Matlab Usage

MatLab is a program provided by MathWorks to make graphing mathematical functions easy. There are hundreds of applications of MatLab, but for the purpose of this project we will only focus on graphing, salting data, and smoothing data. For me, MatLab is something I’ve had to use in previous courses, particularly in my Calculus I and Calculus II courses. I’ve learned that MatLab is very easy to use for both math and computer science students.

To begin, plotting a function is very easy. You simply must declare the desired values of x, either as specific points or through an interval. Once you have your desired x values, you can apply any function to it by declaring this math to a y value. Details can be found using this page: <https://www.mathworks.com/help/matlab/ref/plot.html?s_tid=srchtitle_plot_1>

Graphical user interface

Description automatically generated

Next, to salt the data, you must add random numbers to each point. This is also easy to do using a random number generator. You can easily create multiple random numbers by creating a list of them equal to the size of the list of the original x values. Then, add these random numbers to the x values, and carry on with the function and plotting as usual. More information on random numbers in Matlab can be found here: <https://www.mathworks.com/help/stats/prob.normaldistribution.random.html?searchHighlight=random&s_tid=srchtitle_random_1>

Graphical user interface, text, email

Description automatically generated

Finally, to smooth the data, I felt the easiest solution was to create another function to average out the salted graph. Like the original plot, I’ve created values for a new variable, a, and created a function for it, b, and plotted it to assure that it follows the quadratic formula. Then, I redefined y to become the average of the values of x (salted values) and the values of a (original quadratic values) and applied the regular quadratic formula again. Due to the aggressiveness of the original random values, the smoothed graph does not look very similar to the original, but it still demonstrates the smoothing capabilities possible with MatLab.A picture containing graphical user interface

Description automatically generated Graphical user interface

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