Work Sheet 2 **August 29. 2019**

Course Name: Introduction to Linear and Non Linear Programming Lab
Course Number: CS4101
Name of Instructor: Pritam Rooj and Tapan Naskar
Total Marks: 10

1. Find the extrema of the following functions using the methods below:
   (a) Functions:

   i. $x\exp(-x),\ \ x \geq 0$ iii. $x^3\exp(-x^2),\ \ x \geq 0$ v. $x\left(1+x^2\right)^{-1} \geq 0$

   ii. $x^2\exp(-x^2),\ \ x \geq 0$ iv. $x^5\exp(-|x|),\ \ x \geq 0$ vi. $\left(1-x^2\right)\left(1+x^2\right)^{-1}$

   (b) Methods:

   i. Bisection Method. ii. Fibonacci Search. iii. Golden Search.

   (c) How much iterations needed using each method to get the required value with tolerance $\epsilon = 10^{-6}$?

Table 1: Number of iteration in each method with tolerance $\epsilon = 10^{-6}$

Function $f(x)$	Extrema x_n	Bisection	Fibonacci	Golden

Table 2: Number of iternation in each method with tolerance $\epsilon = 10^{-8}$

Function	Extrema	Bisection	Fibonacci	Golden

2. Find $\lim_{n\to\infty} |\frac{x_{n+1}-x_n}{x_n}|$ for each function, using different methods.