

Package ‘qlspack’

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Title Quasi Least Square Package

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Depends R (>= 2.4.1), geePack (>= 1.0-12), utils

Description QLS is a two-stage computational approach for estimation of the correlation parameters within the framework of GEE. It helps solving parameters in mean, scale, and correlation structures for longitudinal data.

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URL <http://www.cceb.upenn.edu/~sratclif/QLSproject.html>

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R topics documented:

qls	2
rat	3

Index	5
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qls

*Fit Quasi Least Squares (QLS) Estimating Equations***Description**

The `qls` function fits quasi least square estimating equations based on the `geeglm` function in the `geepack` and `cor.estimate` function in the `qlspack`. `qls` has a syntax similar to `glm` and returns an object similar to a `glm` object. An important feature of `qls`, is that an `anova` method exists for these models.

Usage

```
qls(formula, data, id, family = "gaussian",
    time = NULL, correlation = "ar1", std.err = "san.se")
```

Arguments

<code>formula</code>	The model to be fitted. The form is similar to the item documented in <code>geeglm</code> .
<code>data</code>	A data frame containing the variables in the model.
<code>id</code>	a vector which identifies the clusters. The length of 'id' should be the same as the number of observations. Data are assumed to be sorted so that observations on a cluster are contiguous rows for all entities in the formula. The 'id's for different clusters should be different, but need not to be consecutive.
<code>family</code>	A character string describing the error distribution and link function to be used in the model. There are three options: "guassian", "binomial" and "poisson". The default option is "guassian".
<code>time</code>	a vector which identifies the time in the clusters. The length of 'time' should be the same as the number of observations. This argument is used if and only if 'correlation == "markov"'.
<code>correlation</code>	a character string specifying the correlation structure. The following are permitted: "ar1", "exchangeable", "markov", "tridiagonal", "fam" and "ex.fam".
<code>std.err</code>	See corresponding documentation to <code>geeglm</code> .

Value

An object of type 'qlsglm'.

Warning

`qls` has not been thoroughly tested. Please report bugs.

Note

`qls` only works for complete data. Thus if there are NA's in data you can specify `data=na.omit(mydata)`.

Author(s)

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References

Chaganty, N. R. 1997. An alternative approach to the analysis of longitudinal data via generalized estimating equations. *Journal of Statistical Planning and Inference* **63**: 39–54.

Xie, J. and Shults, J. 2009. Implementation of quasi-least squares With the R package qlspack. *UPenn Biostatistics Working Papers* **32**. <http://biostats.bepress.com/upennbiostat/papers/art32>

Shults, J. 1996. The analysis of unbalanced and unequally spaced longitudinal data using quasi-least squares. Ph.D. Thesis, Department of Mathematics and Statistics, Old Dominion University: Norfolk, Virginia.

Shults, J. and Chaganty, N.R. 1998. Analysis of serially correlated data using quasi-least squares. *Biometrics* **54**: 1622–1630.

Chaganty, N.R. and Shults, J. 1999. On eliminating the asymptotic bias in the quasi-least squares estimate of the correlation parameter. *Journal of Statistical Planning and Inference* **76**: 127–144.

See Also

[glm](#)

Examples

```
require(qlspack)
data(rat)
qlsfit.fam <- qls(bp ~ time + as.factor(group), data = rat, id = rat$id,
  time = rat$time, correlation = "fam")
summary(qlsfit.fam)
```

rat ~~ data name/kind ... ~~

Description

~~ A concise (1-5 lines) description of the dataset. ~~

Usage

```
data(rat)
```

Format

A data frame with 291 observations on the following 6 variables.

id2 a numeric vector

id a numeric vector

time a numeric vector

group a numeric vector

bp a numeric vector

highbp a numeric vector

Details

The description of each column of the data set is as follows:

id2 = the id variable for each rat that is provided in Davis (2002).

id = a new id variable that takes value 1,2,..43 after sorting on id and group.

time = the timing of each measurement.

group = the group variable that takes value 1, 2, 3, or 4

bp = the blood pressure value.

highbp = a variable that takes value 1 if the rat's blood pressure is at least 100.

Source

Table 6.11 of Davis (2002)

References

Davis, C.(2002). *Statistical Methods for the Analysis of Repeated Measurements*.

Examples

```
data(rat)
## maybe str(rat) ; plot(rat) ...
```

Index

*Topic **datasets**

rat, [3](#)

*Topic **models**

qls, [2](#)

glm, [3](#)

qls, [2](#)

rat, [3](#)