高等代数: 第八周作业

November 9, 2025

咕咕嘎嘎　11451419

4.4 Exercises 4

Find the vector x determined by the given coordinate vector $[x]_B$ and the given basis B.

$$B = \left\{ \begin{bmatrix} -1 \\ 2 \\ 0 \end{bmatrix}, \begin{bmatrix} 3 \\ -5 \\ 2 \end{bmatrix}, \begin{bmatrix} 4 \\ -7 \\ 3 \end{bmatrix} \right\}, \quad [x]_B = \begin{bmatrix} -4 \\ 8 \\ -7 \end{bmatrix}$$

Solution.

$$x = (-4) \begin{bmatrix} -1 \\ 2 \\ 0 \end{bmatrix} + 8 \begin{bmatrix} 3 \\ -5 \\ 2 \end{bmatrix} + (-1) \begin{bmatrix} 4 \\ -7 \\ 3 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 5 \end{bmatrix}$$

Test

$$\underset{\mathcal{A}\leftarrow\mathcal{B}}{P} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$P_{\mathcal{B}} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$[\mathbf{x}_1]_{\mathcal{B}} = [\mathbf{x}]_{\mathcal{B}}$$