

ME 542

Assignment – 8

Interpolation

- Students need to save all the programs in a zipped file and named after their roll number and submit on MS TEAMS.
- The programs are to be compiled and checked before submitting.
- Make a text file for providing input and your code should read data from the text file.
- Results obtained by your code should be written (do not copy image file of your run) in a pdf file and keep it in the same zipped folder.

1. Develop a program for cubic spline for the following dataset. Calculate $f(1.3)$ and $f(4.1)$ and the absolute error. Given that the original function is $f(x) = x^2/(1 + x^2)$.

x	0	1	2	3	4	5
F(x)	0	0.5	0.8	0.9	0.941176	0.961538

2. Use the same program developed in Q1 and find $f(27)$ for the following dataset. The exact value is 7.986.

x	0	8	16	24	32	40
F(x)	14.621	11.843	9.870	8.418	7.305	6.413

3. Make a program for 3rd order Lagrange polynomial interpolation and calculate $f(3.5)$. Calculate the absolute error at each data point given in the table.

x	0	1.8	5	6	8.2	9.2	12
F(x)	26	16.415	5.375	3.5	2.015	2.54	8