Assignment 2

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Download all python and latex codes from

https://github.com/abhiroopchintalapudi03/EE3900.git

1 Problem 2.42

If $\mathbf{A} = \begin{pmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{pmatrix}$, then find the matrix $\mathbf{X}$ such that $\mathbf{2A} + \mathbf{3X} = \mathbf{5B}$.

2 Solution

$$\mathbf{A} = \begin{pmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{pmatrix} \tag{2.0.1}$$

$$\implies \mathbf{2A} = \begin{pmatrix} 16 & 0 \\ 8 & -4 \\ 6 & 12 \end{pmatrix} \tag{2.0.2}$$

$$\mathbf{B} = \begin{pmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{pmatrix} \tag{2.0.3}$$

$$\implies \mathbf{5B} = \begin{pmatrix} 10 & -10 \\ 20 & 10 \\ -25 & 5 \end{pmatrix} \tag{2.0.4}$$

$$\mathbf{2A} + \mathbf{3X} = \mathbf{5B} \tag{2.0.5}$$

$$\implies \mathbf{3X} = \mathbf{5B} - \mathbf{2A} \tag{2.0.6}$$

$$\implies \mathbf{3X} = \begin{pmatrix} 10 & -10 \\ 20 & 10 \\ -25 & 5 \end{pmatrix} - \begin{pmatrix} 16 & 0 \\ 8 & -4 \\ 6 & 12 \end{pmatrix} \tag{2.0.7}$$

$$\implies \mathbf{3X} = \begin{pmatrix} 10-16 & -10-0 \\ 20-8 & 10-(-4) \\ -25-6 & 5-12 \end{pmatrix} \tag{2.0.8}$$

$$\implies \mathbf{3X} = \begin{pmatrix} -6 & -10 \\ 12 & 14 \\ -31 & -7 \end{pmatrix} \tag{2.0.9}$$

$$\mathbf{3X} = \begin{pmatrix} -6 & -10 \\ 12 & 14 \\ -31 & -7 \end{pmatrix} \tag{2.0.10}$$

$$\mathbf{X} = \begin{pmatrix} -2 & -10/3 \\ 4 & 14/3 \\ -31/3 & -7/3 \end{pmatrix} \tag{2.0.11}$$

$$\implies \mathbf{X} = \begin{pmatrix} -2 & -3.33 \\ 4 & 4.67 \\ -10.33 & -2.33 \end{pmatrix}$$ for $\mathbf{2A} + \mathbf{3X} = \mathbf{5B}$ to be satisfied.