Wilshawn Alexander

In this project, our objective was to apply polynomial approximation and/or an interpolation method of our choosing to model the experimental data of nano-composites. The ideal approach was to subdivide ([a,b]) into maximum and minimum points, which gives you a better approximation for each sides of the graph. Then with the remaining part of graph should be interpolated using a third order polynomial. Your solution can be tested with the solution set given by the professor.

To complete this objective, I created a program to calculate a least square approximation for each subdivision and dataset. The program requires you to initially enter the number of data points you want to use (if using the example set, this should be 1000). Once it is computed, the program will then open the designated file and store the Xs and Ys from the text file into arrays. After data is stored, it is then require to create subdivisions by telling the program where to split the points at (for data.txt, I ended the first division with 225 points and 369 points for data2.txt). Based on the input, the program will now divide the data into subdivisions by putting them in new separate arrays. As the program inputs the new subdivision data, it also calculates and updates the basis after each point is stored. Once completed, the program will then display an approximation equation for each subdivision in slope-intercept form.

During my developmental process, they were a few roadblocks and fascinations along the way. One of my main difficulties involved reading the file correctly, whereas I got the first data set to store easily but the second one was not so. When I finally overcame that obstacle, I noticed that it was very difficult to actually approximate the second set, even with subdivisions because one set of points was completely “isolated” from the others in that data set. The line was very reasonable to achieve but getting the exact end curves was much more challenging. Approximations and interpolation methods are very useful when dealing with future predictions based on past actions of data but you can never be exact, just a technique to minimize future errors when estimating.