EE 457
Introduction to Optimization Theory
Homework 2

Due 19/03/2020

Problem 1) Let $f(x) = 2e^{5-x} + ln^2(x)$

- **a.** Use MATLAB to plot $f(x)$ versus x over the interval $[2,20]$ and verify that $f(.)$ is unimodal over $[2,20]$.
- **b.** Write a MATLAB code using the Golden Section method that locates the minimizer of $f(.)$ over $[2,20]$. Iterate your code 30 times. Make sure to show iteration number, function value, uncertainty intervals at each step.
- **c.** Repeat part **b** using the Fibonacci method.
- **d.** Repeat part **b** using the Bisection method.
- **e.** Repeat part **b** using Newton's method with $x^{(0)} = 0.5$.
- **f.** Plot lengths of uncertainty intervals vs iteration at the same graph. Make sure that plots are properly labeled.
- **g.** Fill the table below with lengths of uncertainty intervals at given iteration steps. Compare the results of the four algorithms employed.

	iter=10	iter=20	iter=30
Golden Section Method			
Fibonacci Method			
Bisection Method			
Newton Method			

Problem 2) Let $g(x) = \cos(x) + 2\sin(x) + x$. Write a MATLAB code to find the root of $g(x) = 0$ using the secant method with $x^{(-1)} = 0, x^{(0)} = 1$ and $\varepsilon = 10^{-5}$. Compute the value of $g(.)$ at the obtained solution.

Important!

- For submission of your homework, use Moodle system to upload all of your MATLAB codes and reports in a single compressed file including your name and homework number. Also make sure each file in the compressed one is named using your fullname and question number (i.e. FirstName_LastNameEE457hw1Q1.m).
- Academic dishonesty will not be tolerated.