

Package ‘Coinprofile’

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Type Package

Title Coincident Profile

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LazyData TRUE

Imports zoo, stats, plyr, coin, Rdpack, exactRankTests (>= 0.8-29),
ggplot2 (>= 1.0.1)

RdMacros Rdpack

Description Builds the
coincident profile proposed by Martinez, W and Nieto, Fabio H and Poncela, P (2016)
<[doi:10.1016/j.spl.2015.11.008](https://doi.org/10.1016/j.spl.2015.11.008)>.
This methodology studies the relationship between a couple of
time series based on the the set of turning points of each
time series. The coincident profile establishes if two time
series are coincident, or one of them leads the second.

RoxygenNote 6.1.1

Suggests knitr, rmarkdown

URL <https://github.com/WilmerMartinezR/Coinprofile>

BugReports <https://github.com/WilmerMartinezR/Coinprofile/issues>

NeedsCompilation no

Repository CRAN

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Contents

coincident_profile	2
dif_TP	3
TP_BryBoschan	4
Index	6

coincident_profile	<i>Coincident Profile</i>
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Description

Returns the coincident profile developed by Martinez et al. (2016). The ideal result is finding the maximum p-value for the lag = 0; otherwise maximum p-value for negative lags suggest leading from x to y, or maximum p-value for positive lags suggest leading from y to x.

Usage

```
coincident_profile(x, y, frequ = 12, MLag = 6, nvar1 = "name.x",
  nvar2 = "name.y", print.graf = FALSE, iyear = 1,
  lyear = numeric(), imonth = 12, lmonth = numeric(),
  tit1 = "Title.x", tit2 = "Title.y", tit3 = "Title.x.y")
```

Arguments

x	Univariate time series
y	Univariate time series
frequ	Frequency of x and y. x and y must have the same frequency
MLag	Maximum lag for the coincident profile
nvar1	Name of x
nvar2	Name of y
print.graf	If TRUE returns a panel 2x2 where the superior panel has both plots of x and y with their turning points (maximums black dots lines and minimums red dots lines). The inferior left panel has the matplot of x and y standardized, respectively $(x - \text{mean}(x))/\text{sd}(x)$. The inferior right panel has the coincident profile where <i>TP</i> shows the number of turning points used.
iyear	The year of the first observation. A single number
lyear	The year of the last observation. A single number
imonth	The amount of months for the first year. A single number
lmonth	The amount of months for the last year. A single number
tit1	Title for the plot x
tit2	Title for the plot y
tit3	Title for the plot x and y

Details

The main output contains two objects: the coincident profile (Profile) and both the lag which has the highest probability and the number of turning points considered to the calculus of the coincident profile (MainLag).

Value

The coincident profile

Author(s)

Wilmer O Martinez R

References

Martinez, W and Nieto, Fabio H and Poncela, P (2016) "Choosing a dynamic common factor as a coincident index", *Statistics and Probability Letters*, (109), 89-98. <http://dx.doi.org/10.1016/j.spl.2015.11.008>.

Banerji, A., (1999) "The lead profile and others non-parametrics tools to evaluate survey series as leading indicators", *Survey Data for Industry, Research and Economic Policy, selected papers presented at the 24th CIRET Conference, Willington, New Zealand*.

Examples

```
set.seed(123)
w <- seq(-3, 7, length.out = 100)
x1 <- sin(pi*w)+rnorm(100,0,0.1)
x2 <- sin(pi*w-0.1)+rnorm(100,0,0.1)
coincident_profile(x1, x2, 4, 5, "name.x", "name.y", TRUE, 1991, 2015, 4, 4)

# In this example x leads y three periods
set.seed(123)
w <- seq(-3, 7, length.out = 100)
x <- sin(pi*w)+rnorm(100,0,0.1)
y <- sin(pi*w-1)+rnorm(100,0,0.1)
coincident_profile(x, y, 4, 6, "name.x", "name.y", TRUE, 1991, 2015, 4, 4)
```

dif_TP

Closest differences

Description

Finds closest differences between two sets of turning points

Usage

```
dif_TP(dato1, dato2, minmax = 1)
```

Arguments

dato1	A vector of data
dato2	A vector of data2
minmax	Indicator variable 1 minimum, 2 maximum

Details

From Martinez et al. (2016): "When the number of turning points in the two time series that are being compared is not the same, we recommend choosing the pairs of turning points, i.e. peak–peak and trough–trough, in the following way: take the first peak of the first time series, then compute the chronological difference with each one of the peaks of the second time series and choose the peak in this time series that leaves the smallest algebraic difference. Now, consider the second peak of the first time series and compute the differences with all the peaks of the second one but the peaks that precedes the one chosen in the previous step. Take from the second time series that for which the difference is the smallest. This procedure for pairing peaks is repeated until either all the peaks in the first time series have been considered or all the peaks in the second series have been exhausted."

Value

Differences between turning points

Examples

```
x <- rnorm(100)
y <- rnorm(100)
dif_TP(TP_BryBoschan(x), TP_BryBoschan(y))
```

TP_BryBoschan	<i>Turning points</i>
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Description

Calculates turning points of a time series using the Bry and Boschan (1971) methodology

Usage

```
TP_BryBoschan(x, frequ = 12, year = 1, month = 1)
```

Arguments

x	univariate time series
frequ	Frequency of the x, 12 monthly or 4 quarterly. Default value 12.
year	The start year of the time series. Default value 1.
month	The start month of the time series. Default value 1.

Value

The dates of the turning points

Author(s)

Wilmer O Martinez R

References

Bry, G. and Boschan, C. (1971) Cyclical Analysis of Time Series: Selected Procedures and Computer Programs, *National Bureau of Economic Research, Inc* **71**(1), 7-63.

Burns, A.F. and Mitchell, W. (1946) Measuring Business Cycles, *National Bureau of Economic Research, NBER, New York*.

Examples

```
x <- rnorm(100)
TP_BryBoschan(x)
```

Index

coincident_profile, [2](#)

dif_TP, [3](#)

TP_BryBoschan, [4](#)