

Package ‘matricks’

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Type Package

Title Useful Tricks for Matrix Manipulation

Version 0.8.2

Description Provides functions, which make matrix creation conciser (such as the core package's function `m()` for rowwise matrix definition or `runifm()` for random value matrices).
Allows to set multiple matrix values at once, by using list of formulae.
Provides additional matrix operators and dedicated plotting function.

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Encoding UTF-8

LazyData true

BugReports <https://github.com/krzjoa/matricks/issues>

URL <https://github.com/krzjoa/matricks>,
<https://krzjoa.github.io/matricks/>

Suggests testthat (>= 2.1.0), knitr, rmarkdown, covr

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LinkingTo Rcpp

Imports Rcpp, rlang, ggplot2, reshape2

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antidiag	<i>Matrix antidiagonals</i>
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Description

Extract or replace the antidiagonal of a matrix, or construct a antidiagonal matrix.

Usage

```
antidiag(x = as.numeric(c(1)), nrow = NULL, ncol = NULL)

antidiag(x) <- value
```

Arguments

x	matrix, vector or 1D array, or missing.
nrow	number of rows (optional; when x is not a matrix)
ncol	number of columns (optional; when x is not a matrix)
value	either a single value or a vector of length equal to that of the current antidiagonal. Should be of a mode which can be coerced to that of x.

Examples

```
# Extracting antidiag
antidiag(diag(3))
# Creating antidiagonal matrix
antidiag(7, 3, 3)
antidiag(1:5, 3, 3)
# Assigning antidiagonal
mat <- matrix(0, 3, 3)
antidiag(mat) <- c(3, 4, 5)
mat
```

at	<i>Set or get matrix value at index vector</i>
----	--

Description

This function allows to access matrix values by passing indices as vector

Usage

```
at(mat, idx)

at(mat, idx) <- value
```

Arguments

mat	matrix
idx	two-element integer vector
value	a value to be assign at index

Value

‘at’ function: value from matrix at index idx

Examples

```
mat <- matrix(0, 3, 3)
idx <- c(1, 2)
# Typically, given matrix and row-column indices as two-element vector, we should do it like this:
mat[idx[1], idx[2]]
mat[idx[1], idx[2]] <- 8
# Using `at`, we can do it simpler!
at(mat, idx)
at(mat, idx) <- 7
mat
at(mat, idx)
```

binding	<i>Bind vector, single values and matrices</i>
---------	--

Description

This functions works very similar to well-known base ‘cbind’ or ‘rbind’ function. However, there is one big difference between these functions. If you pass a vector, each value will be get individually.

Usage

```
col_bind(...)
```

```
row_bind(...)
```

Arguments

... single values, vectors, matrices or data.frames

Value

a matrix being a product of matrix/vector/values binding

Examples

```
# `col_bind` vs `cbind`
cbind(1,2,3,4,5)
col_bind(1,2,3,4,5)
cbind(1:5)
col_bind(1:5)
cbind(matrix(3, 3, 3), 0.33, 4:7)
col_bind(matrix(3, 3, 3), 0.33, 4:7)
# `row_bind` vs `rbind`
rbind(1,2,3,4,5)
row_bind(1,2,3,4,5)
rbind(1:5)
row_bind(1:5)
rbind(matrix(3, 3, 3), 0.33, 4:7)
row_bind(matrix(3, 3, 3), 0.33, 4:7)
```

is_idx_possible	<i>Is idx possible in given matrix?</i>
-----------------	---

Description

Is idx possible in given matrix?

Usage

```
is_idx_possible(mat, idx)
```

Arguments

mat	matrix
idx	two-element vector

Examples

```
is_idx_possible(matrix(0, 3, 3), c(4, 5))
is_idx_possible(matrix(0, 3, 3), c(3, 2))
```

m

A shortcut to create matrix defining rows

Description

One of the main functionalities of the package. It is an alternative to standard way we define matrices in R.

Usage

```
m(...)
```

Arguments

...	Single values, vectors, matrices and 'l' as special symbol which breaks input on the rows.
-----	--

Value

matrix with defines elements

Examples

```
# Typically, we define matrices like this:
x <- matrix(c(1, 2, 3,
              4, 5, 6,
              7, 8, 9), nrow=3, byrow=TRUE)

x
# However, this way of ceating matices seems to be
# a little bit clunky. Using `matricks`, we can do
# it in more staightforward way dividing our input
# into rows by using special symbol `|`
x <- m(1, 2, 3|
      4, 5, 6|
      7, 8, 9)
```

```

x
# Moreover, we can pass to the `m` function
# whole sequences or even matrices.
x <- m(1:5 | 6:10 | 11:15 )
x
# We can combine multiple matrices into one
m(diag(3),      diag(3) * 3|
  diag(3) * 3, diag(3)    )

```

matrix_idx	<i>Get available marix indices</i>
------------	------------------------------------

Description

Get available marix indices

Usage

```
matrix_idx(mat, n.row = NULL, n.col = NULL, mask = NULL)
```

Arguments

mat	matrix
n.row	number of rows; default: NULL
n.col	number of columns; default: NULL
mask	logical matrix; default: NULL

Examples

```

T <- TRUE; F <- FALSE
mat <- matrix(0, 3, 3)
mask <- m(T, T, F | T, F, T | F, F, T)
# All poss
matrix_idx(mat)
matrix_idx(mat, mask = mask)
matrix_idx(mask = mask)

```

neighbour_idx	<i>Get all indices in neighbourhood</i>
---------------	---

Description

Get all indices in neighbourhood

Usage

```
neighbour_idx(mat, idx, mask = NULL, diagonal = TRUE,
  include.idx = FALSE)
```

Arguments

mat	matrix or data.frame
idx	two-element vector
mask	logical matrix; optional
diagonal	include diagonal neighbours
include.idx	include current index

Examples

```
mat <- matrix(0, 3, 3)
neighbour_idx(mat, c(1, 2))
neighbour_idx(mat, c(1, 2), diagonal = FALSE)
neighbour_idx(mat, c(1, 2), diagonal = FALSE, include.idx = TRUE)
# With mask
mat <- matrix(0, 3, 4)
mask <- m(FALSE, FALSE, TRUE, TRUE |
  FALSE, FALSE, FALSE, FALSE |
  TRUE, TRUE, FALSE, TRUE)
neighbour_idx(mat, c(1, 2), mask = mask)
```

neighbour_idx_matrix	<i>Create matrix of lists, where each one contains list of neighbour field coordinates</i>
----------------------	--

Description

Create matrix of lists, where each one contains list of neighbour field coordinates

Usage

```
neighbour_idx_matrix(mat, mask = NULL, diagonal = TRUE,
  random.select = NULL)
```

Arguments

mat	matrix
mask	logical matrix. Its dimensions must be identical with dimensions of mat
diagonal	logical. get diagonal neighbours
random.select	select one random neighbour

Examples

```
T <- TRUE; F <- FALSE
mat <- matrix(0, 3, 3)
mask <- m(T, T, F | T, F, T | F, F, T)
nimat <- neighbour_idx_matrix(mat, mask, diagonal = TRUE)
neighbour_idx_matrix(mat, mask, diagonal = TRUE, random.select = 1)
```

operators	<i>Binary operations on matrices/vectors</i>
-----------	--

Description

This operator allows to do elementwise operation of two algebraic object i.e. matrices/vectors. There is one required condition to perform such operation: at least one domension values from both objects must be the same

Usage

- a %m% b
- a %d% b
- a %-% b
- a %+% b

Arguments

a	matrix/vector
b	matrix/vector

Value

Matrix/vector

Examples

```
# Multiply
m(1, 2, 3 | 4, 5, 6 | 7, 8, 9) %m% v(5,4,3)
# Divide
m(1, 2, 3 | 4, 5, 6 | 7, 8, 9) %d% v(5,4,3)
# Add
m(1, 2, 3 | 4, 5, 6 | 7, 8, 9) %+% v(5,4,3)
# Subtract
m(1, 2, 3 | 4, 5, 6 | 7, 8, 9) %-% v(5,4,3)
```

plot_matrix

*Plot a matrix***Description**

This function allows us to plot matrices easily

Usage

```
plot_matrix(x, ...)

## S3 method for class 'matrix'
plot(x, ...)
```

Arguments

```
x          a matrix
...        for S3 generic API consistency; does nothing
```

Value

a ggplot object

Examples

```
T <- TRUE; F <- FALSE
x1 <- m(T, T, T, F, T |
        T, T, F, T, T |
        F, T, T, T, F |
        T, T, T, T, T |
        F, F, T, T, T |
        F, T, T, T, F)
plot_matrix(x1)
x2 <- m(T, T, T, F, T |
        T, T, F, T, T )
plot(x2)
x3 <- m(runif(3) | runif(3) | runif(3))
plot(x3)
```

rboolm	Create matrix of random choosen boolean values
--------	--

Description

Create matrix of random choosen boolean values

Usage

```
rboolm(nrow, ncol, true.proba = 0.5)
```

Arguments

nrow	number of rows
ncol	numner of columns
true.proba	probability of true values; default: 0.5

Value

a matrix

Examples

```
rboolm(3, 3)
rboolm(4, 5, true.proba = 0.3)
```

repetitions	Repeat columns or rows
-------------	------------------------

Description

Repeat matrix object respectively to its shape and orientation

Usage

```
crep(x, times)

rrep(x, times)
```

Arguments

x	matrix
times	number of repetitions

Details

crep = columnwise repetition

rrep = rowwise repetition

Value

matrix

Examples

```
# Columnwise repetition
crep(v(1:3), 4)
crep(t(v(1:5)), 4)
# Rowwise repetition
rrep(v(1:3), 4)
rrep(t(v(1:5)), 4)
```

runifm

Create matrix of random values drawn from uniform distribution

Description

Create matrix of random values drawn from uniform distribution

Usage

```
runifm(nrow, ncol, min = 0, max = 1)
```

Arguments

nrow	number of rows
ncol	number of columns
min	lower limit of the distribution. Must be finite.
max	upper limit of the distribution. Must be finite.

Value

a matrix

Examples

```
runifm(3, 3)
runifm(4, 5, min = -1, max = 3)
```

runif_same_dims	<i>Create matrix of random values with dimensions copied from an existing matrix</i>
-----------------	--

Description

Create matrix of random values with dimensions copied from an existing matrix

Usage

```
runif_same_dims(mat, min = 0, max = 1)
```

Arguments

mat	matrix
min	lower limit of the distribution. Must be finite.
max	upper limit of the distribution. Must be finite.

Value

a matrix

Examples

```
mat <- matrix(0, 3, 3)
runif_same_dims(mat)
```

seq_matrix	<i>Return a sequence of pairs (value, index vector)</i>
------------	---

Description

Facilitates iterating over matrix, returning a sequence of pairs, where the first element is a value at index (x, y) and the second one is the index (x, y)

Usage

```
seq_matrix(mat)
```

Arguments

mat	matrix
-----	--------

Value

list of two-element list (single value, two-element vector)

Examples

```
mat <- matrix(1:9, 3, 3)
seq_matrix(mat)
```

set_values	<i>Set multiple values using one function call</i>
------------	--

Description

This functions allows to set multiple elements of a matrix instead of using annoying step-by-step assignment by `mat[1,2] <- 2` `mat[2,3] <- 0.5` etc.

Usage

```
set_values(mat, ...)

sv(mat, ...)
```

Arguments

<code>mat</code>	a matrix object
<code>...</code>	formulae; left hand values should be two-element interger vectors and right-hand: a single-value numeric

Value

matrix

Examples

```
mat <- matrix(0, 4, 5)
set_values(mat, c(1,1) ~ 5, c(3, 4) ~ 0.3)
```

v	<i>A shortcut to create a vertical vector</i>
---	---

Description

This function provides convenient shortcut to create a vertical (column) vector.

Usage

```
v(...)
```

Arguments

... arbitrary number of values

Value

matrix with dims n_elements x 1

Examples

```
# Enumerating all the values with commas
v(1, 2, 3)
# Passing whole sequence as an argument
v(1:5)
```

with_same_dims	<i>Create new matrix copying dimensions from the existing one</i>
----------------	---

Description

Create new matrix copying dimensions from the existing one

Usage

```
with_same_dims(mat, data)
```

Arguments

mat a matrix with desired dimensions
 data single numeric value or numeric vector

Value

a matrix

Examples

```
x <- matrix(7, 3, 6)
x
with_same_dims(x, 0)
with_same_dims(x, c(1, 2))
```

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