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Description

Cow data include 100 cows with id records, father’s record, mother’s record, number of HYS, age of first calving and Herd life.

Usage

data("Cow")

Format

A data frame with 100 observations on the following 6 variables.

REGNO The number form animal record as vector or column matrix
FREG The number form father’s animal record as vector or column matrix
MREG The number form mother’s animal record as vector or column matrix
HYS a numeric vector levels of Herd, Year, Season
AGECAL a numeric vector of age of first calving
HL a numeric vector of Herd Life

Examples

data(Cow)
Fitting Linear Quantile Regression Mixed Models With Relationship Matrix

Description
Fit a quantile regression mixed model involved Relationship Matrix 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)
```

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 that will change to factor variable in this function
- `Y`: a response column matrix
- `cova`: covariate effect(s) column matrix
- `alpha`: a parameter for raite error’s variance to variance of random effects dependent on statistical model (Animal model, Sire model, etc.)
- `tau`: desired quantile

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", "rsvd", "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

other packages are available in CRAN.

Value
- **Fixed effects**: estimate for fixed effect(s) from linear quantile regression mixed model with its standard error
- **cova effects**: estimate for covariate effect(s) from linear quantile regression mixed model with its standard error
Random effects estimate for random effect(s) from linear quantile regression mixed model with its standard error

residuals estimate for model residuals from linear quantile regression mixed model

Time_between_start_to_end execution time of linear quantile regression mixed model

MAE mean absolute error for fitted model

summary reporting quantile for effects estimation, variance of response variable, variance of pedigree’s random.effect, variance of record’s random.effect, number of observations, pedigree’s length, fix effect lavels and random effect lavels

Author(s)

Sayyed Reza Alavian

References


Examples

```r
#Start(not run)

data(Cow)
with(lrqmm(id=REGNO,sire=FREG,dam=MREG,X=HYS,Y=HL,cova=AGECAL,alpha=1,tau=0.5)
    ,data=Cow)

#End(not run)
```

Description

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

\texttt{lrqmm_m(id, sire, dam, X, Y, cova=NULL, alpha = 0, tau = 0.5, maxTries = 3000, interval = 30)}

Arguments

- \texttt{id} \quad The number form animal record as column matrix
- \texttt{sire} \quad The number form father's animal record as column matrix
- \texttt{dam} \quad The number form mother's animal record as column matrix
- \texttt{X} \quad fixed effect(s) as column matrix that will change to factor variable in this function
- \texttt{Y} \quad a response column matrix
- \texttt{cova} \quad covariate effect(s) column matrix
- \texttt{alpha} \quad a parameter for rait error's variance to variance of random effects, dependent on statistical model (Animal model, Sire model, etc.)
- \texttt{tau} \quad desired quantile
- \texttt{maxTries} \quad The maximum number of times the connection is check for an answer from the MATLAB server before giving up. Default values is 3000 times.
- \texttt{interval} \quad The interval in seconds between each poll for an answer. Default interval is 30 (second).

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", "R.matlab", "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 
other packages are available in CRAN.

Value

- \texttt{Fixed effects} \quad estimate for fixed effect(s) from linear quantile regression mixed model with its standard error
- \texttt{cova effects} \quad estimate for covariate effect(s) from linear quantile regression mixed model with its standard error
- \texttt{Random effects} \quad estimate for random effect(s) from linear quantile regression mixed model with its standard error
- \texttt{residuals} \quad estimate for model residuals from linear quantile regression mixed model
- \texttt{Time_between_start_to_end} \quad execution time of linear quantile regression mixed model
MAE  mean absolute error for fitted model
summary  reporting quantile for effects estimation, variance of response variable, variance of pedigree’s random effect, variance of record’s random effect, number of observations, pedigree’s length, fix effect levels and random effect levels

Note

When this function stops abnormally (due an error or warning in MATLAB), you should close the MATLAB software window and disconnect the software. By performing this function again, the connection will be established. When more times need to the connection check for an answer from the MATLAB server before giving up, "maxTries" can be increase. When more times need to increase seconds between each poll for an answer, "interval" can be increase.

Author(s)

Sayyed Reza Alavian and Hani Rezaee[ctb]

References


Examples

```r
#Start(not run)
#before running this code, be sure for Matlab installation in your system.
#
# >data(Cow)
# >with(lrqmm_m(id=REGNO,sire=FREG,dam=MREG,X=HYS,Y=HL,cova=AGECAL,alpha=1,tau=0.5)
# ,data=Cow)
#
# #End(not run)
```
Description
Calculated inverse of the generalized big matrix with MATLAB

Usage
```
PINVmat(x, maxTriess = 3000, intervall = 30)
```

Arguments
- `x`: a numeric matrix
- `maxTriess`: The maximum number of times the connection is checked for an answer from the MATLAB server before giving up. Default value is 3000 times.
- `intervall`: The interval in seconds between each poll for an answer. Default interval is 30 (second).

Details
see `pinv` function in MATLAB.

Value
a inverse generalized matrix

Author(s)
Sayyed Reza Alavian

References

Examples
```
M <- rbind(
  c(20, 10, 15, 0, 2),
  c(10, 5, 8, 1, 0),
  c(0, 1, 2, 6, 3))
# before running this code, be sure for Matlab installation in your system.
# >PINVmat(M)
```
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**

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)
```
STDE

Description
This function was written in "summary.rq" in "quantreg" package but in below used and changed for lrqmm function.

Details
This function runs in "lrqmm_m" function.

Author(s)
Sayyed Reza Alavian

References

SVDmat
Calculates SVD of Matrix in MATLAB

Description
This function Calculates SVD of Matrix in MATLAB and produces the "economy size" decomposition.

Usage
SVDmat(E,maxTriess = 3000,intervall = 30)

Arguments
- E: a numeric matrix
- maxTriess: The maximum number of times the connection is checked for an answer from the MATLAB server before giving up. Default value is 3000 times.
- intervall: The interval in seconds between each poll for an answer. Default interval is 30 (second).

Details
This function uses R working directory to build and read files. So there should be enough space. All function's files are removed after finishing calculation. This function is commonly used in big data.
Value

d        a vector containing the positive singular values
u        a matrix with the corresponding left singular vectors
v        a matrix with the corresponding right singular vectors

Note

When this function stops abnormally (due an error or warning in MATLAB), you should close the MATLAB software window and disconnect the software. By performing this function again, the connection will be established. When more times need to the connection check for an answer from the MATLAB server before giving up, "maxTries" can be increase. When more times need to increase seconds between each poll for an answer, "interval" can be increase.

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))
#before running this code, be sure for Matlab installation in your system.
# >SVDmat(M)
```
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