

CONM Sem 7 Assignment 1

1. Explain the different types of errors that occur during computation
2. Explain the Bisection method.
3. Explain the advantages and disadvantages of False Position method
4. Explain Secant method
5. Explain conditions in which the Newton Raphson method fails to converge.
6. State the condition necessary for the convergence of the Fixed Point method.
7. How can we determine the number of negative real roots in a polynomial equation?
8. The smallest positive root of the equation
$$f(x) = x^4 + 3x^2 + x - 10 = 0$$
 - a. Find an interval of unit length which contains this root is to be obtained.
 - b. Perform five iterations of the bisection method.
9. Find the root of the following using False Position Method upto 5 decimal places
 - a. $f(x) = x - e^{-x}$, the root lies between 0.5 and 0.6
 - b. $f(x) = x^3 - x - 4 = 0$ the root lies between 1.79 and 1.8
10. Find the root of the following using Secant Method upto four decimal places:
 - a. $f(x) = x^3 - 4$ starting with 1, 1.5
 - b. $f(x) = x - e^{-x}$ starting with 1, 2
11. Find the root of the following using Newton Raphson Method:
 - a. Find an approximation to $\sqrt{12}$ to four decimal places starting with $x_0 = 3.5$
 - b. $f(x) = x^3 + x - 1$ to four decimal places starting with $x_0 = 1$
12. Find the root of the following using Fixed Point Method for 5 iterations:
$$xe^x = 1$$
 starting with $x_0 = 1$
13. Apply Descarte's Rule to find the number of positive and negative roots
$$f(x) = x^6 + x^4 + x^2 + x + 3$$
14. Find the root of the following using Birge Vieta method starting with 0.5
$$f(x) = x^3 - x^2 - x + 1$$

Ans.

8. a. (1,2) b. 1.34375

9. a. 0.567143 b. 1.79632

10. a. 1.587401 b. 0.567143

11. a. 3.461 b. 0.68233

12. approx. 0.5671

14. 0.95