

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 x_1, x_2 and error limit, e
3. Compute: $f_1 = f(x_1)$ and $f_2 = f(x_2)$
4. If $(f_1 * f_2) > 0$ goto Step 2
5. Determine: $x = x_2 - f(x_2) \frac{x_2 - x_1}{f(x_2) - f(x_1)}$ & $f(x)$
6. If $f_2 * f < 0$ then
 $x_1 = x$;
 else
 $x_2 = x$;
7. If $|\frac{x - x_2}{x}| > e$ [=0.00001] then
 $x_1 = x_2, x_2 = x$
 goto Step 4
 else
 goto Step 8
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. $f_1 = df(x)$
6. If $|f_1| < d$ then
 Display too small slope
 Goto Step 11
7. $x_1 = x - f/f_1$
8. If $(|(x_1 - x)/x_1| < e)$ then
 Display root
 goto Step 11
9. $x = x_1$ 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 $x \log(x) = 1.2$ in **NR Method** within the accuracy $5 * 10^{-7}$.