

1.6.17

EE24BTECH11058 - P.Shiny Diavajna

Question: Using vectors, find the value of k such that points $(k \ -10 \ 3)$, $(1 \ -1 \ 3)$ and $(3 \ 5 \ 3)$ are collinear.

Solution:

Variable	Description
$(k \ -10 \ 3)$	Point A
$(1 \ -1 \ 3)$	Point B
$(3 \ 5 \ 3)$	Point C
k	x coordinate of A

TABLE 0: Variables Used

$$\begin{aligned}
 (C - B \quad B - A)^T &= \begin{pmatrix} 2 & 6 & 0 \\ 1 - k & 9 & 0 \end{pmatrix} \\
 &\xrightarrow{R_2 = R_1 - \frac{6}{9}R_1} \begin{pmatrix} 2 & 6 & 0 \\ \frac{4+2k}{3} & 0 & 0 \end{pmatrix}
 \end{aligned}$$

$$\begin{aligned}
 \frac{4+2k}{3} &= 0 \\
 k &= -2
 \end{aligned}$$

3D Plot of Points and Lines

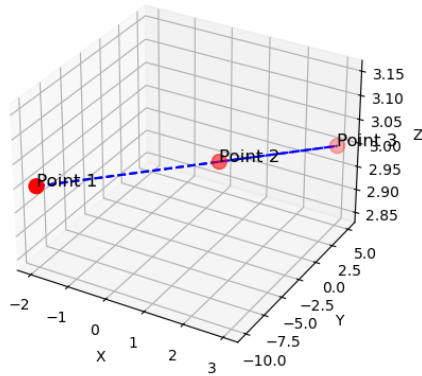


Fig. 0.1: Plot for points A , B and C