Due Oct. 31. 2011, Friday 17:30

RULES

- The answers of the assignment will be posted on our website at 17:00 PM on the due date: www.ce.metu.edu.tr/~ce305 . Late submission will **NOT** be accepted.
- Discussion among friends is encouraged, however, assignment needs to be done and submitted individually.
- This is the **version 1.0**. In case there are any corrections for this homework, we will post an updated version on our website. You can follow the changes in the assignments by the **Version History** section below.
- Post your assignments into the assignment box labeled CE305, in K2 building.
- Email your codes to andac@metu.edu.tr or to mestav@metu.edu.tr with subject 'CE305Hw1'.

Version History

v1.0 Assignment is released.

Part A: Hand Computations (In this part, you are expected to solve the problems manually)

Find the root of the function $f(x) = e^x - 3$ in the interval [0, 2] using

a) Bisection method

b) Regula-Falsi (False position) method

c) Newton-Raphson method (use an initial guess of x_0=0.3)

d) Compare your results of these three methods in terms of number of iterations and speed of convergence. Comment briefly.

For all methods, use a percent relative approximate error tolerance of 5×10^{-3}. Carry out your iterations with 6 decimal places.

Part B: MATLAB (You should provide your source code as well as your iterations)

a) Solve the same problem given in Part A, using Secant method with x_0=0.3 and x_1=0.4 a much lower percent relative error tolerance of $5x10^{-7}$. Define an additional termination criteria in the form of maximum number of iterations N=20.
b) Plot the function in the given interval using Matlab.
c) If you were to change the initial guesses to be x_0=0.4 and x_1=0.3 how would your results vary? Comment briefly.
d) If you select the initial guesses to bracket the root, how would your results of Secant method vary? Comment briefly.