1-1.7-8

EE24BTECH11058 - P.Shiny Diavajna

Question:Using vectors,prove that the points $\begin{pmatrix}2 & -1 & 3\end{pmatrix}$,$\begin{pmatrix}3 & -5 & 1\end{pmatrix}$ and $\begin{pmatrix}-1 & 11 & 9\end{pmatrix}$ are collinear.

Solution:

Variable	Description
$\begin{pmatrix}2 & -1 & 3\end{pmatrix}$	Point **A**
$\begin{pmatrix}3 & -5 & 1\end{pmatrix}$	Point **B**
$\begin{pmatrix}-1 & 11 & 9\end{pmatrix}$	Point **C**

TABLE 0: Variables Used

$$\begin{pmatrix}B-A & C-A\end{pmatrix}^{\top} = \begin{pmatrix}1 & -4 & -2\\ -3 & 12 & 6\end{pmatrix} \tag{0.1}$$

$$\xrightarrow{R_2=R_2+3R_1} \begin{pmatrix}1 & -4 & -2\\ 0 & 0 & 0\end{pmatrix} \tag{0.2}$$

$$\tag{0.3}$$

$$\text{rank = number of non-zero rows} \tag{0.4}$$

$$\text{i.e. rank =1} \tag{0.5}$$

$$\tag{0.6}$$

therefore,

$$\mathbf{A}, \mathbf{B}, \mathbf{C} \text{ are collinear.} \tag{0.7}$$

$$\tag{0.8}$$

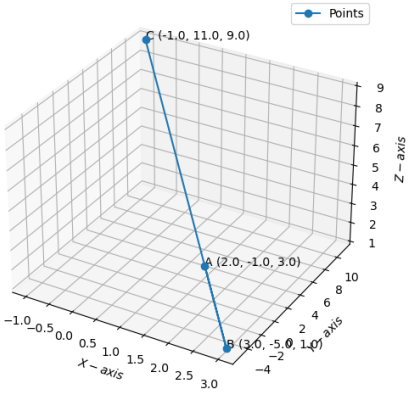

Fig. 0.1: Plot of points A,B and C