Package: bayeslongitudinal (via r-universe)

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Type Package

Title Adjust Longitudinal Regression Models Using Bayesian Methodology

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Description Adjusts longitudinal regression models using Bayesian methodology for covariance structures of composite symmetry (SC), autoregressive ones of order 1 AR (1) and autoregressive moving average of order (1,1) ARMA (1,1).

License GPL (>= 2)

Depends R(>= 3.1.0), LearnBayes, mvtnorm, MASS

Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

NeedsCompilation no

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Contents

bloques *bloques ar 1*

Description

Build a block diagonal matrix with structure AR(1)

Usage

```
bloques(s, r, t, n)
```

Arguments

s	Numerical value indicating global standard deviation of the matrix
r	Numerical value indicating correlation of individuals
t	Numerical value indicating number of times when observations are repeated
n	Numerical value indicating number of individuals

Value

A diagonal block matrix with structure AR(1)

References

Nuñez A. and Zimmerman D. 2001. Modelación de datos longitudinales con estructuras de covarianza no estacionarias: Modelo de coeficientes aleatorios frente a modelos alternativos. Questio. 2001. 25.

Examples

```
bloques(2,.5,10,2)
```

bloques2 *bloques arma (1,1)*

Description

Build a block diagonal matrix with structure ARMA(1,1)

Usage

```
bloques2(s, r, g, t, n)
```

Arguments

s	Numerical value indicating global standard deviation of the matrix
r	Numerical value indicating the first parameter rho correlation of individuals
g	Numerical value indicating the second parameter phi correlation of individuals
t	Numerical value indicating number of times when observations are repeated
n	Numerical value indicating number of individuals

Value

A diagonal block matrix with structure ARMA(1,1)

References

Nuñez A. and Zimmerman D. 2001. Modelación de datos longitudinales con estructuras de covarianza no estacionarias: Modelo de coeficientes aleatorios frente a modelos alternativos. Questio. 2001. 25.

Examples

```
bloques2(2,.5,.8,10,2)
```

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bloques3 *bloques3 compound symmetry*

Description

Build a block diagonal matrix with compound symmetry structure

Usage

```
bloques3(s, r, t, n)
```

Arguments

s	Numerical value indicating global standard deviation of the matrix
r	Numerical value indicating correlation of individuals
t	Numerical value indicating number of times when observations are repeated
n	Numerical value indicating number of individuals

Value

A diagonal block matrix with compound symmetry structure

References

Nuñez A. and Zimmerman D. 2001. Modelación de datos longitudinales con estructuras de covarianza no estacionarias: Modelo de coeficientes aleatorios frente a modelos alternativos. Questio. 2001. 25.

Examples

```
bloques3(2,.5,10,2)
```

`Dental` *Dental distance*

Description

It reports the distance in millimeters from the center of the pituitary to the pteromaxillary fissure. The subjects were 16 children and 11 girls. Data were taken every two years from 8 years and ended at age 14.

Usage

```
Dental
```

Format

A data Frame with 98 rows and 5 variables:

gencode 1 for girls, 0 for boy

id Number of the individual

distance Distance from the center of the pituitary gland to the pterygomaxillary fissure

age Child's age at which measurement was taken

gender Gender of the child

Source

https://faculty.biostat.ucla.edu/robweiss/filedepot_download/87/524

mhar1 *mhar1*

Description

Run Bayesian estimation of a balanced longitudinal model with AR(1) structure

Usage

```
mhar1(Data, Matriz, individuos, tiempos, betai, rhoi, beta1i, beta2i,
  iteraciones, burn)
```

Arguments

Data	A vector with the observations of the response variable
Matriz	The model design matrix
individuos	A numerical value indicating the number of individuals in the study
tiempos	A numerical value indicating the number of times observations were repeated
betai	A vector with the initial values of the vector of regressors
rhoi	A numerical value with the initial value of the correlation
beta1i	A numerical value with the shape parameter of a beta apriori distribution of rho
beta2i	A numerical value with the scaling parameter of a beta apriori distribution of rho
iteraciones	A numerical value with the number of iterations that will be applied the algorithm MCMC
burn	Number of iterations that are discarded from the chain

Value

A dataframe with the mean, median and standard deviation of each parameter, A graph with the histograms and chains for the parameters that make up the variance matrix, as well as the selection criteria AIC, BIC and DIC

References

Gamerman, D. 1997. Sampling from the posterior distribution in generalized linear mixed models. Statistics and Computing, 7, 57-68

Cepeda, C and Gamerman, D. 2004. Bayesian modeling of joint regressions for the mean and covariance matrix. Biometrical journal, 46, 430-440.

Cepeda, C and Nuñez, A. 2007. Bayesian joint modelling of the mean and covariance structures for normal longitudinal data. SORT. 31, 181-200.

Nuñez A. and Zimmerman D. 2001. Modelación de datos longitudinales con estructuras de covarianza no estacionarias: Modelo de coeficientes aleatorios frente a modelos alternativos. Questio. 2001. 25.

Examples

```
attach(Dental)
Y=as.vector(distance)
X=as.matrix(cbind(1,age))
mhar1(Y,X,27,4,c(1,1),0.5,1,1,500,50)
```

`mharma11` *mharma11*

Description

Run Bayesian estimation of a balanced longitudinal model with ARMA(1) structure

Usage

```
mharma11(Data, Matriz, individuos, tiempos, betai, rhoi, gammai, beta1i, beta2i,
  beta1j, beta2j, iteraciones, burn)
```

Arguments

`Data`	A vector with the observations of the response variable
`Matriz`	The model design matrix
`individuos`	A numerical value indicating the number of individuals in the study
`tiempos`	A numerical value indicating the number of times observations were repeated
`betai`	A vector with the initial values of the vector of regressors
`rhoi`	A numerical value with the initial value of the correlation for rho
`gammai`	A numerical value with the initial value of the correlation for phi
`beta1i`	A numerical value with the shape parameter of a beta apriori distribution of rho
`beta2i`	A numerical value with the scaling parameter of a beta apriori distribution of rho
`beta1j`	A numerical value with the shape parameter of a beta apriori distribution of phi
`beta2j`	A numerical value with the scaling parameter of a beta apriori distribution of phi
`iteraciones`	A numerical value with the number of iterations that will be applied the algorithm MCMC
`burn`	Number of iterations that are discarded from the chain

Value

A dataframe with the mean, median and standard deviation of each parameter, A graph with the histograms and chains for the parameters that make up the variance matrix, as well as the selection criteria AIC, BIC and DIC

References

Gamerman, D. 1997. Sampling from the posterior distribution in generalized linear mixed models. Statistics and Computing, 7, 57-68

Cepeda, C and Gamerman, D. 2004. Bayesian modeling of joint regressions for the mean and covariance matrix. Biometrical journal, 46, 430-440.

Cepeda, C and Nuñez, A. 2007. Bayesian joint modelling of the mean and covariance structures for normal longitudinal data. SORT. 31, 181-200.

Nuñez A. and Zimmerman D. 2001. Modelación de datos longitudinales con estructuras de covarianza no estacionarias: Modelo de coeficientes aleatorios frente a modelos alternativos. Questio. 2001. 25.

Examples

```
attach(Dental)
Y=as.vector(distance)
X=as.matrix(cbind(1,age))
mharma11(Y,X,27,4,c(1,1),0.5,0.5,1,1,1,1,500,50)
```

`mhsc` *mhsc*

Description

Run Bayesian estimation of a balanced longitudinal model with compound symmetry structure

Usage

```
mhsc(Data, Matriz, individuos, tiempos, betai, rhoi, beta1i, beta2i,
  iteraciones, burn)
```

Arguments

`Data`	A vector with the observations of the response variable
`Matriz`	The model design matrix
`individuos`	A numerical value indicating the number of individuals in the study
`tiempos`	A numerical value indicating the number of times observations were repeated
`betai`	A vector with the initial values of the vector of regressors
`rhoi`	A numerical value with the initial value of the correlation
`beta1i`	A numerical value with the shape parameter of a beta apriori distribution of rho
`beta2i`	A numerical value with the scaling parameter of a beta apriori distribution of rho
`iteraciones`	numerical value with the number of iterations that will be applied the algorithm MCMC
`burn`	Number of iterations that are discarded from the chain

Value

A dataframe with the mean, median and standard deviation of each parameter, A graph with the histograms and chains for the parameters that make up the variance matrix, as well as the selection criteria AIC, BIC and DIC

References

Gamerman, D. 1997. Sampling from the posterior distribution in generalized linear mixed models. Statistics and Computing, 7, 57-68

Cepeda, C and Gamerman, D. 2004. Bayesian modeling of joint regressions for the mean and covariance matrix. Biometrical journal, 46, 430-440.

Cepeda, C and Nuñez, A. 2007. Bayesian joint modelling of the mean and covariance structures for normal longitudinal data. SORT. 31, 181-200.

Nuñez A. and Zimmerman D. 2001. Modelación de datos longitudinales con estructuras de covarianza no estacionarias: Modelo de coeficientes aleatorios frente a modelos alternativos. Questio. 2001. 25.

Examples

```
attach(Dental)
Y=as.vector(distance)
X=as.matrix(cbind(1,age))
mhsc(Y,X,27,4,c(1,1),0.5,1,1,500,50)
```

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