1-1.9-27

AI24BTECH11028- Ronit Ranjan

Question:
If a point A (0, 2) is equidistant from the points B(3, p) and C (p, 5), then find the value of p.

Solution: We have AB = AC, which implies,

$$\|A - B\| = \|A - C\| \tag{0.1}$$

$$\sqrt{(A-B)^T(A-B)} = \sqrt{(A-C)^T(A-C)} \tag{0.2}$$

where $A = \begin{pmatrix}0\\2\end{pmatrix}$ $B = \begin{pmatrix}3\\p\end{pmatrix}$ $C = \begin{pmatrix}p\\5\end{pmatrix}$.

$$\begin{pmatrix}-3 & 2-p\end{pmatrix}\begin{pmatrix}-3\\2-p\end{pmatrix} = \begin{pmatrix}-p & -3\end{pmatrix}\begin{pmatrix}-p\\-3\end{pmatrix} \tag{0.3}$$

$$9 + (2-p)^2 = p^2 + 9 \tag{0.4}$$

$$p = 1 \tag{0.5}$$