mcov {mcov} R Documentation

Moving Cross-covariance Matrix

Description

The function mcov computes estimates of the lag l moving cross-covariance matrix of non-stationary (and stationary) time series. Notice that the following library is needed to be installed before using the mcov function: library(roll)

Usage

```
mcov(x,w,l)
```

Arguments

`x`
a T-by-m data matrix, where the rows are "T" time points, and the columns are "m" variables

`w`
window width (i.e. window size) at which the mcov is calculated

`l`
the lag at which the mcov is calculated

Value

`mcov`
a symmetric m-by-m matrix, which is the lag l moving cross-covariance matrix of the data matrix x

Note

Choosing the window width (i.e. w) is vital to enhance the results of the mcov to extract accurate information from the data. The size of w depends on the degree of stationarity of the data. Small window sizes are suitable for data that exhibit strong non-stationarity. For stationary data, a window of size "w=T-l" is used.

Author(s)

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References

Alshammri, F. and Pan, J. (2019). Moving dynamic principal component analysis for non-stationary multivariate time series. Manuscript submitted for publication.

Examples

```
##The data matrix X is a non-stationary time series with m=6 and T=1500.
m=6;T=1500
# Generate x_t
X=mat.or.vec(m,T)
a1=arima.sim(list(order=c(1,1,1),ar=0.75,ma=0.9),n=T+1,sd=1)
for(i in 1:2) X[i,]=a1[i+1:T]
a2=arima.sim(list(order=c(1,1,1),ar=0.6,ma=-1.4),n=T+1,sd=1)
for(i in 3:4) X[i,]=a2[(i-1):(T+i-2)]
a3=arima.sim(list(order=c(1,1,1),ar=-0.7,ma=-2.3),n=T+1,sd=1)
for(i in 5:6) X[i,]=a3[(i-3):(T+i-4)]
X=t(X)
X=ts(X)
##calculate the lag 1 moving cross-covariance of x, with w=100 and l=2.
myresult=mcov(X,100,2)
myresult
```