Package ‘rshift’

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Type Package

Title Paleoecology Functions for Regime Shift Analysis

Version 2.1.1

Description Contains a variety of functions, based around regime shift analysis of paleoecological data.

Citations:

Suggests R.rsp

VignetteBuilder R.rsp

Depends R (>= 3.5.0)

Imports grid, zoo, tibble, dplyr, ggplot2, magrittr

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**absolute_to_percentage**

Converting absolute abundance data to a percentage of total abundance for each site

**Description**

Converts absolute abundance data to a percentage of total abundance for each site

**Usage**

```
absolute_to_percentage(data, col, site)
```

**Arguments**

- **data**: The dataframe to be used.
- **col**: The column that change is being measured on.
- **site**: The column containing the site of each sample.

**Value**

The ‘data’ dataframe with an added ‘percentage’ column.
**Hellinger_trans**

*Hellinger transform*

**Description**

Hellinger transforms data (Legendre and Legendre, Numerical Ecology)

**Usage**

`Hellinger_trans(data, col, site)`

**Arguments**

- `data` : The dataframe to be used.
- `col` : The column that change is being measured on.
- `site` : The column containing the site of each sample.

**Value**

The ‘data’ dataframe with an added 'hellinger_trans_vals' column.

---

**lake_data**

*DCA-ordinated pollen data from Lake Consuelo*

**Description**


**Usage**

`data(lake_data)`

**Format**

A data frame with 39 rows and 2 variables

**Details**

- DCA1 - DCA values for each timepoint from the raw dataset.
- Age - timepoint of each sample that has been DCA-ordinated.
Description


Usage

data(lake_RSI)

Format

A data frame with 39 rows and 3 variables

Details

• DCA1 - DCA values for each timepoint from the raw dataset.
• Age - timepoint of each sample that has been DCA-ordinated.
• RSI - Regime Shift Index (see docs for Rodionov()) for each timepoint.

Description

performs the L-method for detection of regime shifts (Lanzante, 1996)

Usage

Lanzante(data, col, time, p = 0.05, merge = FALSE)

Arguments

data The dataframe to be used.
col The column we are measuring change on.
time The column containing time units (e.g. age of a subsample)
p The largest p-value you want to check regime shifts for. Defaults to p = 0.05.
merge Sets the result to be either a regime-shift only table (if FALSE), or an addition to the original table (if TRUE)
Rodionov

Value

If merge = FALSE (default), produces a 2-column table of time (the time value for each regime shift) and p (the p-value for each regime shift). If merge = TRUE, returns the original dataset with an extra p-value column, giving the p-value for each time unit - 0 for non-shift years.

Examples

Lanzante(lake_data, "DCA1", "Age")
Lanzante(lake_data, "DCA1", "Age", p=0.10, merge=TRUE)

---

Rodionov

Rodionov (2004)'s STARS algorithm

Description

performs STARS analysis (Rodionov, 2004) on a dataset

Usage

Rodionov(data, col, time, l, prob = 0.95, startrow = 1, merge = FALSE)

Arguments

data
The dataframe to be used.
col
The column we are measuring change on.
time
The column containing time units (e.g. age of a subsample)
l
The cut-off length of a regime; affects sensitivity (see Rodionov, 2004)
prob
The p-value for significance of a regime shift. Defaults to p = 0.05.
startrow
What row the analysis starts at. Defaults to 1.
merge
Sets the result to be either a regime-shift only table (if FALSE), or an addition to the original table (if TRUE)

Value

If merge = FALSE (default), produces a 2-column table of time (the time value for each regime shift) and RSI (the regime shift index for each regime shift). If merge = TRUE, returns the original dataset with an extra RSI column, giving the regime shift index for each time unit - 0 for non-shift years.

Examples

Rodionov(lake_data, "DCA1", "Age", l=5)
Rodionov(lake_data, "DCA1", "Age", l=5, prob=0.99, startrow=2, merge=TRUE)
**rolling_autoc**  
*Rolling autocorrelation*

__Description__

finds lag-1 autocorrelation in a rolling window; can be used to predict resilience (Liu, Gao, & Wang, 2018)

__Usage__

`rolling_autoc(data, col, l)`

__Arguments__

- `data`: The dataframe that will be used.
- `col`: The column we are measuring change on.
- `l`: The time interval (no. of columns) used in the autocorrelation.

__Value__

A table of rolling lag-1 autocorrelation values.

**RSI_graph**  
*Regime Shift Index graph*

__Description__

creates two graphs, one of data and one of the RSI, as seen in Rodionov (2004)

__Usage__

`RSI_graph(data, col, time, rsi)`

__Arguments__

- `data`: The dataframe that will be used.
- `col`: The column we are measuring change on.
- `time`: The column containing time units (e.g. age of a subsample)
- `rsi`: The column containing RSI values (for best visualisation use Rodionov() with `merge=TRUE`)

__Value__

Two graphs, one on top of the other; one of col against time and one of RSI against time.
Examples

RSI_graph(lake_RSI, "DCA1", "Age", "RSI")
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