Package 'irls'

December 11, 2025

Type Package

Title Generalised Linear Models via Iteratively Reweighted Least Squares

Version 1.0

Author Michail Tsagris [aut, cre], Nikolaos Kontemeniotis [aut], Christos Adam [aut]

Maintainer Michail Tsagris <mtsagris@uoc.gr>

Description
Generalised linear models via the iteratively reweighted least squares algorithm. The functions perform logistic, Poisson and Gamma regression (ISBN:9780412317606), either for a single model or many regression models in a column-wise fashion.

License GPL (>= 2)

Depends R (>= 4.2)

Imports Rcpp (>= 1.0.13)

LinkingTo Rcpp (>= 1.0.13), RcppEigen

Suggests Rfast, Rfast2

RoxygenNote 7.3.3

Encoding UTF-8

NeedsCompilation yes

Repository CRAN

Date/Publication 2025-12-11 13:40:07 UTC

Contents

irls-package *Generalised Linear Models via Iteratively Reweighted Least Squares*

Description

Description: Generalised linear models via the iteratively reweighted least squares algorithm. The functions perform logistic, Poisson and Gamma regression, either for a single model or many regression models in a column-wise fashion.

Details

Package:	irls
Type:	Package
Version:	1.0
Date:	2025-12-03
License:	GPL-2

Maintainers

Michail Tsagris <mtsagris@uoc.gr>.

Author(s)

Michail Tsagris <mtsagris@uoc.gr>, Nikolaos Kontemeniotis <kontemeniotisn@gmail.com> and Christos Adam <pada4m4@gmail.com>.

References

McCullagh, Peter, and John A. Nelder. Generalized linear models. CRC press, USA, 2nd edition, 1989.

Column-wise GLMs with IRLS

Column-wise GLMs with IRLS

Description

GLMs with IRLS.

Usage

```
col.irls(y, x, type = "logistic", maxiter = 100, tol = 1e-6, parallel = FALSE)
```

Arguments

`y`	A numberical vector with the response. Binary data for the binomial regression, count data for the Poisson regression and strictly positive continuous numbers for the Gamma regression.
`x`	A numerical matrix.
`type`	The type of regression model to perform, "logistic", "poisson" or "gamma".
`maxiter`	The maximum number of iterations to perform.
`tol`	The tolerance value to terminate the algorithm.
`parallel`	Should the models be performed in parallel?

Details

The function does logistic, Poisson and Gamma regression via the IRLS algorithm, for each column of x.

Value

A matrix with 3 or 4 columns with the α (constant) and β parameters, the deviance and the ϕ (dispersion) parameter in case of Gamma regression.

Author(s)

Michail Tsagris, Nikolaos Kontemeniotis and Christos Adam. R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

References

McCullagh, Peter, and John A. Nelder. Generalized linear models. CRC press, USA, 2nd edition, 1989.

See Also

`irls`

Examples

```
x <- as.matrix(iris[, 1:4])
y <- rbinom(150, 1, 0.5)
col.irls(y, x)
```

GLMs with IRLS *GLMs with IRLS*

Description

GLMs with IRLS.

Usage

```
irls(y, x, type = "logistic", maxiter = 100, tol = 1e-6)
```

Arguments

y	A numberical vector with the response. Binary data for the binomial regression, count data for the Poisson regression and strictly positive continuous numbers for the Gamma regression.
x	A numerical matrix or a vector.
type	The type of regression model to perform, "logistic", "poisson" or "gamma".
maxiter	The maximum number of iterations to perform.
tol	The tolerance value to terminate the algorithm.

Details

The function does logistic, Poisson and Gamma regression via the IRLS algorithm.

Value

A list including:

coefficients	The regression coefficients.
vcov	The variance covariance matrix of the coefficients.
se	The standard errors of the coefficients.
phi	The dispersion parameter phi of the Gamma regression.
deviance	The deviance of the regression model.
iters	The number of iterations required.

Author(s)

Michail Tsagris, Nikolaos Kontemeniotis and Christos Adam. R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

References

McCullagh, Peter, and John A. Nelder. Generalized linear models. CRC press, USA, 2nd edition, 1989.

See Also

col.irls

Examples

```
x <- as.matrix(iris[, 1:4])
y <- rbinom(150, 1, 0.5)
irls(y, x)
```

Index