Package ‘LRQMM’

February 22, 2020

Type Package
Title Fitting Linear Quantile Regression Mixed Models
Version 1.2.1
Author Sayyed Reza Alavian[aut,cre]
Majid Sarmad[ths]
Mehdi Jabbari Nooghabi[ths]
Hani Rezaee[ctb]
Saeed Zerehdaran[ctb]
Ferdowsi University Of Mashhad [cph]
Maintainer Sayyed Reza Alavian <s.rezaalavian@mail.um.ac.ir>
License GPL-2 | GPL-3
Encoding UTF-8
LazyData true
Depends R (>= 3.5.0)
Imports GeneticsPed, SparseM, quantreg, Matrix, kinship2, MCMCglmm, sparsesvd, corpcor
Suggests MASS
NeedsCompilation no
Repository CRAN
Date/Publication 2020-02-22 09:10:02 UTC

R topics documented:

Cow .................................................. 2
lrqmm ............................................. 2
spginv ............................................ 4

Index 6
Cow

*breastfeeding period data of Iranian Holstein cows*

**Description**

Cow data include 30 cows with id records, father’s record, mother’s record, number of Herd and breastfeeding period length.

**Usage**

```r
data("Cow")
```

**Format**

A data frame with 30 observations on the following 5 variables.

- `id`: The number form animal record as vector or column matrix
- `sire`: The number form father’s animal record as vector or column matrix
- `dam`: The number form mother’s animal record as vector or column matrix
- `HERD`: a number of record’s Herd
- `LACTLENGHT`: a numeric vector of breastfeeding period length

**Examples**

```r
data(Cow)
```

---

**lrqmm**

*Fitting Linear Quantile Regression Mixed Models*

**Description**

Fit a quantile regression mixed model using a sparse implementation of the Frisch-Newton interior-point algorithm.

**Usage**

```r
lrqmm(id, sire, dam, X, Y, cova=NULL, alpha = 0, tau = 0.5, Factor = FALSE)
```
**Arguments**

- **id**: The number form animal record as column matrix
- **sire**: The number form father’s animal record as column matrix
- **dam**: The number form mother’s animal record as column matrix
- **X**: fixed effect(s) as column matrix
- **Y**: a response column matrix
- **cova**: covariate effect(s) column matrix
- **alpha**: a parameter for random error’s variance to variance of random effects
- **tau**: desired quantile
- **Factor**: type of fixed effect that "TRUE" as factor variable and "FALSE" as quantitative variable

**Details**

The function computes an estimate on the tau-th quantile effects of the linear mixed model. This is a sparse implementation of the Frisch-Newton algorithm for quantile regression described in Portnoy and Koenker (1997).

We used "GeneticsPed", "Matrix", "kinship2", "MCMCglmm", "sparsesvd", "corpcor", "SparseM" and "quantreg" packages in this function. Before using "lrqmm" function be sure from installation this packages.

"GeneticsPed" available in <https://bioconductor.org/packages/release/bioc/src/contrib/GeneticsPed_1.46.0.tar.gz> or orders in <http://bioconductor.org/packages/release/bioc/html/GeneticsPed.html>. other packages are available in CRAN.

**Value**

- **Fixed effects**: estimate for fixed effect(s) from linear quantile regression mixed model
- **cova effects**: estimate for covariate effect(s) from linear quantile regression mixed model
- **Random effects**: estimate for random effect(s) from linear quantile regression mixed model
- **residuals**: estimate for model residuals from linear quantile regression mixed model
- **Time_between_start_to_end**: execution time of linear quantile regression mixed model
- **summary**: reporting quantile for effects estimation, mean absolute error for fitted model, variance of response variable, variance of pedigree’s random effect, variance of record’s random effect, number of observations, pedigree’s length, fixed effect labels and random effect labels

**Author(s)**

Sayyed Reza Alavian
References


Examples

```r
#Start(not run)

data(Cow)
with(lrqmm(id,sire,dam,HERD,LACTLENGHT,alpha=1,tau=0.5,Factor=TRUE),data=Cow)

#End(not run)
```

---

**spginv**

*Generalized Inverse of a Sparse Matrix*

**Description**

Calculated inverse of the generalized sparse matrix with sparsesvd function in sparsesvd package and ginv function in MASS package.

**Usage**

```r
spginv(x)
```

**Arguments**

- `x` a sparse real matrix in Matrix package format

**Details**

see sparsesvd function in sparsesvd package and ginv function in MASS package.

**Value**

A inverse generalized sparse matrix
Author(s)

Sayyed Reza Alavian

References


Examples

```r
M <- rbind(
  c(20, 10, 15, 0, 2),
  c(10, 5, 8, 1, 0),
  c( 0, 1, 2, 6, 3))
M <- Matrix::Matrix(M, sparse=TRUE)
spginv (M)
```
Index

*Topic Frisch-Newton interior-point
  lrrqm, 2
*Topic Generalized Inverse
  spginv, 4
*Topic Sparse Matrix
  spginv, 4
*Topic datasets
  Cow, 2
*Topic mixed models
  lrrqm, 2
*Topic quantile regression
  lrrqm, 2

Cow, 2

lrrqm, 2

spginv, 4