QDA(model, Xtest)
```

QDA *Quadratic Discriminant Analysis*

Description

this function fit the QDA model

Usage

```
QDA(X, y, method = c("MLE", "diagonal", "ridge"), lam = NULL)
```

Arguments

X	n x p matrix where the ith row is the values of the predictor for the ith case
y	n entry response vector where the ith entry is the response category in 1, ..., C for the ith case

Value

returns a list with the parameter estimates

Examples

```
QDA(X, y, method = 'ridge', lam = seq(0.1, 2, 0.1))
```

scatter *Scatter*

Description

This function simply streamlines the process of creating a scatterplot with ggplot

Usage

```
scatter(data., x., y.)
```

Arguments

data.	data frame
x.	x-axis
y.	y-axis

Value

a scatterplot

Examples

```
scatter(iris, Sepal.Length, Sepal.Width)
```

`tidy` *Tidy*

Description

tidys package R code and updates package documentation. Directly uses Yihui Xie's 'formatR' package.

Usage

```
tidy()
```

Examples

```
tidy()
```

`timeit` *Time-It*

Description

Simple function that prints the computation time of a function

Usage

```
timeit(f)
```

Arguments

`f`	the function to time

Value

returns the elapsed time

Examples

```
timeit(lm(dist ~ speed, cars))
```

tridiag *Generate tri-diagonal matrices*

Description

Generate p-dimensional matrices so that its inverse is tri-diagonal.

Usage

```
tridiag(p = 8, base = 0.7, n = 100, X = FALSE)
```

Arguments

`p`	desired dimension
`base`	base multiplier

Examples

```
tridiag(p = 10, base = 0.7)
```

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