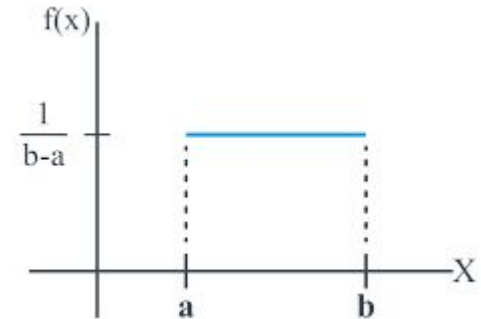# Uniform & Normal Distribution

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Mathematical Background - Uniform Distribution

- Uniform distribution is a distribution model in which the probability of each occurrence is constant, which subsequently means that it has 0 outliers
- This is usually represented by a rectangle that spreads across the range
- Uniform distribution is considered to be a platykurtic model as it has a flat top with fewer values near the tails and close to the mean and the fact that their kurtosis (combined values of the 2 tails of a distribution model compared to a normal distribution) is less than 3.

Formula to calculate variables of Uniform Distribution

Uniform Distribution Formula

$$F(x) = \frac{1}{(b-a)}$$

$$\text{Mean} = \frac{(a+b)}{2}$$

$$\sigma = \sqrt{\frac{(b-a)^2}{12}}$$

Mathematical Background - Normal Distribution

- On the other hand, normal distribution (bell curve) is a distribution model in which the occurrences cluster around a central value with no skew
- This is usually represented by a curve that peaks in the centre
- Normal Distribution is considered a leptokurtic model as it has a peak, but with no biases left and right of the graph, although it has outliers on both sides of the graph
- Normal distribution models have a kurtosis of 3

Formula to calculate variables of Normal Distribution

Normal Distribution Formula

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-(x-\mu)^2}{2\sigma^2}}$$

μ = mean of x

σ = standard deviation of x

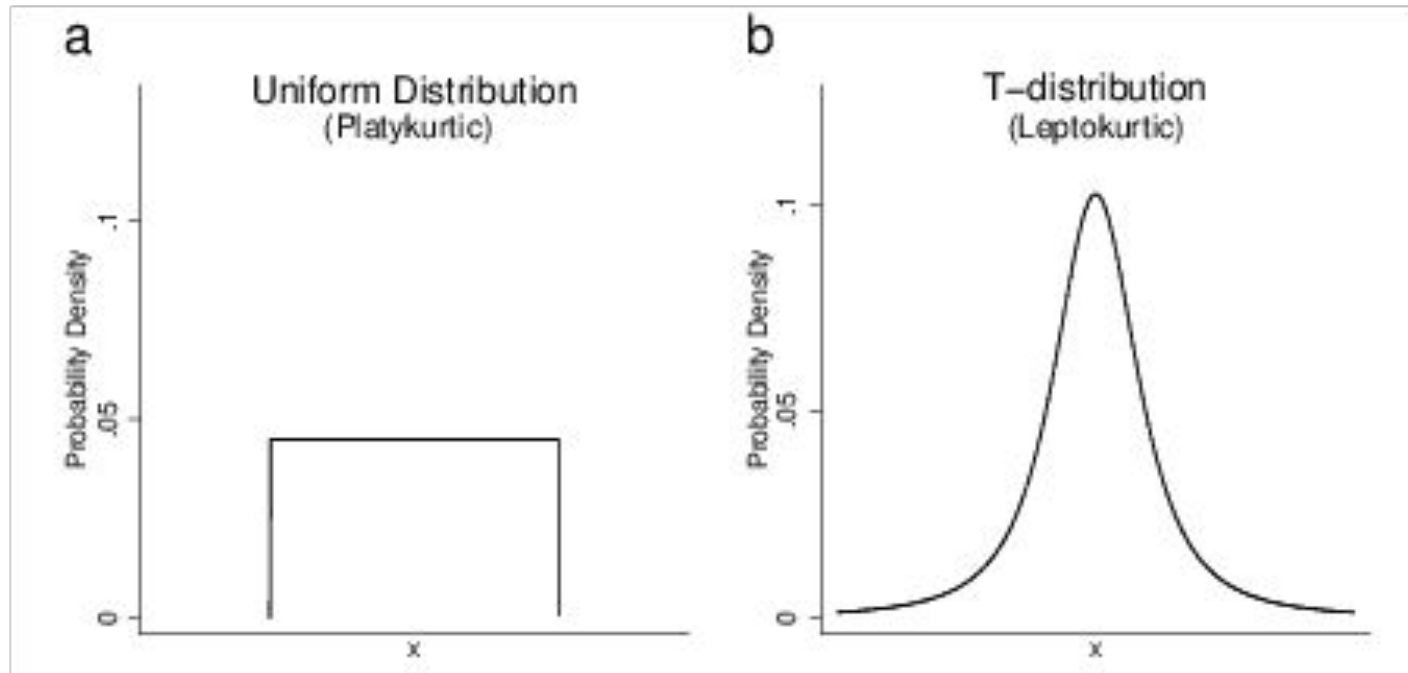$\pi \approx 3.14159 \ldots$

$e \approx 2.71828 \ldots$

Standard Normal Distribution Formula

$$Z = \frac{(X - \mu)}{\sigma}$$

Graphical Representation

a Uniform Distribution (Platykurtic)

b T-distribution (Leptokurtic)

Simulation Time

Link: https://github.com/moniquesenjaya/Distribution-Simulation

Conclusion

- Visual representations are easier to interpret from
- Programming in TkInter requires an excessive, yet unnecessary amount of brainpower
- User experience and design matters in order for users to be able to use the program efficiently