Package ‘general.spherical’

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Type Package

Title An R package which calculates the generalized spherical harmonics

Version 1.0

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Description
An R package which calculates the generalized spherical harmonics. We use the definition provided by Dai and Xu in ``Approximation Theory and Harmonic Analysis on Spheres and Balls".

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Encoding UTF-8

LazyData true

Depends R (>= 4.0)

Imports orthopolynom, pracma, matrixcalc, mefa, Directional, hypergeo, stringr, assertr, Matrix, glmnet

RoxygenNote 7.1.1

NeedsCompilation no

R topics documented:

`y.q.x` *A function to calculate the generalized spherical harmonics*

Description

A function to calculate the generalized spherical harmonics as defined by Dai and Xu in "Approximation Theory and Harmonic Analysis on Spheres and Balls".

Usage

```
y.q.x(x, q, normalize.by.volume)
```

Arguments

`x` A vector of the form x = (x_1, ..., x_p) where p>=3 and each x_j is a real number.

`q` A vector of the form q = (q_1, ..., q_p) where p>=3 and each q_j is a non-negative integer.

`normalize.by.volume` Logical argument. Whether to normalize by the volume of the hyper-sphere. If TRUE, then the value returned with be normalized by the volume element.

Value

The generalized spherical harmonic evaluated for x evaluated for q.

Note

This research was supported by a grant from the Google Cloud Platform.

Author(s)

Nishan Mudalige

References

Dai, F. and Xu, Y. (2013), Approximation Theory and Harmonic Analysis on Spheres and Balls, Springer Science & Business Media.

Examples

```
## Example 1
# q = c(1,0,0)
# x = c(1,1,1)

# y.q.x(x, q, F)
# y.q.x(x, q, T)


## Example 2
# q = c(1,0,0)
# x = c(1/sqrt(3),1/sqrt(3),1/sqrt(3))

# y.q.x(x, q, F)
# y.q.x(x, q, T)


## Example 3
# q = c(1,0,0,0)
# x = c(1/sqrt(8),2/sqrt(8),3/sqrt(8),4/sqrt(8))

# y.q.x(x, q, F)
# y.q.x(x, q, T)



## Example 4
# q = c(0,1,0,0)
# x = c(1/sqrt(8),2/sqrt(8),3/sqrt(8),4/sqrt(8))
# y.q.x(x, q, F)
# y.q.x(x, q, T)
```

Index