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

RoxygenNote 6.1.1

LinkingTo Rcpp

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`antidiag` *Matrix antidiagonals*

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` *Set or get matrix value at index vector*

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 simplier!
at(mat, idx)
at(mat, idx) <- 7
mat
at(mat, idx)
```

binding *Bind vector, single values and matrices*

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 *Is idx possible in given matrix?*

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 '|' 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` *Get available marix indices*

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 *Get all indices in neighbourhood*

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

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 *Binary operations on matrices/vectors*

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	numer 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	numer 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 — *Create matrix of random values with dimensions copied from an existing matrix*

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 — *Return a sequence of pairs (value, index vector)*

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 *Set multiple values useing one function call*

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

mat	a matrix object
...	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 *A shortcut to create a vertical vector*

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 *Create new matrix copying dimensions from the existing one*

Description

Create new matrix copying dimensions from the existing one

Usage

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

Arguments

mat	a matrix with desired dimensions
data	sigle 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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