Assignment 2

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Matrices

***Abstract*—This documnet contains the solution to find the value of given Matrix Equation**

Download all python codes from

https://github.com/shivangi−975/EE5609−Matrix_Theory/tree/master/Assignment2/Codes

Download latex-tikz codes from

https://github.com/shivangi−975/EE5609−Matrix_Theory/blob/master/Assignment2/Assignment2.tex

1 Problem 25

Find the value of equation $A^2 - 5 \times A + 6 \times I$

$$If A = \begin{pmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{pmatrix}$$

2 Solution

Given equation $A^2 - 5 \times A + 6 \times I$

$$A^2 = A \times A = \begin{pmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{pmatrix} \begin{pmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{pmatrix} \tag{2.0.1}$$

$$\begin{pmatrix} 5 & -1 & 2 \\ 9 & -2 & 5 \\ 0 & -1 & -2 \end{pmatrix} \tag{2.0.2}$$

$$5 \times A = \begin{pmatrix} 10 & 0 & 5 \\ 10 & 5 & 15 \\ 5 & -5 & 0 \end{pmatrix} \tag{2.0.3}$$

$$6 \times I = \begin{pmatrix} 6 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 6 \end{pmatrix} \tag{2.0.4}$$

Writing the equation by putting values we have:
$A^2 - 5 \times A + 6 \times I =$

$$\begin{pmatrix} 5 & -1 & 2 \\ 9 & -2 & 5 \\ 0 & -1 & 2 \end{pmatrix} - \begin{pmatrix} 10 & 0 & 5 \\ 10 & 5 & 15 \\ 5 & -5 & 0 \end{pmatrix} + \begin{pmatrix} 6 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 6 \end{pmatrix} \tag{2.0.5}$$

Solving equation we have: $A^2 - 5 \times A + 6 \times I =$

$$\begin{pmatrix} 1 & -1 & -3 \\ -1 & -1 & -10 \\ -5 & 4 & 4 \end{pmatrix} \tag{2.0.6}$$