

# Package ‘EnergyOnlineCPM’

February 16, 2017

**Type** Package

**Title** EnergyOnlineCPM Package

**Version** 1.0

**Date** 2017-02-14

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**Depends** parallel, energy, R (>= 3.3.2)

**Description** This package is used for Phase II multiple change points detection for high dimensional time series.

**License** GPL (>= 2)

## R topics documented:

EnergyOnlineCPM	1
maxEnergyCPMv	2
<b>Index</b>	<b>4</b>

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EnergyOnlineCPM	<i>An R package for Phase II multiple change points detection for high dimensional time series.</i>
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## Description

This package is used for Phase II multiple change points detection for high dimensional time series.

## Details

Package: EnergyOnlineCPM  
Type: Package  
Version: 1.3  
Date: 2017-02-14  
License: GPL (>= 2)

**Author(s)**

Yafei Xu <yafei.xu@hu-berlin.de>

**Examples**

```
# Installation of the package from Github
install.packages("devtools")
library(devtools)
install_github("YafeiXu/EnergyOnlineCPM")
library(EnergyOnlineCPM)
```

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maxEnergyCPMv

*Phase II Multiple Change Points Model for High Dimensional Time Series*


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**Description**

This function is used for online detection of multiple change points based on energy divergence for high dimensional time series.

**Usage**

```
maxEnergyCPMv(data1, wNr, permNr, alpha)
```

**Arguments**

data1	an N*d matrix, N is the number of observations and d the dimensions.
wNr	a scalar of warm-up.
permNr	a scalar of times of permutation.
alpha	a scalar of significant level

**Details**

The function returns ONLY ONE vector containing even number components, where the first half stands for detection time vector and the rest half stands for the vector of change time locations.

**Value**

result	a vector of locations of detection time in the first half, locations of change time in the second half.
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**Author(s)**

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**Examples**

```
library(MASS)

# simulate 300 length time series
simNr=300

# simulate 300 length 5 dimensional standard Gaussian series
Sigma2 <- matrix(c(1,0,0,0,0, 0,1,0,0,0, 0,0,1,0,0, 0,0,0,1,0, 0,0,0,0,1),5,5)
Mean2=rep(1,5)
sim2=(mvrnorm(n = simNr, Mean2, Sigma2))

# simulate 300 length 5 dimensional standard Gaussian series
Sigma3 <- matrix(c(1,0,0,0,0, 0,1,0,0,0, 0,0,1,0,0, 0,0,0,1,0, 0,0,0,0,1),5,5)
Mean3=rep(0,5)
sim3=(mvrnorm(n = simNr, Mean3, Sigma3))

# construct a data set of length equal to 90.
# first 20 points are from standard Gaussian.
# second 30 points from a Gaussian with a mean shift with 555.
# last 40 points are from standard Gaussian.
data1=sim6=rbind(sim2[1:20,],(sim3+555)[1:30,],sim2[1:40,])

# set warm-up number as 20, permutation 200 times, significant level 0.005
wNr=20
permNr=200
alpha=1/200
maxEnergyCPMv(data1,wNr,permNr,alpha)
```

# Index

- \*Topic **Change Point Model**
    - EnergyOnlineCPM, [1](#)
    - maxEnergyCPMv, [2](#)
  - \*Topic **Energy Statistic**
    - EnergyOnlineCPM, [1](#)
    - maxEnergyCPMv, [2](#)
  - \*Topic **High Dimensional Time Series Monitoring**
    - EnergyOnlineCPM, [1](#)
  - \*Topic **Phase II Statistical Process Control**
    - EnergyOnlineCPM, [1](#)
    - maxEnergyCPMv, [2](#)
- EnergyOnlineCPM, [1](#)
- maxEnergyCPMv, [2](#)