DEPARTMENT OF MATHEMATICS, I.I.T. GUWAHATI

MA 322: Scientific Computing Lab - III

1. Use a fixed-point iteration method to determine a solution accurate to within 10^{-4} for $x^4 - x - 10 = 0$ on $[1, 2]$. Use $x_0 = 2$.

2. Use the modified Newton's method to find solutions accurate to within 10^{-5} to the following problems.

   a. $x^4 - 8x^2 - x + 16, \quad 1 \leq x \leq 2,$

   b. $e^{6x} + 3(\ln 2)^2 e^{2x} - (\ln 8)e^{4x} - (\ln 2)^3 = 0, \quad -1 \leq x \leq 0.$

3. Use Muller's method to find a zero accurate to within 10^{-5} to the following problems.

   a. $x^4 - 3x^3 + x^2 + x + 1$ with three initial points as $x_0 = -0.5$, $x_1 = 0$, $x_2 = 0.5$,

   b. $\dfrac{\sin(x)}{x} + e^{-x}$.

4. Use a fixed-point iteration method to find an approximation to $\sqrt{31}$ that is accurate to 10^{-4}.