

# Package ‘Rfolding’

September 30, 2018

**Type** Package

**Title** The Folding Test of Unimodality

**Version** 1.0

**Description** The basic algorithm to perform the folding test of unimodality.

Given a dataset X (d dimensional, n samples), the test checks whether the distribution of the data are rather unimodal or rather multimodal. This package stems from the following research publication:

Siffer Alban, Pierre-Alain Fouque, Alexandre Termier, and Christine Largouët.

“Are your data gathered?” In Proceedings of the 24th ACM SIGKDD International Conference on Knowledge Discovery Data Mining, pp. 2210-2218. ACM, 2018.

<doi:10.1145/3219819.3219994>.

**Encoding** UTF-8

**License** GPL-3

**LazyData** true

**RoxygenNote** 6.1.0

**Suggests** testthat,MASS,knitr,rmarkdown

**Imports** stats

**VignetteBuilder** knitr

**NeedsCompilation** no

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**Repository** CRAN

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folding.ratio	<i>Computes the folding ratio of the input data</i>
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### Description

Computes the folding ratio of the input data

### Usage

```
folding.ratio(X)
```

### Arguments

X                    nxd matrix (n observations, d dimensions)

### Value

the folding ratio

### Examples

```
X = matrix(runif(n = 1000, min = 0., max = 1.), ncol = 1)
phi = folding.statistics(X)
```

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folding.statistics	<i>Computes the folding statistics of the input data</i>
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### Description

Computes the folding statistics of the input data

### Usage

```
folding.statistics(X)
```

### Arguments

X                    nxd matrix (n observations, d dimensions)

### Value

the folding statistics

**Examples**

```
library(MASS)
mu = c(0,0)
Sigma = matrix(c(1,0.5,1,0.5), ncol = 2)
X = mvrnorm(n = 5000, mu = mu, Sigma = Sigma)
Phi = folding.statistics(X)
```

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folding.test	<i>Perform the folding test of unimodality</i>
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**Description**

Perform the folding test of unimodality

**Usage**

```
folding.test(X)
```

**Arguments**

X                    \$nxd\$ matrix (n observations, d dimensions)

**Value**

1 if unimodal, 0 if multimodal

**Examples**

```
library(MASS)
n = 10000
d = 3
mu = c(0,0,0)
Sigma = matrix(c(1,0.5,0.5,0.5,1,0.5,0.5,0.5,1), ncol = d)
X = mvrnorm(n = n, mu = mu, Sigma = Sigma)
m = folding.test(X)
```

folding.test.bound     *Computes the confidence bound for the significance level p*

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**Description**

Computes the confidence bound for the significance level p

**Usage**

```
folding.test.bound(n, d, p)
```

**Arguments**

n	sample size
d	dimension
p	significance level (between 0 and 1, the lower, the more significant)

**Value**

the confidence bound q (the bounds are 1-q and 1+q)

**Examples**

```
n = 2000 # number of observations
d = 2    # 2 dimensional data
p = 0.05 # we want the bound at the level 0.05 (classical p-value)
q = folding.test.bound(n,d,p)
```

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folding.test.pvalue     *Computes the p-value of the folding test*

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**Description**

Computes the p-value of the folding test

**Usage**

```
folding.test.pvalue(Phi, n, d)
```

**Arguments**

Phi	the folding statistics
n	sample size
d	dimension

**Value**

the p-value (the lower, the more significant)

**Examples**

```
library(MASS)
n = 5000
d = 2
mu = c(0,0)
Sigma = matrix(c(1,0.5,1,0.5), ncol = d)
X = mvrnorm(n = n, mu = mu, Sigma = Sigma)
Phi = folding.statistics(X)
p = folding.test.pvalue(Phi,n,d)
```

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<code>pivot.approx</code>	<i>Computes the pivot <math>s_2</math> (approximate pivot)</i>
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**Description**

Computes the pivot  $s_2$  (approximate pivot)

**Usage**

```
pivot.approx(X)
```

**Arguments**

X                    nxd matrix (n observations, d dimensions)

**Value**

the approximate pivot

**Examples**

```
library(MASS)
mu = c(0,0)
Sigma = matrix(c(1,0.5,1,0.5), ncol = 2)
X = mvrnorm(n = 5000, mu = mu, Sigma = Sigma)
Phi = pivot.approx(X)
```

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