NM Lab Sheet
II Year / II Part
Faculty: Computer/Electrical

Labsheet#3

Objectives:

1. Implement **Bisection Method** for the equation $\frac{1-(1+x)^4}{x} - 1 = 0$.
2. Implement **False-Position Method** for the equation $e^{2.8x} + \cos(x) = 3x^2$.

Bisection Method Algorithm:

1. Start
2. Read two initial guesses x1, x2 and error limit, e
3. Compute: f1 = f(x1) and f2 = f(x2)
4. If (f1*f2) > 0 goto Step 2
5. Determine: $x = \frac{x1+x2}{2}$ & f(x)
6. If (|(x1 – x2)/x | < e), then
   display x & goto Step 9
   else
   f = f(x);
7. If ((f*f1) > 0), then
   x1 = x
   f1 = f
   else
   x2 = x
   f2 = f
8. Goto Step 5
9. Stop

False Position Method Algorithm:

1. Start
2. Read two initial guesses x1, x2 and error limit, e
3. Compute: f1 = f(x1) and f2 = f(x2)
4. If (f1*f2) > 0 goto Step 2
5. Determine: $x = x1 - f(x1)\frac{x2-x1}{f(x2)-f(x1)}$ & f(x)
6. If f2*f <0 then
   x1 = x;
   else
   x2 = x;
7. If f(x) > e [=0.00001] then
   goto Step 5
8. Display the root as x.
9. Stop

Lab Assignment#3

1. Write an **algorithm**, **flowchart** & **pseudo-code** for finding a real root of a non-linear equation using **False Position Method**.
2. Explain the **working principle** and **pseudo-code** to find a real root of a non-linear equation using **Bisection Method**.
3. Find a real root of the equation xtan(x)-1=0 using **Binary Chopping of Half-interval Method** *correct up to three (3) significant digits*.
4. Using **Regula-falsi Method**, find a real root of the equation $f(x) = 3x - \sqrt{1 + \sin(x)}$ *correct up to three decimal points*.
5. Locate the root of $f(x) = \boldsymbol{x^{10} - 1} = 0$, between 0 and 1.3 using **Bisection Method** and **Interpolation Method**. Comment on which method is preferable.