1-1.6-24

EE24BTECH11005 - Arjun Pavanje

Question:
Find the values of k if the points $\mathbf{A}\,(2,3)\,,\mathbf{B}\,(4,k)\,,$ and $\mathbf{C}\,(6,-3)$ are collinear
Solution:

Variable	Description
A	Point $(2,3)$
B	$(4,k)$ point
C	$(6,-3)$ point
k	value to be found

TABLE I: Variables Used

First we should construct the collinearity matrix with the given points A, B, C

$$\begin{pmatrix} B-A \\ C-B \end{pmatrix} \tag{1}$$

$$\begin{pmatrix} 2 & k-3 \\ 2 & -3-k \end{pmatrix} \xleftrightarrow{R_2 \to R_2 - R_1} \begin{pmatrix} 2 & k-3 \\ 0 & -2k \end{pmatrix} \tag{2}$$

rank should be 1 for collinearity, for that R_2 must be 0, so

$$-2k = 0 \tag{3}$$

$$\therefore k = 0 \tag{4}$$

The required value of k is $k = 0$

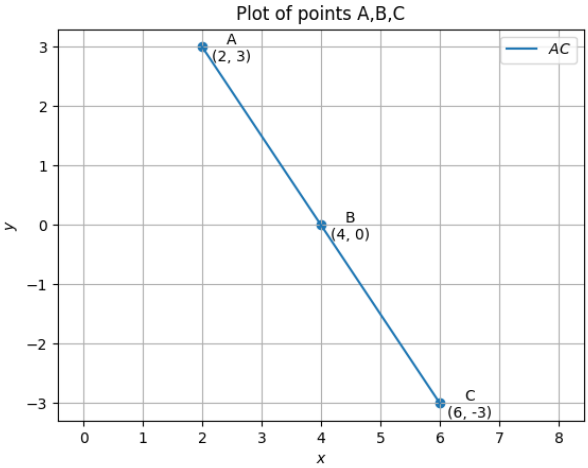

Fig. 1: Plot of the points A,B,C