COMPUTATIONAL AND NUMERICAL METHODS

Lab-2

Find the root of the equation

$$cosx - xe^x = 0$$

by using

1. Newton-Raphson method. Take initial point x_0 =0.
2. By using Secant method. Take initial points x_0 =0, x_1 =1.

Find the root correct up-to 6 decimal places i.e. $\varepsilon=10^{-6}$.

Solve the same problem by using a new method, given by

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)} - \frac{1}{2}\left(\frac{f(x_n)}{f'(x_n)}\right)^2 \left(\frac{f''(x_n)}{f'(x_n)}\right)$$

Take initial point x_0 =0.

Find the root correct up-to 6 decimal places i.e. $\varepsilon=10^{-6}$.

Compare the above three methods in terms of number of iteration required to reach the root with desired accuracy ($\varepsilon=10^{-6}$). Comment on you experiment.