EE24BTECH11033 - Kolluru Suraj

Question:

Point (-4,2) lies on the line segment joining the points A(-4,6) and B(-4,-6). **Solution:**

point	Coordinates
A	(-4,6)
В	(-4, -6)
С	(-4, 2)

TABLE 0: variables used

Points A, B, C are defined to be collinear if

$$rank(\mathbf{B} - \mathbf{A} \quad \mathbf{C} - \mathbf{A}) = 1 \tag{0.1}$$

$$\mathbf{B} - \mathbf{A} = \begin{pmatrix} 0 \\ -12 \end{pmatrix} \tag{0.2}$$

$$\mathbf{C} - \mathbf{A} = \begin{pmatrix} 0 \\ -4 \end{pmatrix} \tag{0.3}$$

The collinearity matrix can be expressed as

$$\begin{pmatrix} 0 & 0 \\ -12 & -4 \end{pmatrix} \tag{0.4}$$

which is a rank 1 matrix. To find the ratio which C divides A, B. Using section formula,

$$\binom{-4}{2} = \frac{\binom{-4}{6} + k \binom{-4}{-6}}{1+k}$$
 (0.5)

$$\implies 2k \begin{pmatrix} 0 \\ 4 \end{pmatrix} = 2 \begin{pmatrix} 0 \\ 4 \end{pmatrix} \tag{0.6}$$

or,
$$k = \frac{1}{2}$$
. (0.7)

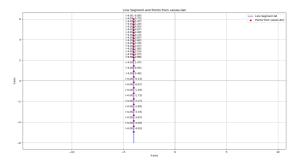


Fig. 0.1: Line connecting ABC