

Assignment 2

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Matrices

Abstract—This document 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

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

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

2 SOLUTION

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

Splitting matrix as $(A-3I)(A-2I)$ we have

$$A - 3I = \begin{pmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{pmatrix} + \begin{pmatrix} -3 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & -3 \end{pmatrix} \quad (2.0.1)$$

$$A - 2I = \begin{pmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{pmatrix} + \begin{pmatrix} -2 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -2 \end{pmatrix} \quad (2.0.2)$$

Multiplying equation (2.0.1) and (2.0.3) we have:

$$A^2 - 5A + 6I = \begin{pmatrix} -1 & 0 & 1 \\ 2 & -2 & 3 \\ 1 & -1 & -3 \end{pmatrix} \begin{pmatrix} 0 & 0 & 1 \\ 2 & -1 & 3 \\ 1 & -1 & -2 \end{pmatrix} \quad (2.0.3)$$

$$A^2 - 5A + 6I = \begin{pmatrix} 1 & -1 & -3 \\ -1 & -1 & -10 \\ -5 & 4 & 4 \end{pmatrix} \quad (2.0.4)$$