Package 'dtt'

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Type Package

Title Discrete Trigonometric Transforms

Version 0.1-2.1

License GPL (>= 2)

URL https://www.r-project.org, https://www.komsta.net/

Description Provides functions for 1D and 2D Discrete Cosine Transform (DCT), Discrete Sine Transform (DST) and Discrete Hartley Transform (DHT).

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Author Lukasz Komsta [aut, cre]

Maintainer Lukasz Komsta <lukasz.komsta@umlub.pl>

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`dtt-package` *Discrete Trigonometric Transforms*

Description

This package provides functions for 1D and 2D Discrete Cosine Transform (DCT), Discrete Sine Transform (DST) and Discrete Hartley Transform (DHT).

Details

Package:	dtt
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Author(s)

Maintainer: Lukasz Komsta <luke@novum.am.lublin.pl>

`dtt` *Discrete Trigonometric Transforms*

Description

Performs univariate discrete sine, cosine or Hartley transform.

Usage

```
dtt(x, type = c("dct", "dst", "dht"), variant = 2, inverted = FALSE)
dct(x, variant = 2, inverted = FALSE)
dst(x, variant = 2, inverted = FALSE)
dht(x, inverted = FALSE)
```

Arguments

`x`	a vector or matrix to be transformed
`type`	type of transform. Default "dct" is discrete cosine, "dst" is discrete sine and "dht" is discrete Hartley
`variant`	a transformation variant - 1...4 for DCT-I...DCT-IV or DST-I...DST-IV. Default is DCT-II or DST-II. Ignored when type = "dht"
`inverted`	if the inverted transform should be performed?

Details

This function transforms a vector of real numbers into a vector of its DCT, DST or DHT components, of the same length.

If the x is a matrix, the transform goes by rows (each row of a result is a transform of corresponding row in x).

The dct, dst and dht functions are simple wrappers for choosing the type by function name.

Value

A transformed vector.

Author(s)

Lukasz Komsta

References

1. N. Ahmed, T. Natarajan, and K. R. Rao, "Discrete Cosine Transform", IEEE Trans. Computers, 90-93, Jan 1974. 2. S. A. Martucci, "Symmetric convolution and the discrete sine and cosine transforms", IEEE Trans. Sig. Processing SP-42, 1038-1051 (1994). 3. R. V. L. Hartley, "A more symmetrical Fourier analysis applied to transmission problems," Proc. IRE 30, 144-150 (1942).

See Also

mvdtt, fft, mvfft

Examples

```
x=seq(0,20,length=200)
y=x*sin(x)+cos(x)+5*cos(10*x)+rnorm(200,sd=0.1)
plot(y)
z=dct(y); z[151:200]=0; lines(dct(z,inverted=TRUE),col=2);
z=dct(y); z[21:200]=0; lines(dct(z,inverted=TRUE),col=4);
```

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mvdtt *2D Discrete Trigonometric Transforms*

Description

Performs multivariate (2D) discrete sine, cosine or Hartley transform.

Usage

```
mvdtt(x, type = c("dct", "dst", "dht"), variant = 2, inverted = FALSE)
mvdct(x, variant = 2, inverted = FALSE)
mvdst(x, variant = 2, inverted = FALSE)
mvdht(x, inverted = FALSE)
```

Arguments

x	a matrix to be transformed
type	type of transform. Default "dct" is discrete cosine, "dst" is discrete sine and "dht" is discrete Hartley
variant	a transformation variant - 1...4 for DCT-I...DCT-IV or DST-I...DST-IV. Default is DCT-II or DST-II. Ignored when type = "dht"
inverted	if the inverted transform should be performed?

Details

This function transforms a matrix of real numbers into a matrix of its DCT, DST or DHT components, of the same dimensions. It is done by so-called row-matrix algorithm.

The mvdct, mvdst and mvdht functions are simple wrappers for choosing the type by function name.

Value

A transformed matrix.

Author(s)

Lukasz Komsta

References

1. N. Ahmed, T. Natarajan, and K. R. Rao, "Discrete Cosine Transform", IEEE Trans. Computers, 90-93, Jan 1974. 2. S. A. Martucci, "Symmetric convolution and the discrete sine and cosine transforms", IEEE Trans. Sig. Processing SP-42, 1038-1051 (1994). 3. R. V. L. Hartley, "A more symmetrical Fourier analysis applied to transmission problems," Proc. IRE 30, 144-150 (1942).

See Also

dtt, fft, mvfft

Examples

```
x = rnorm(100);
dim(x) = c(10,10);
x
mvdct(x)
mvdct(mvdct(x),inverted=TRUE)
```

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