

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 | Coordinates |
|----------|-----------------------------------|
| A | $-2\hat{i} + 3\hat{j} + 5\hat{k}$ |
| B | $\hat{i} + 2\hat{j} + 3\hat{k}$ |
| C | $7\hat{i} - \hat{k}$ |

TABLE 0: Given Values

The matrix

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

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

which has rank 1.

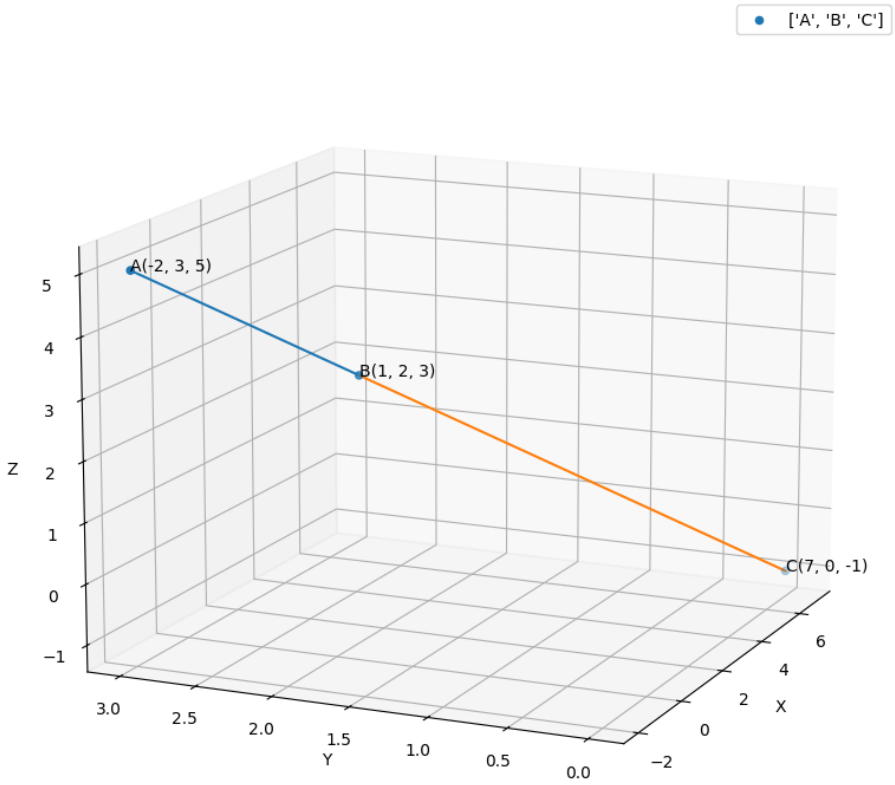


Fig. 0.1: Plot of A,B,C