

Homework: Assigned March 1. Discussion March 4. Due March 8.

Use these problems to integrate the concepts presented in class with implementation details needed to put the concepts to work in practice.

1. Is the data in the file `maybe_uniform.txt` distributed as a Uniform distribution on $[0, 1]$?

Is it possible that the model below is better than the Uniform?

$$f(x) = \begin{cases} \frac{3}{2} & \text{for } 0 < x \leq \frac{1}{2} \\ \frac{1}{2} & \text{for } \frac{1}{2} < x < 1 \\ 0 & \text{otherwise} \end{cases}$$

Is there a third model that is a better fit?

2. Is the data in the file `maybe_normal.txt` a random sample from the normal distribution with mean = 26 and variance = 4? Investigate your result. Make a `qnorm` plot. Make a histogram. Be ready to show and discuss your results.
3. Are the two samples in X , `maybe_same.1.txt`, and Y , `maybe_same.2.txt`, from the same distribution? Could it be that $X + 2$ and Y have the same distribution?
4. Read the data in the file `norm_data.Rdata`. There are 25 data points. Is this a data set drawn from the `**standard normal distribution**`? Use `ecdf()` to compute the empirical distribution of the data. Create a normal distribution that can be used to calculate the Kolmogorov-Smirnov test. Calculate the D statistic. Run the `ks.test()` function and compare your results to the results reported by `ks.test`.
5. Produce empirical distributions with confidence bands for the `fujiquakes.dat` and `faithful.dat`. For the `fujiquakes` data, Find a 95% confidence interval for $F(4.9) - F(4.3)$. For the `faithful` data, estimate a 90 percent confidence interval for the mean waiting time and estimate the median waiting time.