EE5609 Assignment 3

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Abstract—**This assignment involves solving a system of equations using matrix method**

The python solution code for this problem can be downloaded from

The python verification code for this problem can be downloaded from

1 PROBLEM STATEMENT

Solve the system of linear equatios, using matrix method.

$$2x - y = -2 \quad (1.0.1)$$
$$3x + 4y = 3 \quad (1.0.2)$$

2 THEORY

Given a set of linear equations we can use Guass Jordan Elimination method in order to find the the unknown variables.

3 SOLUTION

Given 1.0.1 can be repsented in a matrix form as:

$$\begin{pmatrix} 2 & -1 \\ 3 & 4 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -2 \\ 3 \end{pmatrix} \quad (3.0.1)$$

The corresponding augmented matrix is

$$\left(\begin{array}{cc|c} 2 & -1 & -2 \\ 3 & 4 & 3 \end{array} \right) \quad (3.0.2)$$

We use the Guass Jordan Elimination method as:

$$\left(\begin{array}{cc|c} 2 & -1 & -2 \\ 3 & 4 & 3 \end{array} \right) \quad (3.0.3)$$

$$\xrightarrow{R_2 \leftarrow R_2 - \frac{3}{2}R_1} \left(\begin{array}{cc|c} 2 & -1 & -2 \\ 0 & \frac{11}{2} & 6 \end{array} \right) \quad (3.0.4)$$

$$\xrightarrow{R_2 \leftarrow \frac{2}{11}R_2} \left(\begin{array}{cc|c} 2 & -1 & -2 \\ 0 & 1 & \frac{12}{11} \end{array} \right) \quad (3.0.5)$$

$$\xrightarrow{R_1 \leftarrow R_1 + R_2} \left(\begin{array}{cc|c} 2 & 0 & \frac{-10}{11} \\ 0 & 1 & \frac{12}{11} \end{array} \right) \quad (3.0.6)$$

$$\xrightarrow{R_1 \leftarrow \frac{1}{2}R_1} \left(\begin{array}{cc|c} 1 & 0 & \frac{-5}{11} \\ 0 & 1 & \frac{12}{11} \end{array} \right) \quad (3.0.7)$$

Therefore, the values of x and y are:

$$x = \frac{-5}{11} \quad (3.0.8)$$

$$y = \frac{12}{11} \quad (3.0.9)$$