University of Alberta
Computing Science Department
CMPUT 340 - Fall 2020

Assignment 4
Due date: Nov 19 at 23.59
5 Marks

Introduction to Numerical Methods (CMPUT 340)

Although this assignment requires you to write Python code, you don't need to submit your code to eClass. All you need to submit is a pdf with what is being asked in the question below.

1. Considering the two data sets available in the Jupyter Notebook file on eClass, $(X1, Y1)$ and $(X2, Y2)$, answer the following questions (please include in your answer the plots you are asked to generate).

   a) (1 Mark) Plot the two data sets and then explain why interpolation is (or is not) a good approach to describe each data set. If interpolation is not the recommended approach, then which method would you use to describe the data?

   b) (2 Marks) Use polynomial interpolation with Vandermonde's matrix for both datasets and plot the results (both the curve and data points). Explain the results you obtained using at most two sentences for each data set.

   c) (1 Mark) How can we achieve a better interpolation result for the first data set $(X1, Y1)$? Plot your solution and compare it with the polynomial interpolation from (b). Hint: Do not implement the method from scratch, use the Scipy implementation of the method you decide to use.

   d) (1 Mark) How can we achieve a better result (with interpolation or with a different approach) for the data set $(X2, Y2)$? Plot your solution and compare it with the polynomial interpolation from (b).