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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**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**

```r
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**

```r
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**

```r
ecf_imag(t, smp)
```
**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**

```r
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")
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