# Package 'Homework2'

December 4, 2013

**Type** Package

**Title** Homework2

**Version** 1.0

**Date** 2013-12-04

**Author** Detian Deng

**Maintainer** Detian Deng <ddeng@jhsph.edu>

**Description** Apply Newton and EM algorithm to estimate gaussian mixture model

**License** GPL-2

## R topics documented:



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`Homework2-package` *Homework 2 for Advanced Computing*

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### Description

The package contains a function, 'mixture', which applies Newton and EM algorithm to estimate Gaussian mixture model parameters.

### Details

| | |
|---|---|
| Package: | Homework2 |
| Type: | Package |
| Version: | 1.0 |
| Date: | 2013-12-04 |
| License: | GPL-2 |

mixture(y, method, maxit = NULL, tol = 1e-08, param0 = NULL) input data y, and choose method.

## Author(s)

Detian Deng

Maintainer: Detian Deng <ddeng@jhsph.edu>

## References

class notes

## Examples

```
w = 0.6
m1 = 5; m2 = -5; v1 = 2; v2 = 3

W = rbinom(1000,1,prob=w)
N1 = rnorm(1000,m1,sqrt(v1))
N2 = rnorm(1000,m2,sqrt(v2))
Y = W*N1+(1-W)*N2
rm(w,m1,m2,v1,v2,W,N1,N2)

mixture(y=Y,method="Newton",maxit = 100)
mixture(y=Y,method="EM",maxit = 300)
```

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# hw2_data *Homework2 dataset*

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## Description

A sample of 19600 data points drawn from a Gaussian mixture distribution

## Usage

```
hw2_data
```

## Format

A vector containing 19600 observations.

## Source

GitHub

## References

NA

mixture *Estimating Gaussian mixture model parameters*

## Description

Apply Newton and EM algorithm to estimate Gaussian mixture model parameters.

## Usage

```
mixture(y, method, maxit = NULL, tol = 1e-08, param0 = NULL)
```

## Arguments

| | |
|---|---|
| y | Data in a vector or a data frame. |
| method | "Newton" or "EM". |
| maxit | Maximum number of iteration allowed. |
| tol | Convergence tolerance. |
| param0 | Starting values of parameters. Default to NULL. |

## Value

| | |
|---|---|
| mle | Maximul Likelihood Estimate of parameters. |
| stderr | Standard error of the MLEs |

## Author(s)

Detian Deng

## Examples

```
w = 0.6
m1 = 5; m2 = -5; v1 = 2; v2 = 3

W = rbinom(1000,1,prob=w)
N1 = rnorm(1000,m1,sqrt(v1))
N2 = rnorm(1000,m2,sqrt(v2))
Y = W*N1+(1-W)*N2
rm(w,m1,m2,v1,v2,W,N1,N2)

mixture(y=Y,method="Newton",maxit = 100)
mixture(y=Y,method="EM",maxit = 300)
```

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