
linalg

Release 1.0.4

Jun 24, 2019

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Welcome! This is the documentation for linalg, a simple python package for linear algebra. Main functions and classes

class `linalg.Matrix` (*mat*, *valid=False*)

Implements Matrices.

T () → `linalg.types.Matrix`

computes the transpose of self implemented as an alias of `linalg.unary.transpose`

Returns transposed matrix

Return type *Matrix*

det () → float

computes the determinant for self. implemented as an alias of `linalg.unary.det`

Returns the determinant for mat

Return type float

inv () → `linalg.types.Matrix`

returns the inverse matrix of mat implemented as an alias of `linalg.unary.inverse`

Parameters **mat** (*Matrix*) – the matrix to invert

Returns the inverse matrix of mat

Return type *Matrix*

inverse () → `linalg.types.Matrix`

returns the inverse matrix of mat implemented as an alias of `linalg.unary.inverse`

Parameters **mat** (*Matrix*) – the matrix to invert

Returns the inverse matrix of mat

Return type *Matrix*

ttranspose () → `linalg.types.Matrix`

computes the transpose of self implemented as an alias of `linalg.unary.transpose`

Returns transposed matrix

Return type *Matrix*

`linalg.zeros` (*i: int*, *j: int*) → `linalg.types.Matrix`

creates an i by j zero matrix

Parameters

- **i** (*int*) – number of columns
- **j** (*int*) – number of rows

Returns an i by j matrix filled with zeroes

Return type *Matrix*

`linalg.identity` (*n: int*) → `linalg.types.Matrix`

generates an n by n identity matrix

Parameters **n** (*int*) – number of rows/columns

Returns n by b identity matrix

Return type *Matrix*

`linalg.random_matrix(dim: tuple, rng: tuple, use_float: bool = False) → linalg.types.Matrix`
generates a random matrix

Parameters

- **dim** (*tuple*) – dimensions of matrix
- **rng** (*tuple*) – range of randomized elements
- **float** (*bool*) – whether to use floats for elements (default False)

Returns randomized matrix of specified size and range

Return type *Matrix*

`linalg.lu(mat: linalg.types.Matrix) -> (<class 'linalg.types.Matrix'>, <class 'linalg.types.Matrix'>, <class 'linalg.types.Matrix'>, <class 'int'>)`
implements LUP decomposition

Returns returns a tuple with L, U, and P

Return type *Matrix*, *Matrix*, *Matrix*, int

`linalg.linsolve(mat: linalg.types.Matrix, b: linalg.types.Matrix) → linalg.types.Matrix`
solve a system of linear equations using LU decomposition

Parameters

- **mat** (*Matrix*) – system of linear equations
- **b** (*Matrix*) – column vector to solve for

Returns the solution

Return type *Matrix*

`linalg.pivottize(mat: linalg.types.Matrix) -> (<class 'linalg.types.Matrix'>, <class 'int'>)`
creates the pivoting matrix for mat

Parameters **mat** (*Matrix*) – the matrix to perform the operation on

Returns the pivoting matrix for self and the number of permutations

Return type *Matrix*, int

`linalg.inverse(mat: linalg.types.Matrix) → linalg.types.Matrix`
returns the inverse matrix of mat

Parameters **mat** (*Matrix*) – the matrix to invert

Returns the inverse matrix of mat

Return type *Matrix*

`linalg.det(mat: linalg.types.Matrix) → float`
computes the determinant for a given matrix

Parameters **mat** (*Matrix*) – matrix to compute the determinant for

Returns the determinant for mat

Return type float

`linalg.transpose(mat: linalg.types.Matrix) → linalg.types.Matrix`
computes the transpose of a given matrix

Parameters **mat** (*Matrix*) – matrix to perform the operation on

Returns transposed matrix

Return type *Matrix*

`linalg.T(mat: linalg.types.Matrix) → linalg.types.Matrix`
computes the transpose of a given matrix

Parameters `mat` (*Matrix*) – matrix to perform the operation on

Returns transposed matrix

Return type *Matrix*

`linalg.inv(mat: linalg.types.Matrix) → linalg.types.Matrix`
returns the inverse matrix of mat

Parameters `mat` (*Matrix*) – the matrix to invert

Returns the inverse matrix of mat

Return type *Matrix*

`linalg.as_matrix(ls: list) → linalg.types.Matrix`
Parses the input 2D list into a Matrix. Convenience top-level function for `linalg.matrix.Matrix()`

Parameters `ls` (*list*) – list to convert into matrix

Returns Matrix representation of ls

Return type *Matrix*

`linalg.as_list(mat: linalg.types.Matrix) → list`
Returns the matrix as a vanilla 2D list.

Parameters `mat` (*Matrix*) – matrix to convert

Returns matrix as a 2d list

Return type *list*

CHAPTER 1

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