EE 457 Introduction to Optimization Theory - Homework 2

Due 16/03/2017

Problem 1) Let $f(x) = 3e^{2-x} + 4ln(2x)$

- **a.** Use MATLAB to plot $f(x)$ versus x over the interval $[1,6]$ and verify that $f(.)$ is unimodal over $[1,6]$.
- **b.** Write a MATLAB code using the Golden Section method that locates the minimizer of $f(.)$ over $[1,6]$ to within an uncertainty of 0.02. Make sure to show iteration number, function value, uncertainty intervals at each step.
- **c.** Repeat part **b** using the Fibonacci method with $\varepsilon = 0.02$
- **d.** Compare the results of the two algorithms employed.

Problem 2) Let $f(x) = 3x^4 + 7cos2x, \ \ \forall x \in \mathbb{R}$.

- **a.** Using MATLAB plot $f(x)$ over the interval $[0.5,2]$.
- **b.** Write a MATLAB code using the Golden Section method to locate x^* to within an uncertainty of 0.02. Make sure to show iteration number, function value, uncertainty intervals at each step.
- **c.** Repeat part **b**, using Newton's method with $x^{(0)} = 0.5$.
- **d.** Compare the results of the two algorithms employed.

Problem 3) Let $g(x) = 2x^5 + 3x - 3$. Write a MATLAB code to find the root of $g(x) = 0$ using the secant method with $x^{(-1)} = 0, x^{(0)} = 3$ 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.