ENGG1003 - Thursday Week 9

Normally distributed random numbers

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Lecture overview

1. recap: uniformly distributed random numbers
   - pdf of uniformly distributed rv
   - area under pdf is probability
   - histogram, normalized histogram is basically pdf
2. standard normal distribution (bell curve)
   - pdf, mean $\mu = 0$ and $\sigma = 1$
   - generate using Python
   - area (needs integration) and probability
3. engineering application

1) Uniformly distributed random numbers

- Create an array containing 250 random floats between 0 and 5

`filename.py`

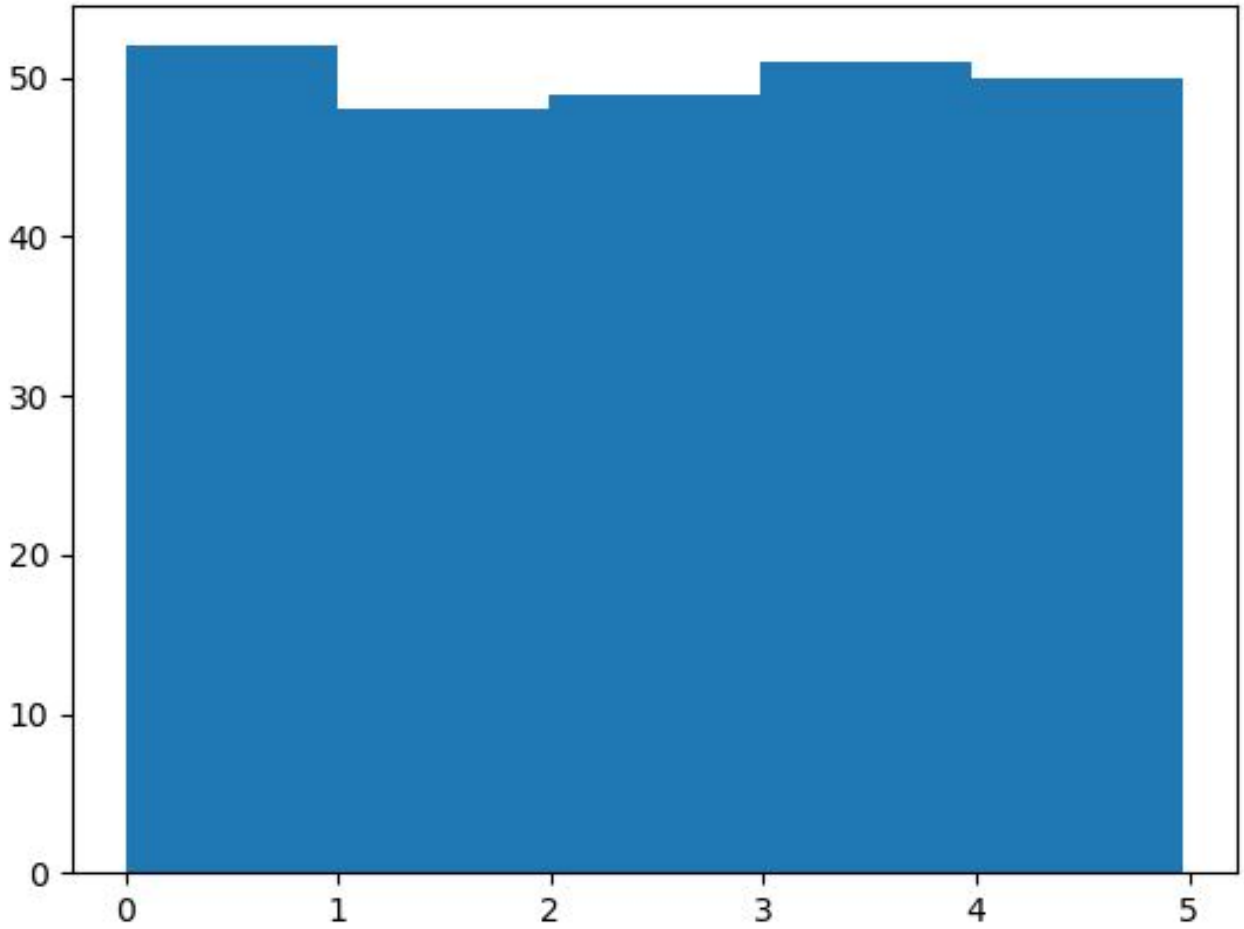
```
1 import numpy as np
2
3 x = np.random.uniform(0.0, 5.0, 250)
4
5 print(x)
```

histogram

- A histogram is a graph showing frequency distributions
- It is a graph showing the number of observations within each given interval.
- To visualize the data set we can draw a histogram with the data we collected
- We will use the Python module Matplotlib to draw a histogram

`filename.py`

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 x = np.random.uniform(0.0, 5.0, 250)
5
6 plt.hist(x, 5)
```


50
40
30
20
10
0
0
1
2
3
4
5

normalized histogram is basically pdf

- same plot as previous, but now normalize using `density=True` in `hist`

pdf of uniformly distributed rv

- XXX

area under pdf is probability

- XXX

2) Standard normal distribution

- XXX

- XXX

- XXX

- XXX

3) Engineering application

- XXX

Lecture summary

1. xxx
2. xxx
3. xxx
4. what's next