1-1.6-14

AI24BTECH11010 - Golla Shriram

Question:
Points $\mathbf{A}(3,1), \mathbf{B}(12,-2)$ and $\mathbf{C}(0,2)$ cannot be vertices of a triangle.
Solution:
If $\mathbf{A}, \mathbf{B}$and $\mathbf{C}$ are collinear then they are not vertices of triangle.
Points $\mathbf{A}, \mathbf{B}, \mathbf{C}$ are defined to be collinear if

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

The collinearity matrix is

$$\begin{pmatrix} 9 & -3 \\ -12 & 4 \end{pmatrix} \xleftrightarrow{R_2 \leftarrow 3R_2+4R_1} \begin{pmatrix} 9 & -3 \\ 0 & 0 \end{pmatrix} \tag{0.2}$$

By applying row reductions we get rank of matrix as 1. So, $\mathbf{A}, \mathbf{B}, \mathbf{C}$ are collinear.

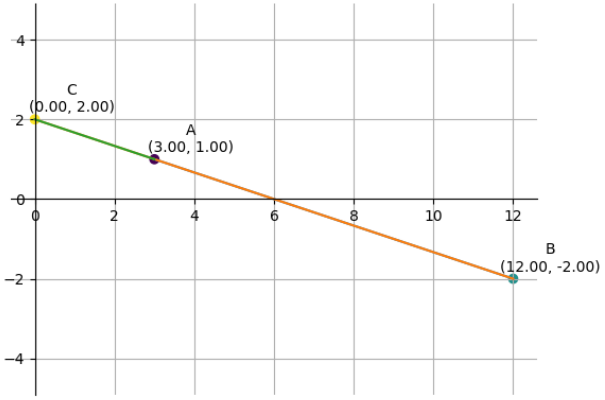

Fig. 0.1: Plot of $\mathbf{A}, \mathbf{B}, \mathbf{C}$