MA588: R-Programming Lab

Lab # 03 (1 Questions, 50 Points)
Submission time: on or before 23-May-2020 at 11:59 hrs Pages: 1

IIT Guwahati

20-May-2020 (Wed)

Question 1: (50 points)

Find the minimum of the function $f(\mathbf{x}) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ using Newton's method. Note that $\mathbf{x}$ is a two dimensional variable with $\mathbf{x} = \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$. Therefore you must study the procedure for optimizing the two dimensional function using Newton's method given in the text book.

Your own R function Implement the Newton's method for the above objective function

In built Newton's Invoke R optimization library Newton's method Compare the output of the two solutions.

For details about Newton's method go through page 345 to 347 of the book `http://mec.nit.ac.ir/file_part/master_doc/20149281833165301436305785.pdf`

You should start your initial value of $\mathbf{x}$ at 100 different points including $\mathbf{x} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ and show that your implementation and tool box implementation has same optimal value.

Instructions Adhere to the following

File Name Keep your roll number as the name of the file. Example: 180101000.R

Independent efforts You should make an honest and independent effort in obtaining the solution to the above problem.

Submission Table below shows which student should submit the code to which TA

TA Name	TA E-mail	From Roll No.	To Roll No.
Saroj	s.shivagunde@iitg.ac.in	194161001	194161010
Maithilee	maith176101104@iitg.ac.in	194161011	194161021

Marking Scheme The evaluation criteria is as follows:

Your method 40 Marks

Library method 5 Marks

Agreement Solution agreement with library method 5 Marks