Package: rolleigen (via r-universe)

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Type Package

Title Rolling Eigenanalysis

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Description Fast and efficient computation of rolling and expanding eigenanalysis for time-series data.

License GPL (>= 2)

URL https://github.com/jasonjfoster/rolleigen

BugReports https://github.com/jasonjfoster/rolleigen/issues

Imports Rcpp, RcppParallel

LinkingTo Rcpp, RcppArmadillo, RcppParallel, roll (>= 1.1.7)

SystemRequirements GNU make

Roxygen list(old_usage = TRUE)

RoxygenNote 7.3.1

Encoding UTF-8

Suggests covr, testthat, zoo, pls, roll

Repository https://jasonjfoster.r-universe.dev

RemoteUrl https://github.com/jasonjfoster/rolleigen

RemoteRef HEAD

RemoteSha f4d3eb40742503c08210e8521bc791a41ea6d23c

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rolleigen-package   *Rolling Eigenanalysis*

Description

Fast and efficient computation of rolling and expanding eigenanalysis for time-series data.

Details

`rolleigen` is a package that provides fast and efficient computation of rolling and expanding eigenanalysis for time-series data.

Author(s)

Jason Foster

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roll_eigen   *Rolling Eigenvalues and Eigenvectors*

Description

A function for computing the rolling and expanding eigenvalues and eigenvectors of time-series data.

Usage

```
roll_eigen(x, width, weights = rep(1, width), center = TRUE,
  scale = FALSE, order = TRUE, min_obs = width, complete_obs = TRUE,
  na_restore = FALSE, online = TRUE)
```

Arguments

x	vector or matrix. Rows are observations and columns are variables.
width	integer. Window size.
weights	vector. Weights for each observation within a window.
center	logical. If TRUE then the weighted mean of each variable is used, if FALSE then zero is used.
scale	logical. If TRUE then the weighted standard deviation of each variable is used, if FALSE then no scaling is done.
order	logical. Change sign and order of the components.
min_obs	integer. Minimum number of observations required to have a value within a window, otherwise result is NA.
complete_obs	logical. If TRUE then rows containing any missing values are removed, if FALSE then pairwise is used.
na_restore	logical. Should missing values be restored?
online	logical. Process observations using an online algorithm.

Value

A list containing the following components:

values	An object of the same class and dimension as x with the rolling and expanding eigenvalues.
vectors	A cube with each slice the rolling and expanding eigenvectors.

Examples

```
n <- 15
m <- 3
x <- matrix(rnorm(n * m), nrow = n, ncol = m)
weights <- 0.9 ^ (n:1)

# rolling eigenvalues and eigenvectors with complete windows
roll_eigen(x, width = 5)

# rolling eigenvalues and eigenvectors with partial windows
roll_eigen(x, width = 5, min_obs = 1)

# expanding eigenvalues and eigenvectors with partial windows
roll_eigen(x, width = n, min_obs = 1)

# expanding eigenvalues and eigenvectors with partial windows and weights
roll_eigen(x, width = n, min_obs = 1, weights = weights)
```

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roll_pcr	*Rolling Principal Component Regressions*

Description

A function for computing the rolling and expanding principal component regressions of time-series data.

Usage

```
roll_pcr(x, y, width, n_comps = ncol(x), weights = rep(1, width),
  intercept = TRUE, center = TRUE, scale = FALSE, min_obs = width,
  complete_obs = TRUE, na_restore = FALSE, online = TRUE)
```

Arguments

x	vector or matrix Rows are observations and columns are the independent variables.
y	vector or matrix. Rows are observations and columns are the dependent variables.
width	integer. Window size.

n_comps	integer. Number of principal components.
weights	vector. Weights for each observation within a window.
intercept	logical. Either TRUE to include or FALSE to remove the intercept.
center	logical. If TRUE then the weighted mean of each variable is used, if FALSE then zero is used.
scale	logical. If TRUE then the weighted standard deviation of each variable is used, if FALSE then no scaling is done.
min_obs	integer. Minimum number of observations required to have a value within a window, otherwise result is NA.
complete_obs	logical. If TRUE then rows containing any missing values are removed, if FALSE then pairwise is used.
na_restore	logical. Should missing values be restored?
online	logical. Process observations using an online algorithm.

Value

A list containing the following components:

coefficients	A list of objects with the rolling and expanding coefficients for each y. An object is the same class and dimension (with an added column for the intercept) as x.
r.squared	A list of objects with the rolling and expanding r-squareds for each y. An object is the same class as x.

Examples

```
n <- 15
m <- 3
x <- matrix(rnorm(n * m), nrow = n, ncol = m)
y <- rnorm(n)
weights <- 0.9 ^ (n:1)

# rolling regressions with complete windows
roll_pcr(x, y, width = 5, n_comps = 1)

# rolling regressions with partial windows
roll_pcr(x, y, width = 5, n_comps = 1, min_obs = 1)

# expanding regressions with partial windows
roll_pcr(x, y, width = n, n_comps = 1, min_obs = 1)

# expanding regressions with partial windows and weights
roll_pcr(x, y, width = n, n_comps = 1, min_obs = 1, weights = weights)
```

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