

# Lab Assignment - Warm-up

Instructor: Dr. Arabin Kumar Dey

## 1 Due date:

- 8/1/2013.

## 2 Notes:

- Submit the codes in all R / C (or C++) corresponding to the questions.
- Make a proper documentation preferably in latex or using some other software and submit the printout of the report in .pdf form.
- Each student needs to write his/ her own solutions, even though discussions of the assignments between students are encouraged.

## 3 Assignments:

1. The Newton-Raphson method is an iterative process for solving the root of the equation  $f(x) = 0$ . According to the method, starting with an initial guess of  $x_0$ , apply the iterative formula

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

where  $f$  denotes the derivative of the function. The iteration stops until you arrive at an acceptable limit  $|x_{n+1} - x_n| < \epsilon$ , where  $\epsilon$  is some pre-specified tolerance value.

Write a program to approximate the root of the equation

$$3x^2 - e^x = 0,$$

to within a tolerance of  $10^{-5}$  . Give the steps in your code and the result of executing your code. Give an explanation why your answer is reasonable. Hint: It may help to graph the function to get a decent initial estimate.