Package ‘empichar’

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Type Package
Title Evaluates the Empirical Characteristic Function for Multivariate Samples
Version 1.0.0
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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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: mxd matrix where the function will be evaluated.
- smp: nxd 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")

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)
**ecf_mod**

**Arguments**

- **t**: mxd matrix where the function will be evaluated.
- **smp**: nxd 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**

```r
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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**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**: mxd matrix where the function will be evaluated.
- **smp**: nxd 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

```r
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**

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

**Arguments**

- `t`: mxd matrix where the function will be evaluated.
- `smp`: nxd 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**

```r
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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