Package 's.harmonic'

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Type Package

Title A package to evaluate spherical harmonics and express Legendre polynomials

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Description An R package to evaluate spherical harmonics and express Legendre polynomials using the Rodrigues' representation.

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Encoding UTF-8

LazyData true

Depends R (>= 3.5.1)

Imports Ryacas, tm

RoxygenNote 6.1.1

NeedsCompilation no

R topics documented:

`a.leg.poly` *A function to display the expression of an associated Legendre polynomials*

Description

Given a non-negative degree l and an order m, this function will display the expression of the associated Legentre polynomial. The output is an object of type 'expression'

Usage

```
a.leg.poly(l, m)
```

Arguments

l	The degree. Must be a non-negative integer.
m	The order. Must be an integer.

Value

The output is an object of tpye 'expression'

Author(s)

Nishan Mudalige

Examples

```
## Display the expression of the associated Legendre polynomial of degree 3 and order 1
## a.leg.poly(3,1)

## Evaluate the associated Legendre polynomial of degree 5 and order -2
## a.leg.poly(5,-2)
```

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plm *A function to evaluates an associated Legendre polynomials*

Description

A function which numerically evaluates an associated Legendre polynomials for a given degree l and order m.

Usage

```
plm(l, m, x.entered)
```

Arguments

l	The degree of the associated Legendre polynomial. Must me a non negative integer.
m	The order of the associated Legendre polynomial. Must be an integer.
x.entered	Value to evaluate the Legendre polynomial.

Author(s)

Nishan Mudalige

Examples

```
## plm(1,1,0.5)

## plm(4,-3,0.5)
```

`spherical.harmonic` *A function to calculate the real spherical harmonics*

Description

A function which calculates the real (tesseral) spherical harmonics for a given degree l and order m. The spherical harmonic is evaluated at the spherical coordinate (theta,phi) on the unit sphere in S^2.

Usage

```
spherical.harmonic(l, m, theta, phi)
```

Arguments

`l`	The degree of the associated Legendre polynomial. Must me a non negative integer.
`m`	The order of the associated Legendre polynomial. Must be an integer.
`theta`	The polar angle.
`phi`	The azimuthal angle.

Author(s)

Nishan Mudalige

Examples

```
## spherical.harmonic(3, 1, pi/2, pi/4)

## spherical.harmonic(5, -2, pi/3, pi/6)
```

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