Package ‘MuChPoint’

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Type Package
Title Multiple Change Point
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Description Nonparametric approach to estimate the location of block boundaries (change-points) of non-overlapping blocks in a random symmetric matrix which consists of random variables whose distribution changes from block to block.
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Compute the Delta of the dynamic programming

Usage

```r
compute_Cn1n2(x)
```

Arguments

- `x`: the matrix of rank

MuChPoint

MuChPoint fitting procedure

Description

Produce a block-wise estimation of a symmetric matrix.

Usage

```r
MuChPoint(Y, Lmax = nrow(Y)/2, N = NULL, cores = 1, verbose = TRUE)
```

Arguments

- `Y`: symmetric matrix of observations.
- `Lmax`: a positive integer less than number of columns (and number of rows). By default, `nrow(Y)/2`.
- `N`: a positive integer vector less than number of columns (and number of rows). `N` is used when the break-points are known. By default, `NULL`.
- `cores`: a positive integer giving the number of cores used. If you use windows, the parallelization is impossible. By default, 1.
- `verbose`: logical. To display the progression bars. By default TRUE.

References

Article: BRAULT V., OUADAH S., SANSONNET L. and LEVY-LEDUC C. Nonparametric homogeneity tests and multiple change-point estimation for analyzing large Hi-C data matrices. Journal of Multivariate Analysis, 2017
**Examples**

```r
require(MuChPoint)
mu = c(rep(c(rep(1, 25), rep(0, 25)), 3)) %*% t(rep(c(rep(0, 25), rep(1, 25)), 3))
Y = matrix(rnorm(150^2, 0, 5), 150) + mu + t(mu)
Y = as.matrix(Matrix::forceSymmetric(Y))
res = MuChPoint(Y)
plot(res, L = 5, shiny = FALSE)
plot(res, L = 1:5, shiny = FALSE, ask = FALSE)
```

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**MuChPoint-class**

Class "MuChPoint"

**Description**

Class of object returned by the MuChPoint function.

**Usage**

```r
## S4 method for signature 'MuChPoint'
show(object)
```

**Arguments**

- **object** an object with class MuChPoint

**Slots**

- **S** a vector object of type numeric, giving the values of the statistics $S_{n(L)}$ following the number $L$.
- **N** a numeric vector with the position of the different break-points.
- **bt** an inferior triangular matrix containing the positions of break-points following the number of break-points (in rows).

**References**

Article: BRAULT V., OUADAH S., SANSONNET L. and LEVY-LEDUC C. Nonparametric homogeneity tests and multiple change-point estimation for analyzing large Hi-C data matrices. Journal of Multivariate Analysis, 2017

**See Also**

See also `plot,MuChPoint-method` and `MuChPoint`.
plot, MuChPoint-method

Produce a plot of two-dimensional segmentation of a MuChPoint fit.

Description

Produce a plot of two-dimensional segmentation of a MuChPoint fit.

Usage

```r
## S4 method for signature 'MuChPoint'
plot(x, y, shiny = TRUE, col = "Color", L = NULL,
     ask = TRUE)
```

Arguments

- `x`: an object of class MuChPoint.
- `y`: used for S4 compatibility represented the matrix (typically, the matrix used in the program MuChPoint).
- `shiny`: for a representation with a shiny application.
- `col`: for the colors of the representations.
- `L`: the summarized matrix with L break-points (L can be a vector).
- `ask`: If TRUE, to hit will be necessary to see next plot.

References

Article: BRAULT V., OUADAH S., SANSONNET L. and LEVY-LEDUC C. Nonparametric homogeneity tests and multiple change-point estimation for analyzing large Hi-C data matrices. Journal of Multivariate Analysis, 2017

See Also

MuChPoint, capushe.

Examples

```r
require(MuChPoint)
mu=c(rep(c(rep(1,25),rep(0,25)),3))%*%t(rep(c(rep(0,25),rep(1,25)),3))
Y=matrix(rnorm(150*2,0,2),150)+mu+t(mu)
Y=as.matrix(Matrix::forceSymmetric(Y))
res=MuChPoint(Y)
plot(res,Y,L=5,shiny=FALSE)
plot(res,Y,L=1:5,shiny=FALSE,ask=FALSE)
```
print.MuchPoint-method

Print for the class of object returned by the MuchPoint function.

Description

Print for the class of object returned by the MuchPoint function.

Usage

## S4 method for signature ' MuchPoint'
print(x, N = NULL)

Arguments

x
an object with class MuchPoint

N
a numeric between 1 and length(x@N) for the number of break-points desired.

summary.MuchPoint-method

Summary of a MuchPoint object.

Description

Summary of a MuchPoint object.

Usage

## S4 method for signature ' MuchPoint'
summary(object)

Arguments

object
an object of class MuchPoint.

See Also

MuchPoint.

Examples

require(MuchPoint)
mu=as.matrix(c(rep(c(rep(1,25),rep(0,25)),3)))%*%t(rep(c(rep(0,25),rep(1,25)),3))
Y=matrix(rnorm(150*2,0,2),150)+mu+t(mu)
Y=as.matrix(Matrix::forceSymmetric(Y))
res=MuchPoint(Y)
summary(res)
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