Practice sheet
CSE330: Numerical methods

1. For $f(x) = x^2 - \sin(x) - 0.5 = 0$ and with $x_l=0$ and $x_u=2$ fill table 1 using Bisection method

2. For $f(x) = 2\sin(x) - \cos(x) + 0.5 = 0$ and interval [0.1, 0.5] fill table 1 using secant method

3. For $f(x) = e^{-x}(3.2 \sin(x) - 0.5 \cos(x)) = 0$ and interval [1, 2] fill table 1 using secant method.

4. For $f(x) = e = 0$ and $x_0=2$ fill table 1 using *Newton-Raphson* method

5. For $f(x) = 2\sin(x) - \cos(x) - 0.5 = 0$ and $x_0=0.8$ fill table 1 using secant method

6. For $f(x) = e^{-x}(3.2 \sin(x) - 0.5 \cos(x)) = 0$ and interval [3, 4] fill table 1 using False position method

7. Find a root of the non-linear equation given below. Use bisection method and continue your solution up to 3rd iteration. Show your results in a tabular form including the percentage errors. Assume the stating value of the root as $x_l = 0$ and $x_u=2$.

$$f(x) = x^2 - \sin(x) - 0.5$$

8. For $f(x) = x^3 + 4x^2 - 10 = 0$ and with $x_l=1$ and $x_u=2$ fill table 1, use false position method

9. $f(x) = e^{-2x} + \sin 2x - 3 = 0$ and with $x_l=-1$ and $x_u=3$ fill table 1 using false-position Method

10. For $f(x) = e^{-2x} + \sin 2x - 3 = 0$ and with $x_l=-1$ and $x_u=1$ fill table 1 using bisection method.

11. For $f(x) = \cos x + 2x - 5 = 0$ and with $x_l=-1$ and $x_u=3$ fill table 1 using bisection method

12. For $f(x) = e^{-2x} + \sin 2x - 3 = 0$ and with $x_0=1$ fill table 1 using Newton Rapson Method

13. For $f(x) = \cos 2x + \sin 2x - 3 = 0$ and with $x_0=1$ fill table 1 using Newton Rapson Method

14. Find the root of the non-linear equation given below using Newton Raphson's Method. Continue your solution up to 3rd iteration. Show your results in a tabular form including the percentage errors. First approximation, $x_0= -2$.

$$\cos (2x) - 2\sin(x) - 5 = 0$$

15. Find the root of the non-linear equation given below using False position method. Continue your steps up to 3rd iteration. Show your results in tabular form including percentage errors. Use $x_l = -2$ and $x_u=2$.

$$e^{-x} = x^3 + x + 1$$

16. Find a root of the non-linear equation given below. Use bisection method and continue your solution up to 3rd iteration. Show your results in a tabular form including the percentage errors. Assume the stating value of the root as $x_l= 0.4$ and $x_u=1.3$.

$$f(x) = e^x - 3x$$