Package 'JacobiEigen'

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Type Package

Title Classical Jacobi Eigenvalue Algorithm

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Imports Rcpp

Description Implements the classical Jacobi algorithm for the eigenvalues and eigenvectors of a real symmetric matrix, both in pure 'R' and in 'C++' using 'Rcpp'. Mainly as a programming example for teaching purposes.

License GPL (>= 2)

LinkingTo Rcpp

Suggests stats, knitr, dplyr, tidyr, ggplot2, rbenchmark, rmarkdown

VignetteBuilder knitr

NeedsCompilation yes

RoxygenNote 6.1.1

Repository CRAN

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R topics documented:

Jacobi *The Jacobi Algorithm using Rcpp*

Description

The Classical Jacobi Algorithm

Usage

```
Jacobi(x, symmetric = TRUE, only.values = FALSE, eps = 0)
```

Arguments

x	A real symmetric matrix
symmetric	a logical value. Is the matrix symmetric? (Only symmetric matrices are allowed.)
only.values	A logical value: do you want only the eigenvalues?
eps	an error tolerance. 0.0 implies .Machine$double.eps and sqrt(.Machine$double.eps) if only.values = TRUE

Details

Eigenvalues and optionally, eigenvectore, of a real symmetric matrix using the classical Jacobi algorithm, (Jacobi, 1854)

Value

a list of two components as for base::eigen

Examples

```
V <- crossprod(matrix(runif(40, -1, 1), 8))
Jacobi(V)
identical(Jacobi(V), JacobiR(V))
all.equal(Jacobi(V)$values, base::eigen(V)$values)
```

JacobiR *The Jacobi Algorithm in Pure R*

Description

The Jacobi Algorithm

Usage

```
JacobiR(x, symmetric = TRUE, only.values = FALSE, eps = if
  (!only.values) .Machine$double.eps else sqrt(.Machine$double.eps))
```

Arguments

x	a real symmetric matrix
symmetric	a logical value. Is the matrix symmetric? (Only symmetric matrices are allowed.)
only.values	A logical value: Do you want only the eigenvalues?
eps	a small positive error tolerance

Details

Eigenvalues and optionally, eigenvectore of a real symmetric matrix using the classical Jacobi algorithm, (Jacobi, 1854)

Value

a list of two components as for base::eigen

Examples

```
V <- crossprod(matrix(rnorm(25), 5))
JacobiR(V)
identical(Jacobi(V), JacobiR(V))
all.equal(Jacobi(V)$values, base::eigen(V)$values)
```

JacobiS *The Jacobi Algorithm using Rcpp with a stagewise rotation protocol*

Description

The Classical Jacobi Algorithm with a stagewise protocol

Usage

```
JacobiS(x, symmetric = TRUE, only.values = FALSE, eps = 0)
```

Arguments

x	A real symmetric matrix
symmetric	a logical value. Is the matrix symmetric? (Only symmetric matrices are allowed.)
only.values	A logical value: do you want only the eigenvalues?
eps	an error tolerance. 0.0 implies .Machine$double.eps and sqrt(.Machine$double.eps) if only.values = TRUE

Details

Eigenvalues and optionally, eigenvectore, of a real symmetric matrix using the classical Jacobi algorithm, (Jacobi, 1846) using a stagewise rotation protocol

Value

a list of two components as for base::eigen

Examples

```
V <- crossprod(matrix(runif(40, -1, 1), 8))
JacobiS(V)
all.equal(JacobiS(V)$values, Jacobi(V)$values)
zapsmall(crossprod(JacobiS(V)$vectors, Jacobi(V)$vectors))
```

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