Package ‘MuChPoint’

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Type   Package
Title   Multiple Change Point
Version 0.6.3
Maintainer Brault Vincent <vincent.brault@univ-grenoble-alpes.fr>

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. BRAULT Vincent, OUADAH Sarah, SANSONNET Laure and LEVY-LEDUC Celine (2017) <doi:10.1016/j.jmva.2017.12.005>.

Imports  Matrix, capushe, shiny, utils, methods, Rcpp
Collate  MuChPoint_Class.R RcppExports.R MuChPoint.R

URL https://github.com/Lionning/MuChPoint

BugReports https://github.com/Lionning/MuChPoint/issues

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RoxygenNote 7.1.2

LinkingTo Rcpp

NeedsCompilation yes

Author Brault Vincent [cre, aut],
       Cougoulat Glenn [ctb],
       Ouadah Sarah [ctb],
       Sansonnet Laure [ctb]

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### Compute_Cn1n2

#### Description
Compute the Delta of the dynamic programming in Rcpp

#### Usage
Compute_Cn1n2(x)

#### Arguments
- **x**: the matrix of rank

### MuChPoint

#### Description
Produce a block-wise estimation of a symmetric matrix.

#### Usage
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.
MuChPoint-class

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,Y,L=5,shiny=FALSE)
plot(res,Y,L=1:10,shiny=FALSE,ask=FALSE)
```

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 $S(n_1,...,n_L)$ 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
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

## 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=1:10,shiny=FALSE,ask=FALSE)
```
### print,MuChPoint-method

*Print for the class of object returned by the MuChPoint function.*

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#### Description

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

#### Usage

```r
## 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.

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### summary,MuChPoint-method

*Summary of a MuChPoint object.*

---

#### Description

Summary of a MuChPoint object.

#### Usage

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

#### Arguments

- `object`: an object of class `MuChPoint`.

#### See Also

- `MuChPoint`

#### 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)
summary(res)
```
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