Package 'chebInterp'

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Type Package

Title Chebyshev Polynomial Interpolation

Version 0.1.0

Maintainer Walter Zhang <walterwzhang@chicagoboth.edu>

Description Chebyshev polynomial interpolation routines

License GPL-3

Depends R (>= 3.1.0)

Suggests parallel, knitr, rmarkdown, reshape

VignetteBuilder knitr

Encoding UTF-8

RoxygenNote 6.1.1

R topics documented:

`calculateChebyshevCoefficients` *Computes the Chebyshev coefficients from a given function and cheb list*

Description

Also checks to ensure the cheb$T matrix is orthogonal The rounding down to 0 in the beginning is to account for numerical precision and is controlled by the tolerance parameter The function f only takes one argument

Usage

```
calculateChebyshevCoefficients(f, cheb, tolerance = 1e-12)
```

Arguments

f	Function to be approximated (function)
cheb	List of item from initalizeChebyshevApproximator (list)
tolerance	Numerical Tolerance for rounding down

Value

A list of Chebyshev coefficients (matrix)

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calculateChebyshevPolynomials

Computes the polynomials for a given degree and vector of values.

Description

Resultant matrix of polynomials is of size length(x) by N + 1

Usage

```
calculateChebyshevPolynomials(x, N)
```

Arguments

x	Vector of values to compute the polynomials at (numeric)
N	Highest Degree of the Polynomial (Integer)

Value

A matrix of the polynomials (matrix)

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evaluateChebyshev

Evaluates the Chebyshev Approximation for a matrix (or a vector) of points

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Description

Option for parallelized evaluation for many points to evaluate

Usage

```
evaluateChebyshev(x, cheb, parallel = FALSE, numcores = 1L)
```

Arguments

x	Points to evaluate with size Points by Dimensions (matrix)
cheb	List of item from initalizeChebyshevApproximator (list)
parallel	Boolean flag for parallelization (logical)
numcores	Cores for parallelization (integer)

Value

A vector of predictions for each point of x

`evaluateChebyshev_T` *Evaluates the Chebyshev Approximation for a matrix (or a vector) of points and returns the underlying basis function values instead of the interpolation values*

Description

Option for parallelized evaluation for many points to evaluate

Usage

```
evaluateChebyshev_T(x, cheb, parallel = FALSE, numcores = 1L)
```

Arguments

`x`	Points to evaluate with size Points by Dimensions (matrix)
`cheb`	List of item from initalizeChebyshevApproximator (list)
`parallel`	Boolean flag for parallelization (logical)
`numcores`	Cores for parallelization (integer)

Value

A matrix of the underlying basis function values

`initializeChebyshevApproximator` *Initializes the Chebyshev Approximation*

Description

Initializes the Chebyshev Approximation

Usage

```
initializeChebyshevApproximator(D, N, M = N + 1, bounds = NULL,
  upper_b = NULL, lower_b = NULL)
```

Arguments

`D`	Dimensions of the Problem (integer)
`N`	Highest Degree of the Polynomial (integer)
`M`	Number of Interpolation Nodes in each dimension (integer)
`bounds`	Bounds of the rectangle on which the function is approximated (list)
`upper_b`	A vector of upper bounds (numeric)
`lower_b`	A vector of lower bounds (numeric)

Value

A list of the initialized approximation

Index