ASSIGNMENT-6

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Download all python codes from

https://github.com/BatharajuRamana/ASSIGNMENT-6/tree/main/CODES

and latex-tikz codes from

https://github.com/BatharajuRamana/ASSIGNMENT-6/tree/main

1 Question No 2.27

prove that the three points $\begin{pmatrix}-4\\6\\10\end{pmatrix}$, $\begin{pmatrix}2\\4\\6\end{pmatrix}$ and $\begin{pmatrix}14\\0\\-2\end{pmatrix}$ are collinear.

2 SOLUTION

Let,

$$\mathbf{A} = \begin{pmatrix}-4\\6\\10\end{pmatrix}, \mathbf{B} = \begin{pmatrix}2\\4\\6\end{pmatrix}, \mathbf{C} = \begin{pmatrix}14\\0\\-2\end{pmatrix} \tag{2.0.1}$$

$$\mathbf{B} - \mathbf{A} = \begin{pmatrix}6\\-2\\-4\end{pmatrix} \tag{2.0.2}$$

$$\mathbf{C} - \mathbf{A} = \begin{pmatrix}18\\-6\\-12\end{pmatrix} \tag{2.0.3}$$

$$\mathbf{M} = \begin{pmatrix}B - A & C - A\end{pmatrix}^T \tag{2.0.4}$$

$$\mathbf{M} = \begin{pmatrix}6 & -2 & -4\\18 & -6 & -12\end{pmatrix} \xleftrightarrow{R_2 \to R_2 - R_1} \begin{pmatrix}6 & -2 & -4\\12 & -4 & -8\end{pmatrix} \tag{2.0.5}$$

$$\xleftrightarrow{R_2 \to R_2 - 2R_1} \begin{pmatrix}6 & -2 & -4\\0 & 0 & 0\end{pmatrix} \tag{2.0.6}$$

$$\implies rank\left(M\right) = 1 \tag{2.0.7}$$

The points are collinear.

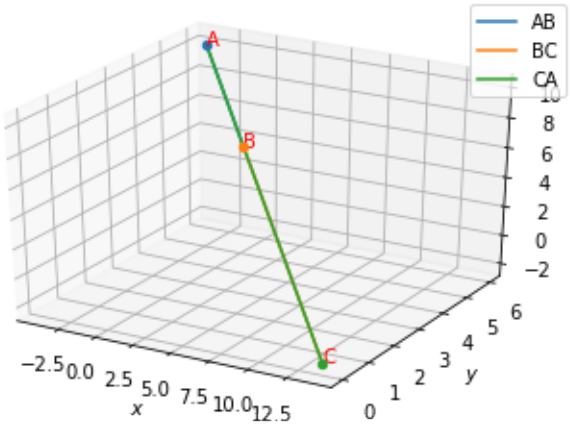

Fig. 0: collinear