Package ‘varjmcmm’

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Type Package

Title Estimations for the Covariance of Estimated Parameters in Joint Mean-Covariance Models

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Estimate the covariance of estimated parameters using a bootstrap based method

**Description**

`bootcovjmcm` gives the estimation of the covariance of estimated parameters returned by `jmcm` by using a bootstrap based method.

**Usage**

`bootcovjmcm(object, mydata, numboot)`

**Arguments**

- **object**: a fitted joint mean-covariance model of class "jmcmMod", returned by the function `jmcm`.
- **mydata**: the data frame used in fitting the model.
- **numboot**: the number of the bootstrap replications

**Value**

an estimated covariance matrix of the estimated parameters.

**References**


**Examples**

```r
cattleA <- cattle[cattle$group=='A', ]
fit.mcd <- jmcm(weight|id|I(ceiling(day/14+1))~1|1, 
data = cattleA, 
cov.method = "mcd", 
triple = c(1,1,1))
bootcovjmcm(fit.mcd, cattleA, 5)
## Larger number of replications is needed to achieve accuracy, however it may take hours.
bootcovjmcm(fit.mcd, cattleA, 500)
```
covjmcm

**Estimate the covariance of estimated parameters using the explicit formula**

**Description**

covjmcm is a combination of covjmcm_mcd, covjmcm_acd, and covjmcm_hpc. It identifies the corresponding type of the model, i.e. MCD, ACD, or HPC, and calculates the estimation of the covariance of estimated parameters using explicit formula, which is the inverse of the estimated Fisher’s information matrix.

**Usage**

covjmcm(object)

**Arguments**

- object: a fitted joint mean-covariance model of class "jmcmMod", returned by the function jmcm.

**Value**

an estimated covariance matrix of the estimated parameters.

**References**


**See Also**

covjmcm_mcd, covjmcm_acd, and covjmcm_hpc

**Examples**

```r
## balanced data
cattleA <- cattle[cattle$group=='A',]
fit.mcd <- jmcm(weight|id[I(ceiling(day/14+1))]==1],
data = cattleA, cov.method = "mcd",
triple = c(8,3,4))
cov.mcd <- covjmcm(fit.mcd) ##same as covjmcm_mcd(fit.mcd)
## unbalanced data
## This may take about 1.25 min.
```
fit.hpc <- jmcm(I(sqrt(cd4)) | id | time ~ 1 | 1,
     data = aids, triple = c(8,1,1),
     cov.method = "hpc")
cov.hpc <- covjmcm(fit.hpc)  ##same as covjmcm_hpc(fit.hpc)

covjmcm_acd

Calculate the estimation of the covariance of estimated parameters in a ACD model, via the explicit formula.

Description

covjmcm_acd calculates the estimation of the covariance of estimated parameters in a ACD model using the explicit formula, which is the inverse of the estimated Fisher’s information matrix.

Usage

covjmcm_acd(object)

Arguments

object a fitted joint mean-covariance model of class "jmcmMod", returned by the function jmcm.

Value

an estimated covariance matrix of the estimated parameters in a ACD model.

References


See Also

covjmcm, covjmcm_mcd, and covjmcm_hpc

Examples

##This may take more than 5s.
cattleA <- cattle[cattle$group=="A", ]
fit.acd <- jmcm(weight|id|I(ceiling(day/14+1))~1|1,
     data = cattleA, cov.method = "acd",
     triple = c(8,3,4))
cov.acd <- covjmcm_acd(fit.acd)
Description

covjmcm_hpc gives the estimation of the covariance of estimated parameters in a HPC model using the explicit formula, which is the inverse of the estimated Fisher's information matrix.

Usage

covjmcm_hpc(object)

Arguments

object  a fitted joint mean-covariance model of class "jmcmMod", returned by the function jmcm.

Value

an estimated covariance matrix of the estimated parameters in a HPC model.

References


See Also

covjmcm, covjmcm_mcd, and covjmcm_acd

Examples

##This may take more than 1 min.
cattleA <- cattle[cattle$group=="A", ]
fit.hpc <- jmcm(weight|id|I(ceiling(day/14+1))~1|1,
data = cattleA, cov.method = "hpc",
   triple = c(8,3,4))
cov.hpc <- covjmcm_hpc(fit.hpc)
covjmcm_mcd  

Calculate the estimation of the covariance of estimated parameters in a MCD model, via the explicit formula.

Description

covjmcm_mcd gives an estimation of the covariance of estimated parameters in a MCD model using the explicit formula, which is the inverse of the estimated Fisher’s information matrix.

Usage

covjmcm_mcd(object)

Arguments

object  
a fitted joint mean-covariance model of class "jmcmMod", returned by the function jmcm.

Value

an estimated covariance matrix of the estimated parameters in a MCD model.

References


See Also

covjmcm, covjmcm_acd, and covjmcm_hpc

Examples

cattleA <- cattle[cattle$group=='A', ]
fit.mcd <- jmcm(weight|id|I(ceiling(day/14+1))-1|1,
data = cattleA, cov.method = "mcd",
  triple = c(8,3,4))
cov.mcd <- covjmcm_mcd(fit.mcd)
**Description**

The package provides estimations of the covariance of estimated parameters in joint mean-covariance models, which is fitted in `jmcm` package. Two methods are available. `bootcovjmcm` calculates the covariance estimation via a bootstrap based method. `covjmcm` uses explicit formula, i.e. the inverse of the estimated Fisher’s information, to calculate the covariance estimation. The bootstrap method may need large number of replications and thus may be time consuming. The explicit formula in the second method is asymptotically correct, and thus is valid only when the sample size is large.

**References**


**See Also**

covjmcm and bootcovjmcm for more details and examples.
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