

Assignment 9

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Abstract—This document contains a solution to find explicitly all 2x2 row-reduced echelon matrices.

Download all latex-tikz codes from

https://github.com/Matish007/Matrix-Theory-EE5609-/tree/master/Assignment_9

1 PROBLEM

Describe explicitly all 2x2 row-reduced echelon matrices.

2 SOLUTION

2x2 matrices which are row-reduced echelon matrix are:-

$$\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}, \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix}, \begin{pmatrix} 1 & 1 \\ 0 & 0 \end{pmatrix}, \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

We will find the basis matrix out of these:-

$$\begin{aligned} c_1 \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} + c_2 \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} + c_3 \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix} + c_4 \begin{pmatrix} 1 & 1 \\ 0 & 0 \end{pmatrix} \\ + c_5 \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} \end{aligned} \quad (2.0.1)$$

$$c_2 + c_4 + c_5 = 0 \quad (2.0.2)$$

$$c_3 + c_4 = 0 \quad (2.0.3)$$

$$c_5 = 0 \quad (2.0.4)$$

By solving (2.0.2),(2.0.3),(2.0.4) we get two matrices as basis

$$\begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} \quad (2.0.5)$$

$$\begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix} \quad (2.0.6)$$