

1.6.28

EE24BTECH11007 - Arnav Makarand Yadnopavit

Question:

Show that the points **A** $(-2\hat{i} + 3\hat{j} + 5\hat{k})$, **B** $(\hat{i} + 2\hat{j} + 3\hat{k})$ and **C** $(7\hat{i} - \hat{k})$ 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

$$(B - A \quad C - A)^T = \begin{pmatrix} 3 & -1 & -2 \\ 9 & -3 & -6 \end{pmatrix} \quad (0.1)$$

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

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

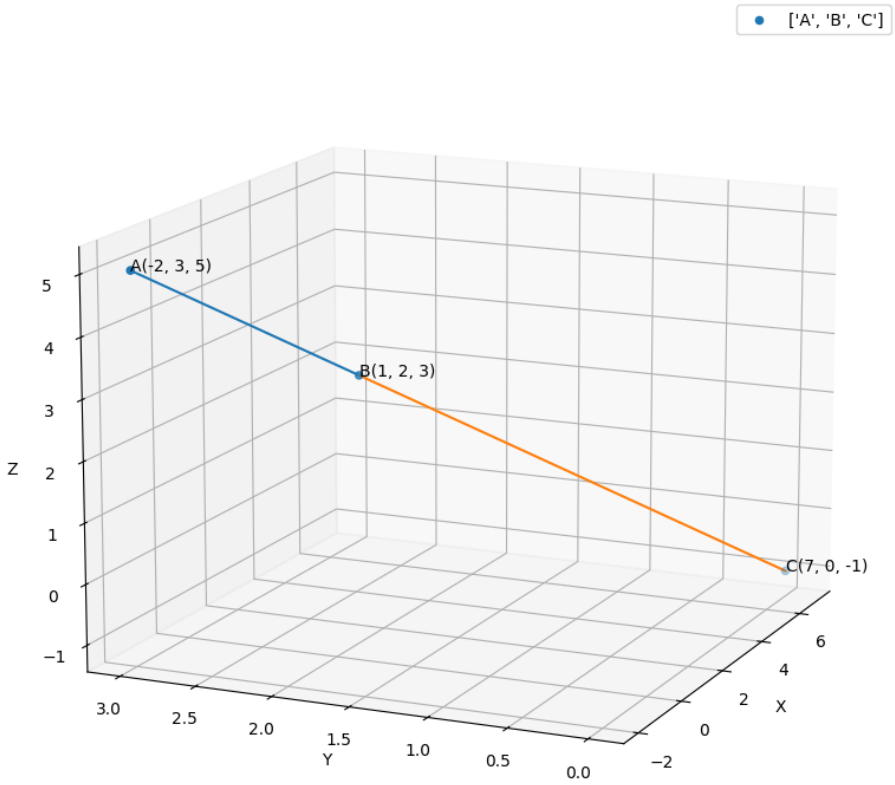


Fig. 0.1: Plot of A,B,C