

Assignment 8

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Abstract—This document finds the solutions of given matrix by row reduction.

Download python codes from

[https://github.com/priya6971/
matrix_theory_EE5609/tree/master/
Assignment8/codes](https://github.com/priya6971/matrix_theory_EE5609/tree/master/Assignment8/codes)

Download latex-tikz codes from

[https://github.com/priya6971/
matrix_theory_EE5609/tree/master/
Assignment8](https://github.com/priya6971/matrix_theory_EE5609/tree/master/Assignment8)

Now, we can apply Row Reduction Methodology :

$$\begin{pmatrix} 3 & -1 & 2 \\ 2 & 1 & 1 \\ 1 & -3 & 0 \end{pmatrix} \xleftrightarrow{R_1=R_1+R_2} \begin{pmatrix} 5 & 0 & 3 \\ 2 & 1 & 1 \\ 1 & -3 & 0 \end{pmatrix} \quad (2.0.2)$$

$$\xleftrightarrow{R_2=R_2-2R_3} \begin{pmatrix} 5 & 0 & 3 \\ 0 & 7 & 1 \\ 1 & -3 & 0 \end{pmatrix} \quad (2.0.3)$$

$$\xleftrightarrow{R_3=R_3-\frac{1}{5}R_1} \begin{pmatrix} 5 & 0 & 3 \\ 0 & 7 & 1 \\ 0 & -3 & -\frac{3}{5} \end{pmatrix} \quad (2.0.4)$$

$$\xleftrightarrow{R_1=\frac{1}{5}R_1} \begin{pmatrix} 1 & 0 & \frac{3}{5} \\ 0 & 7 & 1 \\ 0 & -3 & -\frac{3}{5} \end{pmatrix} \quad (2.0.5)$$

$$\xleftrightarrow{R_2=\frac{1}{7}R_2} \begin{pmatrix} 1 & 0 & \frac{3}{5} \\ 0 & 1 & \frac{1}{7} \\ 0 & -3 & -\frac{3}{5} \end{pmatrix} \quad (2.0.6)$$

$$\xleftrightarrow{R_3=R_3+3R_2} \begin{pmatrix} 1 & 0 & \frac{3}{5} \\ 0 & 1 & \frac{1}{7} \\ 0 & 0 & -\frac{6}{35} \end{pmatrix} \quad (2.0.7)$$

1 PROBLEM

If

$$A = \begin{pmatrix} 3 & -1 & 2 \\ 2 & 1 & 1 \\ 1 & -3 & 0 \end{pmatrix} \quad (1.0.1)$$

Find all solutions of $AX = 0$ by row reducing A .

2 SOLUTION

For the given equation $AX = 0$ can be defined as follows:

$$\begin{pmatrix} 3 & -1 & 2 \\ 2 & 1 & 1 \\ 1 & -3 & 0 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \quad (2.0.1)$$