1.6.28

EE24BTECH11007 - Arnav Makarand Yadnopavit

Question:
Show that the points **A** $\left(-2\hat{i}+3\hat{j}+5\hat{k}\right)$, **B** $\left(\hat{i}+2\hat{j}+3\hat{k}\right)$ and **C** $\left(7\hat{i}-\hat{k}\right)$ are collinear
Solution: From Table 0

Point	**Vector**
A	$\begin{pmatrix}-2 & 3 & 5\end{pmatrix}$
B	$\begin{pmatrix}1 & 2 & 3\end{pmatrix}$
C	$\begin{pmatrix}7 & 0 & -1\end{pmatrix}$

TABLE 0: Given Values

The matrix

$$\begin{pmatrix}B-A & C-A\end{pmatrix}^{\top} = \begin{pmatrix}3 & -1 & -2\\ 9 & -3 & -6\end{pmatrix} \tag{0.1}$$

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

$\therefore$ the rank=1 which implies points are collinear.

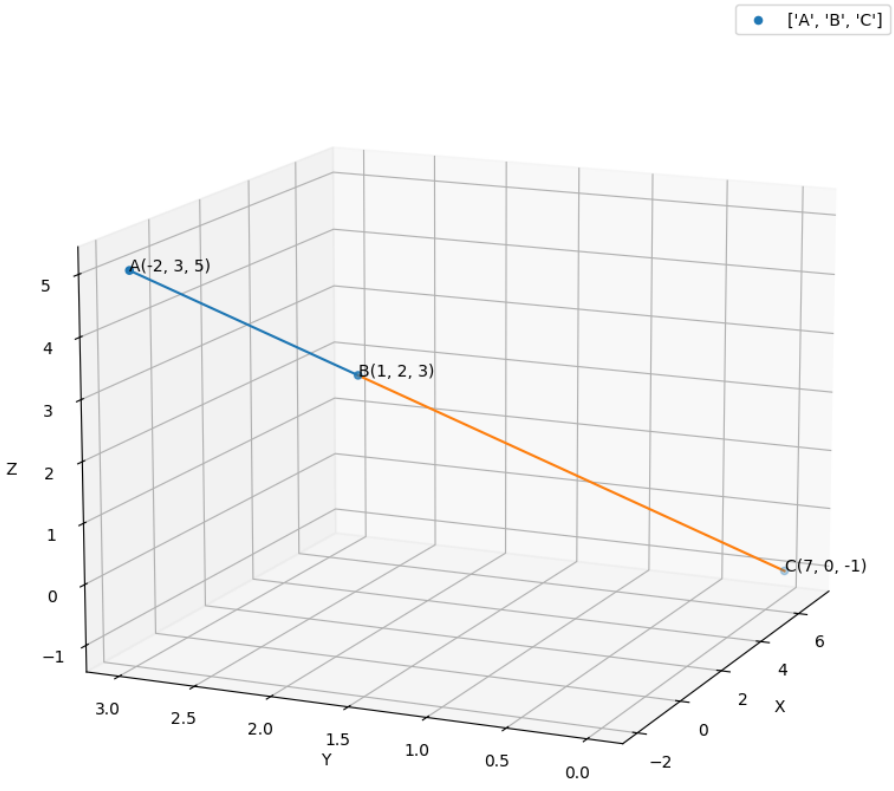

Fig. 0.1: Plot of A,B,C