

Package ‘tempord’

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Title Finding temporal orders with causal vector in data/signals/time series

Version 0.9.2

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Description The package contains a main function, enabling the user to estimate bivariate temporal orders in data/signals/time series, depending on customizable settings.

Depends R (>= 3.5.0)

Encoding UTF-8

LazyData true

RoxygenNote 6.1.1

Imports ggplot2,
TSdist

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Description

The main function, enabling to estimate bivariate temporal orders in data/signals/time series, depending on the settings.

Usage

```
tempord(sig1, sig2, method, thr, scaling, sig_length, max_shift, fs,  
point_time_res = 1, shift_time_res = 1, td_type, ...)
```

Arguments

sig1	First data/signal/time series (stands still during the analysis)
sig2	Second data/signal/time series (is being moved during the analysis)
method	Selection of the method ("LM" or "TD" are possible, without a default value)
thr	Selection threshold for determining the curve of maximum or minimum values, respectively (for "LM" and "TD"); without a default value.
scaling	Standardization type: 0 - no standardization; 1 - uniform standardization; 2 - Gaussian standardization; without a default value.
sig_length	Length of the signal segment to window (in seconds); without a default value.
max_shift	Maximal shifts in both directions as 2-element numeric vector (in seconds): maximum backward, maximum forward; without a default value.
fs	Sampling frequency (in Hz).
point_time_res	Time resolution of points, 1 by default.
shift_time_res	Time resolution of shifts (as a multiple of the sampling period), 1 by default.
td_type	Type of distance to calculate: "euclidean", "manhattan", "minkowski", "infnorm", "ccor", "sts", "edr", "erp", "less", "fourier", "tquest", "dissim" can be used without any additional package; dtw package required: "dtw", "keogh.lb"; TSclust package required: "acf", "pacf", "ar.lpc.ceps", "ar.mah", "ar.mah.statistic", "ar.mah.pvalue", "ar.pic", "cdm", "cid", "cor", "cort", "wav", "int.per", "per", "mindist.sax", "ncd", "pred", "spec.glk", "spec.isd", "spec.llr"; pdc package required: "pdc"; longitudinalData package required: "frechet".
...	Additional parameters for time series distances functions.

Value

1) Output parameters in an array form; 2) Output parameters in a data frame form; 3) Figure prepared using ggplot function (The color palette is selected so that the maximum/minimum values are marked in blue; red areas are for the opposite); 4) The curve of maximum or minimum values.

References

Function uses TSdist package (authors: Usue Mori, Alexander Mendiburu, Jose A. Lozano).

Examples

```
require(ggplot2)
fs <- 25
fsig <- 16/60
t <- seq(from=1/fs, to=6000/fs, length.out=6000)
data <- data.frame(TV = 2*sin(2*pi*fsig*t)+rnorm(6000,sd=0.1),
                  RR = 1.2*sin(2*pi*fsig*t + pi)+rnorm(6000,sd=0.1))
bto <- tempord(data$RR,data$TV,"LM",0.95,2,10,c(-2,2),fs,fs,1)
bto$Fig
```

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