MACM 316 – Homework 5

- Problems are not to be submitted. The related quiz will be given in class.
- Feel free to use Canvas discussions but please keep in mind that these forums are open.

A. Lagrange interpolation

Section 3.1 Ex 1

Section 3.1 Ex 3

Section 3.1 Ex 5

Section 3.1 Ex 7

B. Newton divided differences

Section 3.3 Ex 3 (these are the same as 3.1 Ex 5 b and c; compare your results)

Section 3.3 Ex 13 ('understated by 10' means the value they gave is 10 less than it actually is)

Section 3.3 Ex 16

Section 3.3 Ex 19

Section 3.3 Ex 20

C. Vandermonde matrices

1. Find the determinant of the Vandermonde matrix for 2 points. Repeat this for 3 points. (Challenge: compute this for a general number of points)

2. From the previous question, it should be obvious for what sets of points the Vandermonde matrix is singular. Explain how you could deduce this without using the determinant.

3. Use Matlab to find the condition number of the Vandermonde matrix for equally spaced points between -1 and 1. How does this change with the number of points? The demo interpmonomial.m on Canvas uses the command 'vander' to produce this matrix.