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

Labsheet#4

Objectives:

1. Implement Secant Method for the equation $x - e^{-x} = 0$.
2. Implement NR Method for the equation $xe^x = \cos(x)$.

Secant 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: $x = x2 - f(x2)\frac{x2-x1}{f(x2)-f(x1)}$ & f(x)
6. If f2*f <0 then
   x1 = x;
   else
   x2 = x;
7. If $|\frac{x-x2}{x}|$ > e [=0.00001] then
   x1 = x2, x2 = x
   goto Step 4
   else
   goto Step 7
8. Display the root as x.
9. Stop

NR Method Algorithm:

1. Start
2. Read x, e, n, d
3. Do for i =1 to n in step of 2
4. f = f(x)
5. f1 = df(x)
6. If |f1 < d| then
   Display too small slope
   Goto Step 11
7. x1 = x – f/f1
8. If (|(x1-x)/x1) < e then
   Display root
   goto Step 11
9. x = x1 and end loop
10. Display method does not converge due to oscillation.
11. Stop

Lab Assignment#4

1. Find **a root** of the equation $x^5 - 3x^3 - 1 = 0$ correct up to *4-decimal places* by the **Secant Method**.
2. Find the **real root** of the equation $f(x) = 3x - \cos(x) - 1$ correct to *6-decimal places* using **NR Method**.
3. Find **a real root** of the equation $4e^{-x}\sin(x) - 1 = 0$ by **False Position** & **Secant Methods** correct to *4-decimal* places lying 0 and 0.5. And compare these methods.
4. Calculate **a positive real root** of the equation $xlog(x) = 1.2$ in **NR Method** within the accuracy $5*10^{-7}$.