



# Information Technology University, Lahore

## Numerical Analysis BSEE-19 Spring-2022 Assignment # 02

Issue Date: Sunday 24/04/2022

Due Date: Saturday 30/04/2022

Total marks =100

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### Instructions

1. Please review the University Plagiarism Policy.
2. Late submission will not be accepted.
3. This Assignment will access your CLOs as per OBE.
4. This Assignment is based on CLO2.
5. Assignment should be uploaded as PDF file.
6. The name of the file should be your Roll Number as; BSEEXXXX.
7. Please submit your own work only.

### Question 1:

Determine the real root of  $f(x) = 5x^3 - 5x^2 + 6x - 2$

- (a) Graphically.
- (b) Using bisection to locate the root. Employ initial guesses of  $x_l = 5.0$  and  $x_u = 5.1$  and iterate until the estimated error  $\varepsilon_a$  below a level of  $\varepsilon_s = 10\%$ .

### Question 2:

Determine the real root  $f(x) = -25 + 82x - 90x^2 + 44x^3 - 8x^4 + 0.7x^5$

- (a) Graphically.
- (b) Using bisection to determine the root to  $\varepsilon_s = 10\%$ . Employ initial guesses of  $x_l = 0.5$  and  $x_u = 1.0$ .
- (c) Perform the same computation as in (b) but use the false position method and  $\varepsilon_s = 0.2\%$ .

**Question 3:**

Determine the real root of  $x^{3.5} = 80$

(a) analytically and

(b) with the false-position method to within  $es = 2.5\%$ . Use initial guesses of 2.0 and 5.0

**Question 4:**

Determine the positive real root of  $\ln(x^4) = 0.7$  using MATLAB

(a) using three iterations of the bisection method, with initial guesses of  $x_l = 0.5$  and  $x_u = 2$ ,

(b) using three iterations of the false-position method, with the same initial guesses as  $x_l = 0.5$  and  $x_u = 2$ .

Compare the results of both bisection method and false position method graphically using MATLAB.