Matlab Array Broadcast and Expansion Examples

back to Fan's Reusable Matlab Repository or Dynamic Asset Repository.

Matrix broadcasting was added to matlab's recent editions. This is an important step for vectorizing codes. Proper usage of broadcasting reduces memory allocation requirements for matrix matrix operations.

Expand with Broadcast, Percentage Choice grids

```
clear all
ar_w_perc = [0.1,0.5,0.9]
```

```
ar_w_perc = 1×3
    0.1000    0.5000    0.9000
```

```
ar_w_level = [-2,0,2]
```

```
ar_w_level = 1×3
    -2     0     2
```

```
fl_b_bd = -4
```

```
fl_b_bd = -4
```

```
ar_k_max = ar_w_level - fl_b_bd
```

```
ar_k_max = 1×3
     2     4     6
```

```
ar_ak_perc = [0.1,0.3,0.7,0.9]
```

```
ar_ak_perc = 1×4
    0.1000    0.3000    0.7000    0.9000
```

```
mt_k = (ar_k_max'*ar_ak_perc)'
```

```
mt_k = 4×3
    0.2000    0.4000    0.6000
    0.6000    1.2000    1.8000
    1.4000    2.8000    4.2000
    1.8000    3.6000    5.4000
```

```
mt_a = (ar_w_level - mt_k)
```

```
mt_a = 4×3
   -2.2000   -0.4000    1.4000
   -2.6000   -1.2000    0.2000
   -3.4000   -2.8000   -2.2000
   -3.8000   -3.6000   -3.4000
```

Expand Matrix Twice

```
clear all
% Same as above
ar_w_level = [-2,-1,-0.1]
```

```
ar_w_level = 1×3
```

```
   -2.0000   -1.0000   -0.1000
```

```
fl_b_bd = -4
```

```
fl_b_bd = -4
```

```
ar_k_max = ar_w_level - fl_b_bd
```

```
ar_k_max = 1×3
    2.0000    3.0000    3.9000
```

```
ar_ak_perc = [0.001, 0.1,0.3,0.7,0.9, 0.999]
```

```
ar_ak_perc = 1×6
    0.0010    0.1000    0.3000    0.7000    0.9000    0.9990
```

```
mt_k = (ar_k_max'*ar_ak_perc)'
```

```
mt_k = 6×3
    0.0020    0.0030    0.0039
    0.2000    0.3000    0.3900
    0.6000    0.9000    1.1700
    1.4000    2.1000    2.7300
    1.8000    2.7000    3.5100
    1.9980    2.9970    3.8961
```

```
mt_a = (ar_w_level - mt_k)
```

```
mt_a = 6×3
   -2.0020   -1.0030   -0.1039
   -2.2000   -1.3000   -0.4900
   -2.6000   -1.9000   -1.2700
   -3.4000   -3.1000   -2.8300
   -3.8000   -3.7000   -3.6100
   -3.9980   -3.9970   -3.9961
```

```
% fraction of borrowing for bridge loan
ar_coh_bridge_perc = [0, 0.5, 0.999];

% Expand matrix to include coh percentage dimension
mt_k = repmat(mt_k, [1, length(ar_coh_bridge_perc)])
```

```
mt_k = 6×9
    0.0020    0.0030    0.0039    0.0020    0.0030    0.0039    0.0020    0.0030 ···
    0.2000    0.3000    0.3900    0.2000    0.3000    0.3900    0.2000    0.3000
    0.6000    0.9000    1.1700    0.6000    0.9000    1.1700    0.6000    0.9000
    1.4000    2.1000    2.7300    1.4000    2.1000    2.7300    1.4000    2.1000
    1.8000    2.7000    3.5100    1.8000    2.7000    3.5100    1.8000    2.7000
    1.9980    2.9970    3.8961    1.9980    2.9970    3.8961    1.9980    2.9970
```

```
mt_a = repmat(mt_a, [1, length(ar_coh_bridge_perc)])
```

```
mt_a = 6×9
   -2.0020   -1.0030   -0.1039   -2.0020   -1.0030   -0.1039   -2.0020   -1.0030 ···
   -2.2000   -1.3000   -0.4900   -2.2000   -1.3000   -0.4900   -2.2000   -1.3000
   -2.6000   -1.9000   -1.2700   -2.6000   -1.9000   -1.2700   -2.6000   -1.9000
   -3.4000   -3.1000   -2.8300   -3.4000   -3.1000   -2.8300   -3.4000   -3.1000
   -3.8000   -3.7000   -3.6100   -3.8000   -3.7000   -3.6100   -3.8000   -3.7000
   -3.9980   -3.9970   -3.9961   -3.9980   -3.9970   -3.9961   -3.9980   -3.9970
```

```
mt_a = mt_a
```

```
mt_a = 6×9
   -2.0020   -1.0030   -0.1039   -2.0020   -1.0030   -0.1039   -2.0020   -1.0030 ···
   -2.2000   -1.3000   -0.4900   -2.2000   -1.3000   -0.4900   -2.2000   -1.3000
   -2.6000   -1.9000   -1.2700   -2.6000   -1.9000   -1.2700   -2.6000   -1.9000
   -3.4000   -3.1000   -2.8300   -3.4000   -3.1000   -2.8300   -3.4000   -3.1000
   -3.8000   -3.7000   -3.6100   -3.8000   -3.7000   -3.6100   -3.8000   -3.7000
   -3.9980   -3.9970   -3.9961   -3.9980   -3.9970   -3.9961   -3.9980   -3.9970
```

```
% bridge loan component of borrowing
ar_brdige_a = (ar_coh_bridge_perc'*ar_w_level)'
```

```
ar_brdige_a = 3×3
         0   -1.0000   -1.9980
         0   -0.5000   -0.9990
         0   -0.0500   -0.0999
```

```
ar_brdige_a = ar_brdige_a(:)'
```

```
ar_brdige_a = 1×9
         0         0         0   -1.0000   -0.5000   -0.0500   -1.9980   -0.9990 ···
```

```
% borrowing choices excluding bridge loan
mt_a_nobridge = mt_a - ar_brdige_a
```

```
mt_a_nobridge = 6×9
   -2.0020   -1.0030   -0.1039   -1.0020   -0.5030   -0.0539   -0.0040   -0.0040 ···
   -2.2000   -1.3000   -0.4900   -1.2000   -0.8000   -0.4400   -0.2020   -0.3010
   -2.6000   -1.9000   -1.2700   -1.6000   -1.4000   -1.2200   -0.6020   -0.9010
   -3.4000   -3.1000   -2.8300   -2.4000   -2.6000   -2.7800   -1.4020   -2.1010
   -3.8000   -3.7000   -3.6100   -2.8000   -3.2000   -3.5600   -1.8020   -2.7010
   -3.9980   -3.9970   -3.9961   -2.9980   -3.4970   -3.9461   -2.0000   -2.9980
```