1.5.8

EE25BTECH11020 - Darsh Pankaj Gajare

Question:
Find the ratio in which $\mathbf{P}\,(4,5)$ divides the line segment joining $\mathbf{A}\,(2,3)$ and $\mathbf{B}\,(7,8)$.
Solution: Given:

TABLE I: Given data

Point	matrix
A	$\begin{pmatrix}2\\3\end{pmatrix}$
B	$\begin{pmatrix}7\\8\end{pmatrix}$
P	$\begin{pmatrix}4\\5\end{pmatrix}$

$$k = \frac{(\mathbf{A}-\mathbf{P})^T(\mathbf{P}-\mathbf{B})}{\|\mathbf{P}-\mathbf{B}\|^2} \tag{1}$$

Substituting values,

$$k = \frac{\begin{pmatrix}-2 & -2\end{pmatrix}\begin{pmatrix}-3\\-3\end{pmatrix}}{\left\|\begin{pmatrix}-3\\-3\end{pmatrix}\right\|^2} = \frac{2}{3} \tag{2}$$