Homework-3

ICME MS5523 (2022)

Instructions:

1. Copying is strictly not allowed and will lead to negative marks.
2. Late submission will lead to zero marks
3. Prepare answer scripts using "word or latex", handwritten scripts are not allowed
4. The filename should be in the following format "Roll No_HW3".
5. The file should be in PDF format.
6. Attach the screenshots of MATLAB program and outputs in the answer script, also upload them separately.

Q1) What are quadrature schemes in numerical analysis and why are they required? Explain different types of quadrature schemes using appropriate examples.

(1-2)

Q2) Consider the given function and evaluate the following using MATLAB.

$$f(x) = -1 + x - 3x^2 + 2x^3 + 5x^4 - 4x^5$$

(1-1-1-1-1)

a) Integration of the $f(x)$ in the limits of -1 to 1.

b) Using one- point Gauss-Quadrature scheme

c) Using two-point Gauss-Quadrature scheme

d) Using three-point Gauss-Quadrature scheme

e) Evaluate exact solution by definite integral and write your comments on the accuracy of solution in terms of number of gauss points and order of the polynomial.

Q3) Consider $f(x) = \cosh(x)$, Evaluate the integration of the $f(x)$ in the limits of -1 to 1 using one-point, two-point, three-point approximation and comment on accuracy.

(2)