Meshgrid Arrays in R

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Go back to fan's REconTools Package, R4Econ Repository, or Intro Stats with R Repository.

- r expand.grid meshed array to matrix
- r meshgrid
- r array to matrix
- r reshape array to matrix
- dplyr permuations rows of matrix and element of array
- tidyr expand_grid mesh matrix and vector

```
options(knitr.duplicate.label = 'allow')
```

```
library(tidyverse)
library(tidyr)
library(knitr)
library(kableExtra)
# file name
st_file_name = 'fs_meshr'
# Generate R File
purl(paste0(st_file_name, ".Rmd"), output=paste0(st_file_name, ".R"), documentation = 2)
# Generate PDF and HTML
# rmarkdown::render("C:/Users/fan/R4Econ/support/array/fs_meshr.Rmd", "pdf_document")
# rmarkdown::render("C:/Users/fan/R4Econ/support/array/fs_meshr.Rmd", "html_document")
```

Mesh Matrix and Vector using dplyr expand_grid

In the example below, we have a matrix that is 5 by 2, and a vector that is 1 by 3. We want to generate a tibble dataset that meshes the matrix and the vector, so that all combinations show up.

Note *expand_grid* is a from tidyr 1.0.0.

```
# it_child_count = N, the number of children
it_N_child_cnt = 5
# P fixed parameters, nN is N dimensional, nP is P dimensional
ar_nN_A = seq(-2, 2, length.out = it_N_child_cnt)
ar_nN_alpha = seq(0.1, 0.9, length.out = it_N_child_cnt)
mt_nP_A_alpha = cbind(ar_nN_A, ar_nN_alpha)

# Choice Grid
it_N_choice_cnt = 3
fl_max = 10
fl_min = 0
ar_nN_alpha = seq(fl_min, fl_max, length.out = it_N_choice_cnt)

# expand grid with dplyr
expand_grid(x = 1:3, y = 1:2)
```

```
## # A tibble: 6 x 2
##       x     y
##   <int> <int>
```

```
## 1      1     1
## 2      1     2
## 3      2     1
## 4      2     2
## 5      3     1
## 6      3     2
```

```
tb_expanded <- as_tibble(mt_nP_A_alpha) %>% expand_grid(choices = ar_nN_alpha)

# display
kable(tb_expanded) %>%
  kable_styling(bootstrap_options = c("striped", "hover", "condensed", "responsive"))
```

ar__nN__A	ar__nN__alpha	choices
-2	0.1	0
-2	0.1	5
-2	0.1	10
-1	0.3	0
-1	0.3	5
-1	0.3	10
0	0.5	0
0	0.5	5
0	0.5	10
1	0.7	0
1	0.7	5
1	0.7	10
2	0.9	0
2	0.9	5
2	0.9	10

Mesh Matrix (meshgrid) for R using expand.grid

Define Two Arrays and Mesh Them using expand.grid

Given two arrays, mesh the two arrays together.

```
# use expand.grid to generate all combinations of two arrays

it_ar_A = 5
it_ar_alpha = 10

ar_A = seq(-2, 2, length.out=it_ar_A)
ar_alpha = seq(0.1, 0.9, length.out=it_ar_alpha)

mt_A_alpha = expand.grid(A = ar_A, alpha = ar_alpha)

mt_A_meshed = mt_A_alpha[,1]
dim(mt_A_meshed) = c(it_ar_A, it_ar_alpha)

mt_alpha_meshed = mt_A_alpha[,2]
dim(mt_alpha_meshed) = c(it_ar_A, it_ar_alpha)

# display
kable(mt_A_meshed) %>%
```

```
  kable_styling(bootstrap_options = c("striped", "hover", "condensed", "responsive"))
```

-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2

```
kable(mt_alpha_meshed) %>%
  kable_styling(bootstrap_options = c("striped", "hover", "condensed", "responsive"))
```

0.1	0.1888889	0.2777778	0.3666667	0.4555556	0.5444444	0.6333333	0.7222222	0.8111111	0.9
0.1	0.1888889	0.2777778	0.3666667	0.4555556	0.5444444	0.6333333	0.7222222	0.8111111	0.9
0.1	0.1888889	0.2777778	0.3666667	0.4555556	0.5444444	0.6333333	0.7222222	0.8111111	0.9
0.1	0.1888889	0.2777778	0.3666667	0.4555556	0.5444444	0.6333333	0.7222222	0.8111111	0.9
0.1	0.1888889	0.2777778	0.3666667	0.4555556	0.5444444	0.6333333	0.7222222	0.8111111	0.9

Two Identical Arrays, Mesh to Generate Square using expand.grid

Two Identical Arrays, individual attributes, each column is an individual for a matrix, and each row is also an individual

```
# use expand.grid to generate all combinations of two arrays

it_ar_A = 5

ar_A = seq(-2, 2, length.out=it_ar_A)
mt_A_A = expand.grid(Arow = ar_A, Arow = ar_A)
mt_Arow = mt_A_A[,1]
dim(mt_Arow) = c(it_ar_A, it_ar_A)
mt_Acol = mt_A_A[,2]
dim(mt_Acol) = c(it_ar_A, it_ar_A)

# display
kable(mt_Arow) %>%
  kable_styling(bootstrap_options = c("striped", "hover", "condensed", "responsive"))
```

-2	-2	-2	-2	-2
-1	-1	-1	-1	-1
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2

```
kable(mt_Acol) %>%
  kable_styling(bootstrap_options = c("striped", "hover", "condensed", "responsive"))
```

-2	-1	0	1	2
-2	-1	0	1	2
-2	-1	0	1	2
-2	-1	0	1	2
-2	-1	0	1	2