Military Institute of Science & Technology (MIST)
Department of Computer Science and Engineering
Session: Level 2, Term II (Fall 2020), Batch: CSE 19
Course Code: CSE 214, Course Title: Numerical Methods Sessional

Assignment on Solution of Simultaneous Equation of a Linear System

Time: 1 week **Total Marks: 20**

Please read carefully the instructions that are stated below –

Instructions:

- There are two problems as follows (details are given in (**Page 02**):
  - *Problem 01* **MUST** be solved manually (either handwritten or typed).
  - *Problem 02* **MUST** be solved using MATLAB code.
- The following format should be maintained while submission –

  For Problem 01:

  1) Specify your **Student ID** and **Section** on the top of the submitted script.
  2) Put your **signature** below on the **last page** of your submitted script.
  3) The document **MUST** be submitted in **PDF format**.

  For Problem 02:

  1) Specify your **Student ID** and **Section** as the file name.
  3) The code **MUST** be submitted as MATLAB script (.m file extension).
- The assignment should be submitted through the given **Google classroom link**.
- Put the two files in a zip file and rename you zip file as '**Student ID_Section**' while submission.
- The assignment **MUST** be submitted individually.

Stay Safe, Stay Home!

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Problem 01: (Solve it using MATLAB code)

Solve the following linear system to find the value of x_1, x_2 and x_3 using Naïve Gauss Elimination method with partial pivoting mechanism –

$$2x_1 + x_2 + x_3 = 5$$
$$2x_1 + x_2 + 4x_3 = 8$$
$$3x_1 + 5x_2 + 2x_3 = 15$$

The input would be the coefficients and constant values of the equations and the output should display only the values of x_1, x_2 and x_3.

Problem 02: (Solve it manually – either handwritten or typed)

Firstly, form 3 sets of linear equations for 3 unknown variables where the first equation's coefficients will be the first three digits of your student ID with adding 3 to each of them respectively; the constant value would be 8, the second equation's coefficients will be the next three digits of your student ID with adding 2 to each of them respectively; the constant value would be 12 and the third equation's coefficients will be the last three digits of your student ID with adding 1 to each of them respectively; the constant value would be 5.

Then, solve this linear system to find the value of the unknowns using Gauss Seidel Elimination method. Correct up to 5 decimal points and also find the number of iterations. Apply partial pivoting mechanism if the roots of the system do not converge. Even after pivoting if it does not converge, then write 'No solution can be obtained using Gauss Seidel Elimination method for this set of simultaneous linear equations'.

For example, suppose a student's student ID is **201514044**, then the linear system to be solved will be as follows:

Digits extracted from Student ID	Adding 3, 2 and 1 respectively to the 3 set of digits	Coefficients to be placed in the equations
2 0 1	(2+3) (0+3) (1+3)	5 3 4
5 1 4	(5+2) (1+2) (4+2)	7 3 6
0 4 4	(0+1) (4+1) (4+1)	1 5 5

The formed set of simultaneous linear equation for this Student ID would be as shown below:

$$5x_1 + 3x_2 + 4x_3 = 8$$
$$7x_1 + 3x_2 + 6x_3 = 12$$
$$x_1 + 5x_2 + 5x_3 = 5$$

NOTE: The duration to complete the assignment is 1 week **starting** from **19 October, 2020 to 25 October, 2020 (11.45 PM)**. No assignments will be accepted after the deadline.

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