Package: RcppNumerical (via r-universe)

September 7, 2024

Type Package

Title 'Rcpp' Integration for Numerical Computing Libraries

Version 0.6-0

Date 2023-09-06

Maintainer Yixuan Qiu <yixuan.qiu@cos.name>

Description A collection of open source libraries for numerical computing (numerical integration, optimization, etc.) and their integration with 'Rcpp'.

License GPL (>= 2)

Copyright See file COPYRIGHTS

URL https://github.com/yixuan/RcppNumerical

BugReports https://github.com/yixuan/RcppNumerical/issues

LazyData TRUE

Imports Rcpp

LinkingTo Rcpp, RcppEigen

Suggests knitr, rmarkdown, prettydoc, mvtnorm, RcppEigen

VignetteBuilder knitr, rmarkdown

RoxygenNote 7.2.3

Repository https://yixuan.r-universe.dev

RemoteUrl https://github.com/yixuan/rcppnumerical

RemoteRef HEAD

RemoteSha 6ad26382a3414c248c9562c92985bb9e82fa1f04

Contents

`fastLR` *Fast Logistic Regression Fitting Using L-BFGS Algorithm*

Description

`fastLR()` uses the L-BFGS algorithm to efficiently fit logistic regression. It is in fact an application of the C++ function `optim_lbfgs()` provided by **RcppNumerical** to perform L-BFGS optimization.

Usage

```
fastLR(
  x,
  y,
  start = rep(0, ncol(x)),
  eps_f = 1e-08,
  eps_g = 1e-05,
  maxit = 300
)
```

Arguments

`x` The model matrix.

`y` The response vector.

`start` The initial guess of the coefficient vector.

`eps_f` Iteration stops if $|f - f'|/|f| < \epsilon_f$, where f and f' are the current and previous value of the objective function (negative log likelihood) respectively.

`eps_g` Iteration stops if $||g|| < \epsilon_g * \max(1, ||\beta||)$, where β is the current coefficient vector and g is the gradient.

`maxit` Maximum number of iterations.

Value

`fastLR()` returns a list with the following components:

`coefficients` Coefficient vector

`fitted.values` The fitted probability values

`linear.predictors` The fitted values of the linear part, i.e., $X\hat{\beta}$

`loglikelihood` The maximized log likelihood

`converged` Whether the optimization algorithm has converged

Author(s)

Yixuan Qiu `https://statr.me`

See Also

glm.fit()

Examples

```
set.seed(123)
n = 1000
p = 100
x = matrix(rnorm(n * p), n)
beta = runif(p)
xb = c(x %*% beta)
p = 1 / (1 + exp(-xb))
y = rbinom(n, 1, p)

system.time(res1 <- glm.fit(x, y, family = binomial()))
system.time(res2 <- fastLR(x, y))
max(abs(res1$coefficients - res2$coefficients))
```

Index