Python Numpy Combine Arrays to Matrix

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Contents

1 Generate Matrix from Arrays **1**
1.1 Generate a Random Matrix 1
1.2 Stack Arrays to Matrix 2

1 Generate Matrix from Arrays

Go to the **RMD**, **PDF**, or **HTML** version of this file. Go back to Python Code Examples Repository (bookdown site) or the pyfan Package (API).

```
import numpy as np
```

1.1 Generate a Random Matrix

Generate a matrix with random numbers and arbitrary number of rows and columns. Several types of matrix below:

1. uniform random
2. integer random
3. integer random resorted (shuffled)
4. integer random redrawn (with replacements)

Set size:

```
it_rows = 2;
it_cols = 3;
np.random.seed(123)
```

uniform random:

```
# A random matrix of uniform draws
mt_rand_unif = np.random.rand(it_rows, it_cols)
print(mt_rand_unif)
```

```
## [[0.69646919 0.28613933 0.22685145]
##  [0.55131477 0.71946897 0.42310646]]
```

integer random:

```
# A random matrix of integers
it_max_int = 10
mt_rand_integer = np.random.randint(it_max_int, size=(it_rows, it_cols))
print(mt_rand_integer)
```

```
## [[6 1 0]
```

```
##  [1 9 0]]
```

integer random resorted (shuffled):

```
# A sequence of numbers, 1 to matrix size, resorted, unique
it_mat_size = it_rows*it_cols
ar_seq = np.arange(it_mat_size)
ar_idx_resort = np.random.choice(np.arange(it_mat_size), it_mat_size, replace = False)
ar_seq_rand_sorted = ar_seq[ar_idx_resort]
mt_seq_rand_sorted = ar_seq_rand_sorted.reshape((it_rows, it_cols))
print(mt_seq_rand_sorted)
# achieve the same objective with a shuffle
```

```
## [[5 4 2]
##  [3 1 0]]
```

```
np.random.shuffle(ar_seq)
mt_seq_rand_shuffle = ar_seq.reshape((it_rows, it_cols))
print(mt_seq_rand_shuffle)
```

```
## [[2 1 3]
##  [5 0 4]]
```

integer random redrawn (with replacements):

```
# A sequence of numbers, 1 to matrix size, resorted, nonunique, REPLACE = TRUE
it_mat_size = it_rows*it_cols
ar_seq = np.arange(it_mat_size)
ar_idx_resort_withreplacement = np.random.choice(np.arange(it_mat_size), it_mat_size, replace = True)
ar_seq_rand_sorted_withreplacement = ar_seq[ar_idx_resort_withreplacement]
mt_seq_rand_sorted_withreplacement = ar_seq_rand_sorted_withreplacement.reshape((it_rows, it_cols))
print(mt_seq_rand_sorted_withreplacement)
```

```
## [[3 2 4]
##  [2 4 0]]
```

1.2 Stack Arrays to Matrix

Given various arrays, generate a matrix by stacking equi-length arrays as columns

```
# three arrays
ar_a = [1,2,3]
ar_b = [3,4,5]
ar_c = [11,4,1]

# Concatenate to matrix
mt_abc = np.column_stack([ar_a, ar_b, ar_c])
print(mt_abc)
```

```
## [[ 1  3 11]
##  [ 2  4  4]
##  [ 3  5  1]]
```