**Assignment #5** – Data analysis, stats, and plotting – 10/28/2024 – **Due: 11/4/2024**

Create a script with the following components

1. Use the normrnd() function to generate 10,000 normally-distributed data points with a mean of 30 and standard deviation of 10
   1. Plot a histogram of the data
   2. On the same axes, plot a histogram of another normal distribution with a mean of 0 and standard deviation of 20
   3. Make sure both histograms have the same bin width
   4. Change the color of the first histogram (whatever looks nice to you)
2. Load in “seamount.mat”, which contains x, y, and z coordinates of a topographic map of an undersea volcano.
   1. Use the scatter3() function to plot filled circles at each of the x, y, and z coordinates of the volcano. The color of each circle should correspond to its height (z coordinate)
   2. Don’t forget to label your axes (including the z axis!)
3. Using the patient data in the “patients.xlsx” excel sheet, fit a linear model describing the diastolic blood pressure as a function of age, height, weight, gender, and smoking status.
   1. Using the plotAdded() function, plot the effect of being a smoker on diastolic blood pressure, with all other variables adjusted for
   2. With the same data and model, perform an anova. You’ll have to specify the “gender” and “smoking” variables as categorical factors – check the documentation for anova() and the name/value inputs section
4. The Fibonacci sequence is a sequence of numbers in which each entry is the sum of the preceding two entries – e.g. [1, 1, 2, 3, 5, 8, 13, …].
   1. Write a function called fib() that takes in a number n > 0 which calculates the nth element of the Fibonacci sequence – e.g. fib(1) = 1, fib(2) = 1. It should also return the sum of the 1st-nth elements as a second output
5. Using the data in “indomethacin.xlsx”, plot each subject’s blood concentration of medicine over time on the same plot (i.e., you’ll have 6 different lines on the plot)
   1. On the same axes, plot the mean concentration time course (i.e., plot the mean concentration across subjects at each time point) with error bars representing the standard deviation across subjects (use the “errorbar()” function)
   2. Make the mean and error bar line thicker than the others (check out the LineWidth property)