Package 'cotrend'

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Type Package

Title Consistent Co-Trending Rank Selection

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Description Implements cointegration/co-trending rank selection
algorithm in Guo and Shintani (2013) ``Consistent
co-trending rank selection when both stochastic and nonlinear
deterministic trends are present''.
The Econometrics Journal 16: 473-483
<doi:10.1111/j.1368-423X.2012.00392.x>.
Numbered examples correspond to Feb 2011 preprint
<http://www.fas.nus.edu.sg/ecs/events/seminar/seminar-papers/05Apr11.pdf>.

Depends xts

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RoxygenNote 6.1.1

NeedsCompilation no

R topics documented:

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cotrend	*Consistent Cotrending Rank Selection*

Description

Package implements method to find cointegration and cotrending rank according to Guo and Shintani (2011).

Usage

```
cotrend(x, ...)
## Default S3 method:
cotrend(x,type=c("paired","joint"),CT="BIC",...)
## S3 method for class 'cotrend'
print(x,...)
```

Arguments

x	Matrix or xts object of dimension T x m. Where T is the number of time periods and m is the number of time series.
...	Additional parameters are type = "paired" (default) or "joint" which metric function CT="BIC" (default),"HQ" or "AIC".
type	Selects the method. "paired" is default and it find r1 and r2 independently. "joint" selects both r1 and r2 at the same time.
CT	Penalty functions elements. The default is to use "BIC" (Bayesian information criterion). User can also select "AIC" or "HQ". See Guo and Shintani (2011).

Details

For details on method see Guo and Shintani (2011). Most experiments find default method (paired,BIC) to have good performance. The probability of finding the correct rank is quite good for data sample as small as 50 observations.

Value

List with:

rank	Array with 2 elements. First element is the cointegration rank (r1) and the second is the week cotrending rank (r2).
m	Number of time series. Number of cols of input matrix.
T	Number of time periods (observations). Number of rows of input matrix.
eigenvalues	Eigenvalues from von Neumann matrix used in the algorithm.
vonNeumann	Multivarite ratio of the von Neumann ratio. A matrix of dimention m x m.

Author(s)

A. Christian Silva

References

Z-F. Guo and M. Shintani, "Consistent cotrending rank selection when both stochastic and nonlinear deterministic trends are present", Preprint, www.vanderbilt.edu/econ/faculty/Shintani/cotrend.pdf, version Feb 2011.

Examples

```
x <- example_eq3()
cotrend(x)
cotrend(x,type="joint")
```

Examples	*Examples time series presented in Guo and Shintani (2011) to test their algorithm.*

Description

Some examples found in Guo and Shintani (2011). The number of the example corresponds to the equation number in the paper (version published on Feb 2011). The current code can adjust every parameters in the paper. The default values are the most common values selected in the paper.

Usage

```
example_eq3(T = 50, mu1 = 0.5, mu2 = 2, c1 = 0.5, c2 = 1)
example_eq4(T = 50, mu1 = 0.5, mu2 = 2, c1 = 0.5, c2 = 1)
example_eq8(T = 50, rho1 = 1, mu0 = 2, mu1 = 0.5, c = 0.5, tau = 0.5, y0 = 0)
example_eq9(T = 400, mu0 = 2 , mu1=0.5, c=0.5, tau1=0.5, tau2=1/3)
```

Arguments

T	Number of time periods (observations). Practically the number of rows in the output matrix.
mu0	Increase rate for deterministic trend. See Gou and Shintani (2011).
mu1	Increase rate for deterministic trend. See Guo and Shintani(2011).
mu2	Increase rate for deterministic trend.
c	Intercept for deterministic trend.
c1	Intercept for deterministic trend.
c2	Intercept for deterministic trend.
rho1	Autocorrelation coefficient. If rho1 = 1, we have a I(1) process. See Guo and Shintani (2011).
tau	Time location for break point. Before tau the mean trend is different than after.
tau1	Time location for break point. Before tau the mean trend is different than after.
tau2	Time location for break point. Before tau the mean trend is different than after.
y0	Starting point for simulation of Equation 9. See Guo and Shintani (2011).

Details

The outcome of the rank finding algorithm cotrend depends on T. That is true for all examples. If T-> Inf, the probability to find the correct rank pair is P -> 1. Equation 3 should give rank pair r1 = 0 and r2 = 1. Equation 4 has r1 = 1 and r2 = 1. Both examples are independent of the parameters selected. Equation 8 has rank r1 = 1 and r2 = 1 if rho1 = 0.5 and r1 = 0 and r2 = 1 if rho1 = 1. Equation 9 has rank r1 = 0 and r2 = 0 for the default parameters. See Guo and Shintani (2011).

Value

Output is matrix of dimention T x m. m=2 for eq3 or eq4 and m=3 for eq8 and eq9.

Author(s)

A. Christian Silva

References

Z-F. Guo and M. Shintani, "Consistent cotrending rank selection when both stochastic and nonlinear deterministic trends are present", Preprint, www.vanderbilt.edu/econ/faculty/Shintani/cotrend.pdf, version Feb 2011.

Examples

```
x <- example_eq3()
c <- cotrend(x)
print(c)
```

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