Package 'MuChPoint'

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Type Package

Title Multiple Change Point

Version 0.6.4

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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.
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, grDevices, graphics

Collate MuChPoint_Class.R RcppExports.R MuChPoint.R

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

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

License GPL-2

Encoding UTF-8

RoxygenNote 7.3.3

LinkingTo Rcpp

NeedsCompilation yes

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`Compute_Cn1n2` *Compute the Delta of the dynamic programming*

Description

Compute the Delta of the dynamic programming in Rcpp

Usage

```
Compute_Cn1n2(x)
```

Arguments

`x`	the matrix of rank

`MuChPoint` *MuChPoint fitting procedure*

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.

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

```
require(MuChPoint)
require(Matrix)
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(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

```
## 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(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

See Also

See also plot,MuChPoint-method and MuChPoint.

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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

```
require(MuChPoint)
require(Matrix)
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(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.*

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)
require(Matrix)
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(forceSymmetric(Y))
res=MuChPoint(Y)
summary(res)
```

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