University of Regina
Software Systems Engineering

Winter term 2018 ENSE-350
Lab # 05

[Put your code, graphs (if any) and the required explanation in ONE file and upload it to URCourses.

The following is a set of two simultaneous nonlinear equations with two unknowns:

$$x_1^2 + x_1 x_2 = 10$$
$$x_2 + 3x_1 x_2^2 = 57 \qquad (1)$$

In contrast to linear systems which plot as straight lines, these equations plot as curves on an x_2 versus x_1 graph. As in Figure 1, the solution is the intersection of the curves.

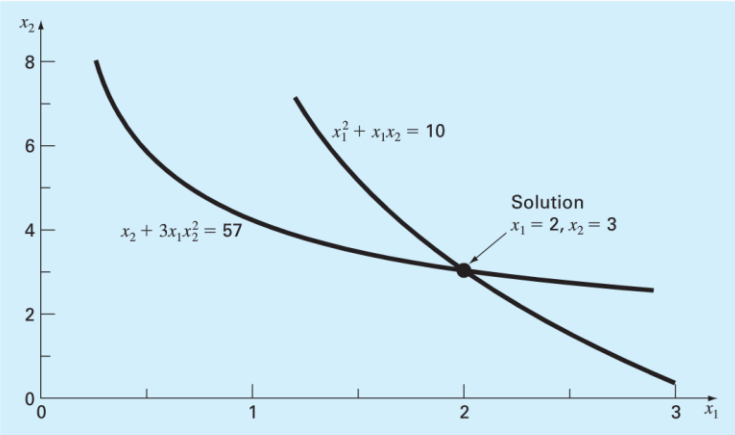

Figure 1: Graphical depiction of the solution of two simultaneous nonlinear equations.

Using a high-level programming language (C/C++, C#, Java etc.) write a program to compute the roots of the system of non-linear set of two equations given above (Equation (1)) using the multiple-equation Newton-Raphson method. Initiate the computation with guesses of $x_1 = 1.5$ and $x_2 = 3.5$.

Acknowledgement: This question is taken (Example 12.4) from "Applied Numerical Methods W/MATLAB: for Engineers & Scientists, 3rd Edition by Chapra, Steven"