1.6.17

EE24BTECH11058 - P.Shiny Diavajna

Question:Using vectors,find the value of k such that points $\begin{pmatrix} k & -10 & 3 \end{pmatrix}$, $\begin{pmatrix} 1 & -1 & 3 \end{pmatrix}$ and $\begin{pmatrix} 3 & 5 & 3 \end{pmatrix}$ are collinear.

Solution:

Variable	Description
$\begin{pmatrix} k & -10 & 3 \end{pmatrix}$	Point **A**
$\begin{pmatrix} 1 & -1 & 3 \end{pmatrix}$	Point **B**
$\begin{pmatrix} 3 & 5 & 3 \end{pmatrix}$	Point **C**
k	x coordinate of **A**

TABLE 0: Variables Used

$$\begin{pmatrix} C-B & B-A \end{pmatrix}^{\top} = \begin{pmatrix} 2 & 6 & 0 \\ 1-k & 9 & 0 \end{pmatrix}$$

$$\xrightarrow{R_2 = R_1 - \frac{6}{9}R_1} \begin{pmatrix} 2 & 6 & 0 \\ \frac{4+2k}{3} & 0 & 0 \end{pmatrix}$$

$$\frac{4+2k}{3} = 0$$

$$k = -2$$

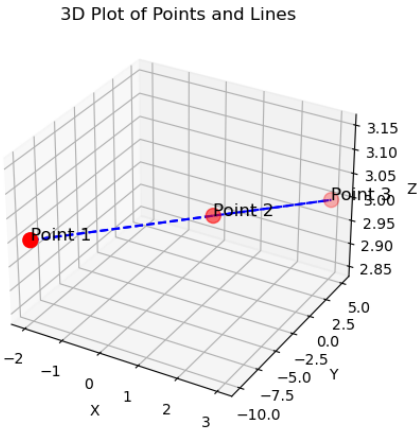

Fig. 0.1: Plot for points A , B and C