

1-1.7-8

EE24BTECH11058 - P.Shiny Diavajna

Question: Using vectors, prove that the points $(2, -1, 3)$, $(3, -5, 1)$ and $(-1, 11, 9)$ are collinear.

Solution:

| Variable | Description |
|---|----------------|
| $\begin{pmatrix} 2 & -1 & 3 \end{pmatrix}$ | Point A |
| $\begin{pmatrix} 3 & -5 & 1 \end{pmatrix}$ | Point B |
| $\begin{pmatrix} -1 & 11 & 9 \end{pmatrix}$ | Point C |

TABLE 0: Variables Used

$$\begin{aligned} (B - A \quad C - A)^T &= \begin{pmatrix} 1 & -4 & -2 \\ -3 & 12 & 6 \end{pmatrix} \\ &\xrightarrow{R_2 = R_2 + 3R_1} \begin{pmatrix} 1 & -4 & -2 \\ 0 & 0 & 0 \end{pmatrix} \end{aligned}$$

rank = number of non-zero rows
i.e. rank = 1

therefore,

A, B, C are collinear.

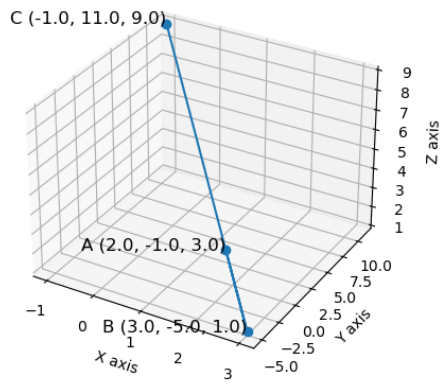


Fig. 0.1: Plot of points A,B and C