Package 'empichar'

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Type Package

Title Evaluates the Empirical Characteristic Function for Multivariate Samples

Version 1.0.1

Description Evaluates the empirical characteristic function of univariate and multivariate samples. This package uses 'RcppArmadillo' for fast evaluation. It is also possible to export the code to be used in other packages at 'C++' level.

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Encoding UTF-8

RoxygenNote 7.2.3

LinkingTo Rcpp, RcppArmadillo

Imports Rcpp

Suggests testthat (>= 2.1.0), spelling, covr

Language en-US

URL https://github.com/gbasulto/empichar

BugReports https://github.com/gbasulto/empichar/issues

NeedsCompilation yes

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Repository CRAN

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Contents

ecf *Empirical characteristic function*

Description

Empirical characteristic function of a d-dimensional random variable. This function is evaluated at m vectors of size d.

Usage

```
ecf(t, smp)
```

Arguments

t	m x d matrix where the function will be evaluated.
smp	n x d matrix with sample size if size n.

Details

This function must receive matrices or vectors. It is a wrapper function that allows more general inputs.

Value

A complex vector of size m with the empirical characteristic function.

Examples

```
library(empichar)
t <- seq(-10, 10, 0.05)
X <- rnorm(150, mean = 1)
vals <- ecf(t, X)
plot(t, Re(vals), type = "l", main = "real part")
plot(t, Im(vals), type = "l", main = "imaginary part")
```

ecf_imag *Imaginary part of empirical characteristic function*

Description

Imaginary part of empirical characteristic function of a d-dimensional random variable. This function is evaluated at m vectors of size d.

Usage

```
ecf_imag(t, smp)
```

Arguments

t	m x d matrix where the function will be evaluated.
smp	n x d matrix with sample size if size n.

Details

This function must receive matrices or vectors. It is a wrapper function that allows more general inputs.

Value

A vector of size m with the imaginary part of the empirical characteristic function.

Examples

```
library(empichar)
t <- seq(-10, 10, 0.05)
X <- rnorm(150, mean = 1)
vals <- ecf_imag(t, X)
plot(t, vals, type = "l")
```

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ecf_mod *Modulus of empirical characteristic function*

Description

Modulus of empirical characteristic function of a d-dimensional random variable. This function is evaluated at m vectors of size d.

Usage

```
ecf_mod(t, smp)
```

Arguments

t	m x d matrix where the function will be evaluated.
smp	n x d matrix with sample size if size n.

Details

This function must receive matrices or vectors. It is a wrapper function that allows more general inputs.

Value

A vector of size m with the modulus of the empirical characteristic function.

Examples

```
library(empichar)
t <- seq(-10, 10, 0.05)
X <- rnorm(150)
vals <- ecf_mod(t, X)
plot(t, vals, type = "l")
```

`ecf_real` *Real part of empirical characteristic function*

Description

Real part of empirical characteristic function of a d-dimensional random variable. This function is evaluated at m vectors of size d.

Usage

```
ecf_real(t, smp)
```

Arguments

`t`	m x d matrix where the function will be evaluated.
`smp`	n x d matrix with sample size if size n.

Details

This function must receive matrices or vectors. It is a wrapper function that allows more general inputs.

Value

A vector of size m with the real part of the empirical characteristic function.

Examples

```
library(empichar)
t <- seq(-10, 10, 0.05)
X <- rnorm(150)
vals <- ecf_real(t, X)
plot(t, vals, type = "l")
```

Index