1 Assignment 1 - Solving Nonlinear Equations

- The function $h(x) = xsin(x)$ occurs in the study of undamped forced oscillations. Write a ***one complete program*** to solve $h(x) = 1$ in [0,2] by:

    1. Halving the Interval (Bisection) Method
    2. The Method of False Position (regula falsi)
    3. Newton's Method
    4. Muller's method
    5. Fixed-point Iteration; $x = g(x)$ Method

- You can make use of the available matlab codes presented in the Hands-On sessions.

- Tabulate the actual error values as the following; (See Table 1. The number of iterations is not limited to or defined as 15.)

- Plot the behaviours of the errors (use ratios) for the all cases. Compare and discuss the rate of convergence.

n	Bisection $(x_n - r)$	Regula Falsi $(x_n - r)$	Newton $(x_n - r)$	Muller $(x_n - r)$	Fixed-point $(x_n - r)$
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
12					
13					
14					
15					

n	Bisection $f(x_n)$	Regula Falsi $f(x_n)$	Newton $f(x_n)$	Muller $f(x_n)$	Fixed-point $f(x_n)$
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
12					
13					
14					
15					

Table 1: The Error Sequences