UNIVERSITY OF PERADENIYA
Department of Engineering Mathematics

EM215 Numerical Methods – 2024 (E/20 Semesters 4)

Assignment 2

Part 1: Submit the answers to Q2, Q3, Q7 and Q8 of tutorial 2

(50 marks)

Part 2: Use either Python or Matlab to solve the following.

Determine the real root of

$$f(x) = 4x^3 - 6x^2 + 7x - 2.3 = 0$$

(a) using the bisection method. Use initial guesses of $x_l = 0$ and $x_u = 1.0$ and an approximate percent relative error of 0.5% as the stopping criteria.

(b) using fixed point iteration method. Using an initial guess of $x_0 = 0$ and an approximate percent relative error of 0.5% as the stopping criteria.

(c) using Newton Raphson method. Use the initial guess $x_0 = -0.5$, and a stopping criteria of 0.5% approximate percent relative error.

(d) Use the above calculations to graphically show that the bisection method and the fixed point iteration method converges linearly and the Newton Raphson method converges quadratically.

(50 marks)

Provide answers to Part 1 as a hardcopy and Part 2 as a softcopy.

Deadline for submission: 4.00PM on 24th of April 2024