

Most of the problems in this homework are taken from the course textbook.

- Section 3.1, Problems 4 and 13.
- Section 3.2, Problems 3 and 8.
- The equation

$$f(x) \equiv x + e^{-Bx^2} \cos(x) = 0, \quad B = 1, 10, 50 \quad (1)$$

has a unique root in $(-1, 0)$.

1. Use the Secant method to find it as accurately as possible with tolerance $\varepsilon = 10^{-4}$. As an initial choice of x_0 as 0 and x_1 determined by Bisection method.
2. Explain the observed behavior in the iterates for high values of B .
3. Please plot $f(x)$ for different values of B to locate the root α .
4. Repeat parts 1 and 2 for the Bisection and Newton Method using the Matlab code provided in the textbook on pages 75 and 86 respectively. How many iterations do the Bisection and Newton method take to achieve convergence with the desired tolerance $\varepsilon = 10^{-4}$. Please turn in just your output values as shown in the Tables 3.1 and 3.2.