# ASSIGNMENT 1 - EE5600

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*Abstract*—**This paper contains solution to problem no 17 of Lines and Planes section. Links to Python codes are available below.**

Download python codes using

### 1 PROBLEM

Find $m$ if

$$\begin{pmatrix} 2 & 3 \end{pmatrix} \mathbf{x} = 11 \tag{1.0.1}$$

$$\begin{pmatrix} 2 & -4 \end{pmatrix} \mathbf{x} = -24 \tag{1.0.2}$$

$$\begin{pmatrix} m & -1 \end{pmatrix} \mathbf{x} = -3 \tag{1.0.3}$$

### 2 SOLUTION

Given, the system of equations in matrix equation format are as below

$$\begin{pmatrix} 2 & 3 \\ 2 & -4 \\ m & -1 \end{pmatrix} \mathbf{x} = \begin{pmatrix} 11 \\ -24 \\ -3 \end{pmatrix} \tag{2.0.1}$$

**Step1**: Assuming the system of equations are consistent, lets reduce the augmented matrix [A'b], to find the value of m.

$$\begin{pmatrix} 2 & 3 & 11 \\ 2 & -4 & -24 \\ m & -1 & -3 \end{pmatrix} \tag{2.0.2}$$

$$\begin{pmatrix} 2 & 3 & 11 \\ 0 & -7 & -35 \\ m & -1 & -3 \end{pmatrix} \xleftarrow{R2->R2-R1} \tag{2.0.3}$$

$$\begin{pmatrix} 2 & 3 & 11 \\ 0 & -7 & -35 \\ 2m+2 & 1 & 5 \end{pmatrix} \xleftarrow{R3->2R3+R1} \tag{2.0.4}$$

$$\begin{pmatrix} 2 & 3 & 11 \\ 0 & -7 & -35 \\ 14m+14 & 0 & 0 \end{pmatrix} \xleftarrow{R3->R2+7R3} \tag{2.0.5}$$

Since the system of equations are assumed consistent,

$$\Rightarrow 14m + 14 = 0 \tag{2.0.6}$$

$$\Rightarrow m = -1 \tag{2.0.7}$$