

# 1-1.7-3

EE24BTECH11005 - Arjun Pavanje

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:**

Variable	Description
<b>A</b>	$(-2\hat{i} + 3\hat{j} + 5\hat{k})$ point
<b>B</b>	$(\hat{i} + 2\hat{j} + 3\hat{k})$ point
<b>C</b>	$(7\hat{i} - \hat{k})$ point

TABLE I: Variables Used

First we should construct the collinearity matrix with the given points  $A, B, C$

$$\begin{pmatrix} B - A \\ C - B \end{pmatrix} \quad (1)$$

$$\begin{pmatrix} 3 & -1 & -2 \\ 6 & -2 & -4 \end{pmatrix} \xrightarrow{R_2 \rightarrow R_2 - 2R_1} \begin{pmatrix} 3 & -1 & -2 \\ 0 & 0 & 0 \end{pmatrix} \quad (2)$$

There is one, non-zero row, rank of matrix is 1,  $\therefore$  the 3 points are collinear

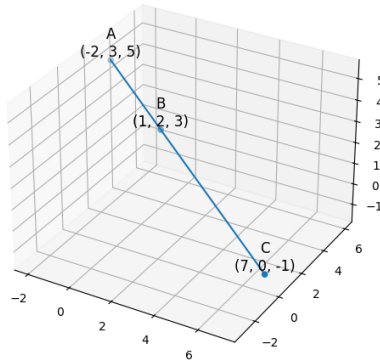


Fig. 1: Plot of the points A,B,C