Package ‘FASeg’

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Type Package

Title Joint Segmentation of Correlated Time Series

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Description It contains a function designed to the joint segmentation in the mean of several correlated series. The method is described in the paper X. Collilieux, E. Lebarbier and S. Robin. A factor model approach for the joint segmentation with between-series correlation (2015) <arXiv:1505.05660>.

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Joint Segmentation of Set of Correlated Time-Series
Description

FASeg contains a function designed to the joint segmentation (the segmentation is series-specific) in the mean of several correlated series. The form of the correlation is assumed to be arbitrary and we propose to model it with a factor model. A EM algorithm is used to estimate the parameters and a model selection strategy is proposed to determine both the number of breakpoints and the number of factors.

Author(s)

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References

A factor model approach for the joint segmentation with between-series correlation (arXiv:1505.05660)

Examples

library(FASeg)
data(Y)
M=max(Y$series)
uniKmax=3
multiKmax=11
qmax=M-1
selection=FALSE
WithoutCorr=FALSE
seg=F_FASeg(Y,uniKmax,multiKmax,qmax,selection,WithoutCorr)
Arguments

Y  Data frame, with size [(n*M) x 3], which contains the data and other informations, n is the length of each series and M is the number of series

uniKmax  Maximal number of segments per series (uniKmax will be lower or equal to n)

multiKmax  Maximal number of segments for all the series (multiKmax will be greater or equal to M)

qmax  Maximal number of factors (qmax will be lower or equal to M-1) (default qmax=M-1). If qmax=0 then a joint segmentation with multiKmax segments and without taking into account the correlation between series is performed

selection  A logical value indicating if the selection of the number of segments K and the number of factors Q is performed (default=TRUE). If it is TRUE, K and Q are selected; if it is FALSE, K is fixed to multiKmax and Q is fixed to qmax

WithoutCorr  A logical value indicating if, when K and Q are selected, the joint segmentation without taking into account the correlation between series is also a possible solution in the selection (default=FALSE)

Value

Contains the following attributes:

SelectedK  Selected number of segments for all the series if selection=TRUE, the number of segments fixed by the user otherwise (K=multiKmax)

Selectedq  Selected number of factors if selection=TRUE, the number of factors fixed by the user otherwise (Q=qmax)

SelectedSigma  Estimation of the covariance matrix Sigma

SelectedPsi  Estimation of the matrix Psi

SelectedB  Estimation of the matrix of coefficients B

SelectedZ  Estimation of the latent vectors Z

SelectedSeg  Optimal segmentation with a selected or fixed value of the number of segments and the number of factors

Author(s)

Xavier Collilieux, Emilie Lebarbier and Stephane Robin

References

A factor model approach for the joint segmentation with between-series correlation (arXiv:1505.05660)
Description

A data frame [(n x M) x 3] containing 5 Gaussian series with size n=50 each simulated as in the paper arXiv:1505.05660 (with rho=0.6 and sigma=0.2). The total number of segments is K=11 or 6 breakpoints (at position 39 for series 1; 35 for series 2; no breaks for series 3; 11 for series 4 and 2, 3 and 12 for series 5).

Usage

data(Y)

Format

A data frame with 250 observations on the following 3 variables.

series a numeric vector
position a numeric vector
signal a numeric vector

Details

series: the number of the series; position: the grid {1:n}; signal: the values of the observed signal

Examples

library(FASeg)
data(Y)
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