5.2.65

ee25btech11063-vejith

Question

Solve

$\mathbf{X}+\mathbf{Y}=\begin{pmatrix}5 & 2\\ 0 & 9\end{pmatrix}$ and $\mathbf{X}-\mathbf{Y}=\begin{pmatrix}3 & 6\\ 0 & -1\end{pmatrix}$

Solution:

Given,

$$\mathbf{X}+\mathbf{Y}=\begin{pmatrix}5 & 2\\ 0 & 9\end{pmatrix} \tag{1}$$

$$\mathbf{X}-\mathbf{Y}=\begin{pmatrix}3 & 6\\ 0 & -1\end{pmatrix} \tag{2}$$

Add equation (1) and (2)

$$2\mathbf{X}=\begin{pmatrix}8 & 8\\ 0 & 8\end{pmatrix} \tag{3}$$

$$\implies \mathbf{X}=\begin{pmatrix}4 & 4\\ 0 & 4\end{pmatrix} \tag{4}$$

Subtract equation (1) and (2)

$$2\mathbf{Y}=\begin{pmatrix}2 & -4\\ 0 & 10\end{pmatrix} \tag{5}$$

$$\implies \mathbf{Y}=\begin{pmatrix}1 & -2\\ 0 & 5\end{pmatrix} \tag{6}$$

$$\implies \mathbf{X}=\begin{pmatrix}4 & 4\\ 0 & 4\end{pmatrix} \text{ and } \mathbf{Y}=\begin{pmatrix}1 & -2\\ 0 & 5\end{pmatrix} \tag{7}$$