

MATH 248 FALL 2018 – LABORATORY ASSIGNMENT 4 – Sochacki
DUE: Tuesday Oct. 24, 2017
POINTS: 50

1. Let $N_0(x), N_1(x), N_2(x), N_3(x), N_4(x)$ be the first five Newton Divided Difference interpolating polynomials. Give their first derivatives. Note: Full credit on this problem requires a nice algorithm and form for the polynomials and their first derivatives. (8 points)
2. Let $L_0(x), L_1(x), L_2(x), L_3(x), L_4(x)$ be the first five Lagrange interpolating polynomials. Give their first derivatives. Note: Full credit on this problem requires a nice algorithm and form for the polynomials and their first derivatives. (8 points)
3. Let $V_0(x), V_1(x), V_2(x), V_3(x), V_4(x)$ be the first five Vandermonde interpolating polynomials. Give their first derivatives. Note: Full credit on this problem requires a nice algorithm and form for the polynomials and their first derivatives. (8 points)
4. You are to write two Matlab scripts each of which will read in $n+1$ points $(x_0, y_0), \dots, (x_n, y_n)$. You can 'load' the points in from a file. I will email you three files that will be part of your turn in. The first file will contain the x – values, the second file will contain the corresponding y – values and the third file will contain the x – values for which you are to give the y – values from your interpolating polynomial. The Matlab scripts will
 - I. use an n^{th} degree Lagrange interpolating polynomial passing through the set of interpolating points to approximate the y - values at a set of given x 's. (10 points)
 - II. determine a Vandermonde interpolating polynomial passing through the set of interpolating points to approximate the y - values at a set of given x 's. You should use one of matlab's matrix vector solvers. (10 points)

You are to plot the calculated points in matlab and comment on how these plots are related to your interpolating polynomial. (3 points)

Your matlab codes should have variable names that are descriptive. Your coding should be top down and efficient. Make sure the number of calculations is minimized. Your input and output should be well labeled with easy to read instructions. Your turn in should be neat and professional. (3 points)