Lecture A5.Simulation 2

Baek, Jong min

2021-01-05

Exercise(Page.10)

Using runif() function in R, complete the following code block that generates 1,000 random numbers that follow $exp(5)$?

```python
import numpy as np
import math
N = 1000
u = np.random.uniform(low=0,high=1,size=N)
x = np.log(1-u)/3

print(x[:5])
```
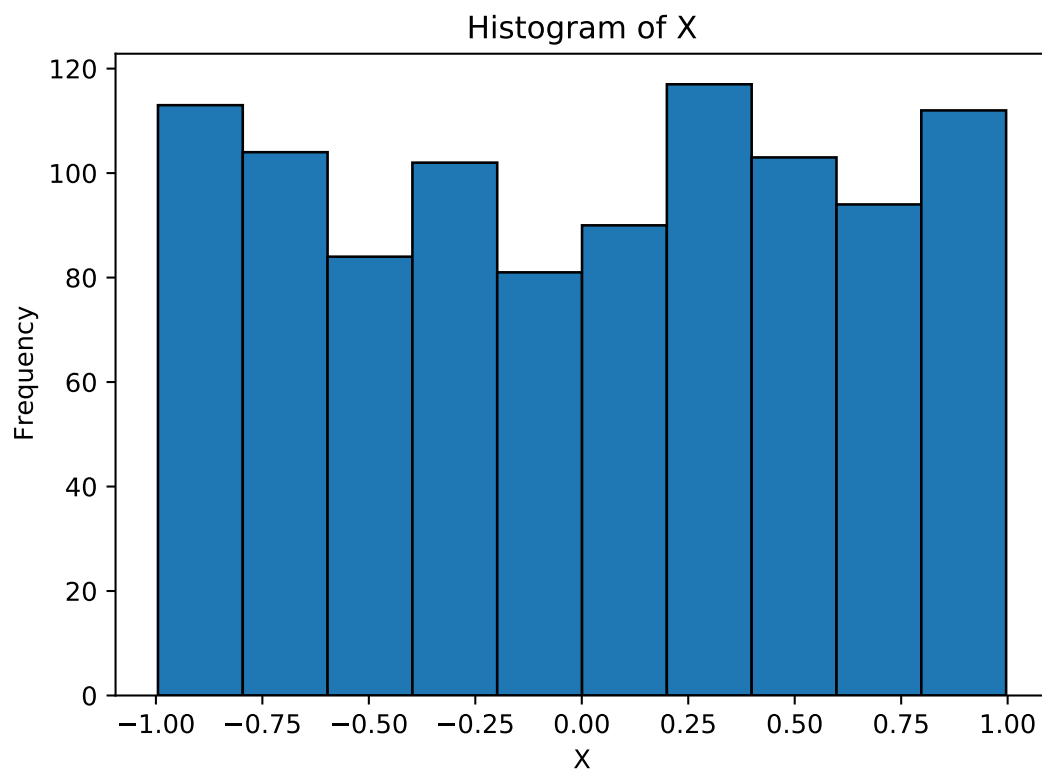
```
## [-0.18435978 -0.19304834 -0.1659015  -0.07853541 -0.10234903]
```

Uniform random numbers(Page.15)

```
x = np.random.uniform(low=-1,high=1,size=1000)
plt.hist(x,edgecolor='black')
```

```
## (array([113., 104.,  84., 102.,  81.,  90., 117., 103.,  94., 112.]), array([-9.95187837e-
01, -7.96028085e-01, -5.96868334e-01, -3.97708582e-01,
##         -1.98548830e-01,  6.10922381e-04,  1.99770674e-01,  3.98930426e-01,
##          5.98090178e-01,  7.97249930e-01,  9.96409682e-01]), <BarContainer object of 10 artists>)
```

```
plt.xlabel('X')
plt.ylabel('Frequency')
plt.title('Histogram of X')
plt.show()
```
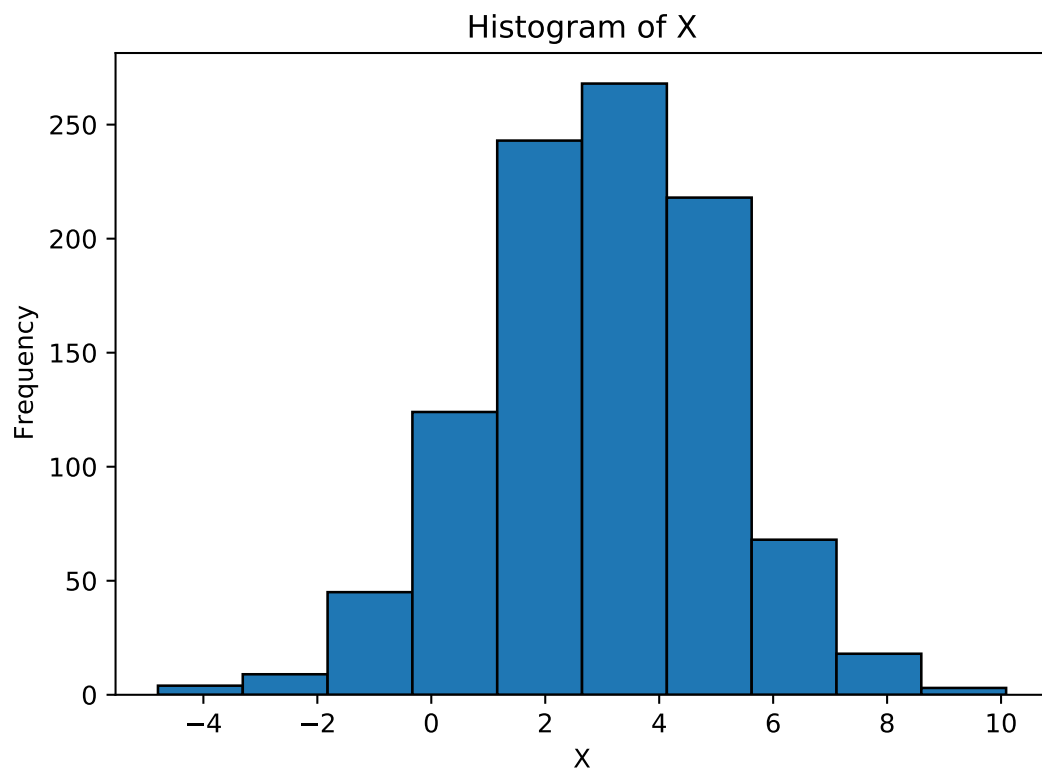
Normal random numbers(Page.16)

```python
x = np.random.normal(loc=3,scale=2,size=1000)
# loc = mean, scale = sd, size = n
plt.hist(x,edgecolor='black')
```

```
## (array([  4.,    9.,   45.,  124.,  243.,  268.,  218.,   68.,   18.,    3.]), array([-4.79736524, -
3.30874737, -1.82012951, -0.33151164,  1.15710622,
##          2.64572409,  4.13434195,  5.62295982,  7.11157768,  8.60019555,
##         10.08881341]), <BarContainer object of 10 artists>)
```

```python
plt.xlabel('X')
plt.ylabel('Frequency')
plt.title('Histogram of X')
plt.show()
```
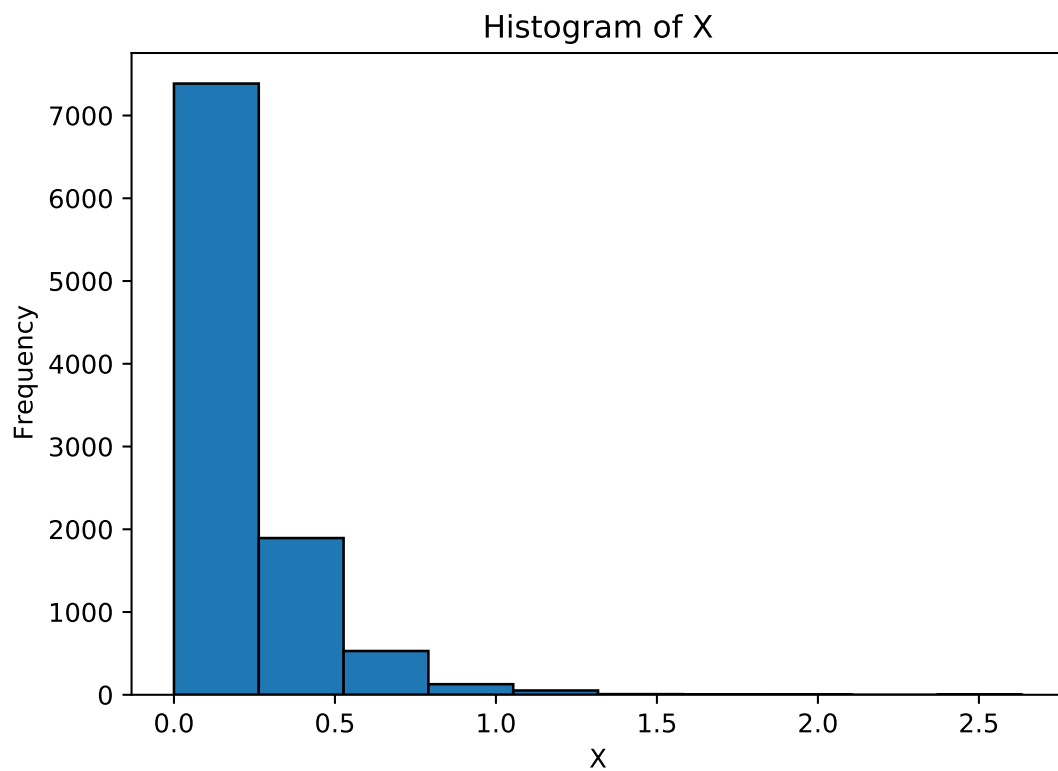
Exponential random numbers(Page.17)

```
x = np.random.exponential(scale=1/5, size=10000)
plt.hist(x,edgecolor='black')
```

```
## (array([7.386e+03, 1.894e+03, 5.290e+02, 1.280e+02, 5.200e+01, 8.000e+00,
##         1.000e+00, 1.000e+00, 0.000e+00, 1.000e+00]), array([2.57735618e-05, 2.63444671e-
01, 5.26863569e-01, 7.90282467e-01,
##        1.05370137e+00, 1.31712026e+00, 1.58053916e+00, 1.84395806e+00,
##        2.10737696e+00, 2.37079585e+00, 2.63421475e+00]), <BarContainer object of 10 artists>)
```

```
plt.xlabel('X')
plt.ylabel('Frequency')
plt.title('Histogram of X')
plt.show()
```
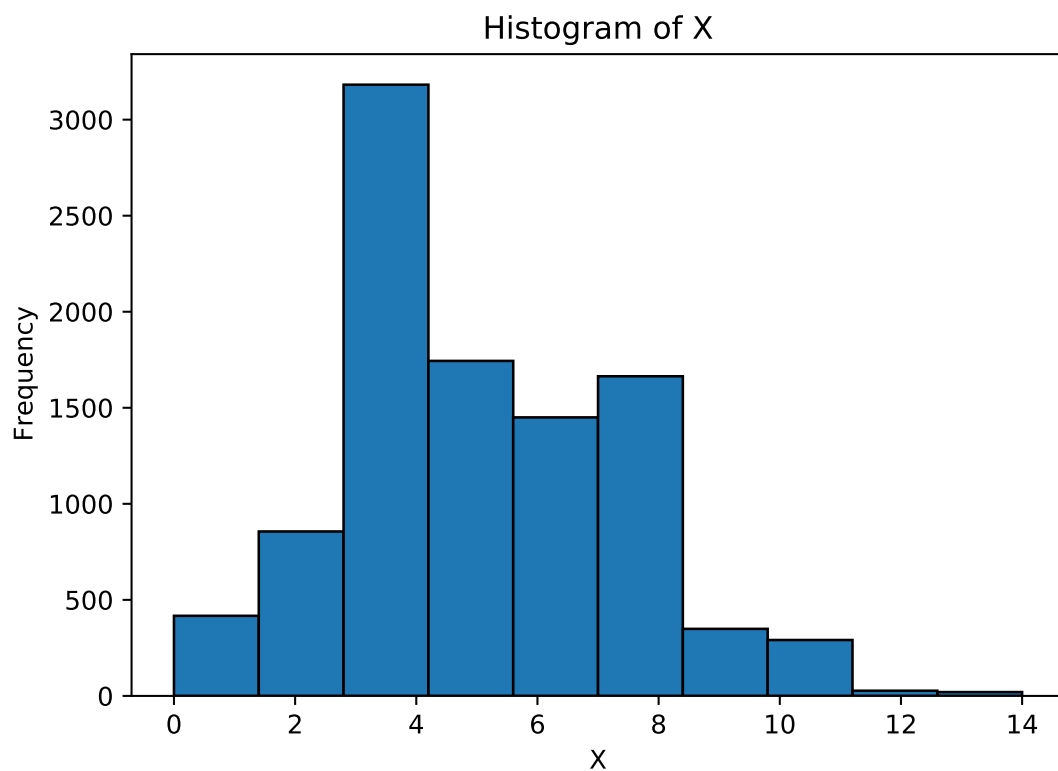
Poisson random numbers(Page.18)

```
x = np.random.poisson(lam=5,size=10000)
plt.hist(x,edgecolor='black')
```

```
## (array([ 417.,  856., 3182., 1744., 1450., 1664.,  349.,  291.,   27.,
##      20.]), array([ 0. , 1.4, 2.8, 4.2, 5.6, 7. , 8.4, 9.8, 11.2, 12.6, 14. ]), <BarContainer object of 10
```

```
plt.xlabel('X')
plt.ylabel('Frequency')
plt.title('Histogram of X')
plt.show()
```


A5.Rmd

```
"No pain No gain"
```

```
## [1] "No pain No gain"
```