Package: mscp (via r-universe)

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Type Package

Title Multiscale Change Point Detection via Gradual Bandwidth Adjustment in Moving Sum Processes

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Description Multiscale moving sum procedure for the detection of changes in expectation in univariate sequences. References - Multiscale change point detection via gradual bandwidth adjustment in moving sum processes (2021+), Tijana Levajkovic and Michael Messer.

License GPL-3

RoxygenNote 7.1.1

NeedsCompilation no

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Repository CRAN

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mscp *mscp*

Description

Multiscale change point detection via gradual bandwidth adjustment in moving sum processes. A method for the detection of changes in the expectation in univariate sequences.

Usage

```
mscp(x, delta = 20, g = 20, kappa = NA, alpha = 0.01, sim = 500)
```

Arguments

x	numeric vector. Input sequence of random variables.
delta	integer >=2. Default = 20. Minimal window considered.
g	integer >=1. Default = 20. Spacing between starting points.
kappa	NA or positive real number. Default = NA. Breaking threshold. If NA, then kappa is derived in simulations, using alpha and sim
alpha	numeric in (0,1). Default = 0.01. Significance level, i.e., sets kappa as (1-alpha)-quantile of maximum of Gaussian process limit.
sim	integer >=1. Default = 500. Number of simulations for kappa.

Value

invisible list

cp	detected change points (ordered according to detection)
mean_sd	matrix of estimated means and standard deviations
path	list containing matrices, each matrix describing the path of a detected change point. First column: t-value, second column: h-value, third column: D-value (statistic), first row: starting values, last row: end values
S	matrix of possible starting values. First column: t-value, second column: h-value, third column: D-value (statistic), fourth column: step when cut out
x	input sequence
delta	minimal window size
g	spacing between starting points
kappa	threshold

Author(s)

Tijana Levajkovic and Michael Messer

References

Multiscale change point detection via gradual bandwidth adjustment in moving sum processes (2021+), Tijana Levajkovic and Michael Messer

See Also

plot.mscp, summary.mscp

Examples

```
set.seed(1)
Tt <- 1000
cp <- c(250,500,600,650,750)
mu <- c(2,3,6,9,12,15)
sd <- c(1,1,2,1,2,1)
m  <- rep(mu,diff(c(0,cp,Tt)))
s  <- rep(sd,diff(c(0,cp,Tt)))
x  <- rnorm(Tt,m,s)
result <- mscp(x,kappa=4.77) # kappa set manually
# result <- mscp(x) # kappa derived in simulations
summary(result)
plot(result)
```

---

plot.mscp *plot.mscp*

Description

Plot method for class 'mscp'

Usage

```
## S3 method for class 'mscp'
plot(x = x, cex = 1, plot.legend = TRUE, ...)
```

Arguments

x	object of class mscp
cex	numeric, global sizes in plot
plot.legend	logical, if TRUE legends are plotted
...	additional arguments

Value

No return value, called for side effects

Author(s)

Tijana Levajkovic and Michael Messer

References

Multiscale change point detection via gradual bandwidth adjustment in moving sum processes (2021+), Tijana Levajkovic and Michael Messer

See Also

`mscp`, `summary.mscp`

Examples

```
set.seed(1)
Tt <- 1000
cp <- c(250,500,600,650,750)
mu <- c(2,3,6,9,12,15)
sd <- c(1,1,2,1,2,1)
m  <- rep(mu,diff(c(0,cp,Tt)))
s  <- rep(sd,diff(c(0,cp,Tt)))
x  <- rnorm(Tt,m,s)
result <- mscp(x,kappa=4.77) # kappa set manually
# result <- mscp(x) # kappa derived in simulations
summary(result)
plot(result)
```

`summary.mscp` *summary.mscp*

Description

Summary method for class 'mscp'

Usage

```
## S3 method for class 'mscp'
summary(object, ...)
```

Arguments

`object`	object of class mscp
`...`	additional arguments

Value

No return value, called for side effects

Author(s)

Tijana Levajkovic and Michael Messer

References

Multiscale change point detection via gradual bandwidth adjustment in moving sum processes (2021+), Tijana Levajkovic and Michael Messer

See Also

mscp, plot.mscp

Examples

```
set.seed(1)
Tt <- 1000
cp <- c(250,500,600,650,750)
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m  <- rep(mu,diff(c(0,cp,Tt)))
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x  <- rnorm(Tt,m,s)
result <- mscp(x,kappa=4.77) # kappa set manually
# result <- mscp(x) # kappa derived in simulations
summary(result)
plot(result)
```

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