# 1-1.7-3

EE24BTECH11005 - Arjun Pavanje

Question:

Show that the points $\mathbf{A}\begin{pmatrix}-2\\3\\5\end{pmatrix}$, $\mathbf{B}\begin{pmatrix}1\\2\\3\end{pmatrix}$, and $\mathbf{C}\begin{pmatrix}7\\0\\-1\end{pmatrix}$ are collinear

**Solution:**

| Variable | Description |
|---|---|
| **A** | $\begin{pmatrix}-2\\3\\5\end{pmatrix}$ point |
| **B** | $\begin{pmatrix}1\\2\\3\end{pmatrix}$ point |
| **C** | $\begin{pmatrix}7\\0\\-1\end{pmatrix}$ point |

TABLE I: Variables Used

First we should construct the collinearity matrix with the given points $A, B, C$

$$\begin{pmatrix}B-A\\C-B\end{pmatrix} \tag{1}$$

$$\begin{pmatrix}3&-1&-2\\6&-2&-4\end{pmatrix} \xleftrightarrow{R_2\to R_2-2R_1} \begin{pmatrix}3&-1&-2\\0&0&0\end{pmatrix} \tag{2}$$

There is one, non-zero row, rank of matrix is 1, $\therefore$ the 3 points are collinear

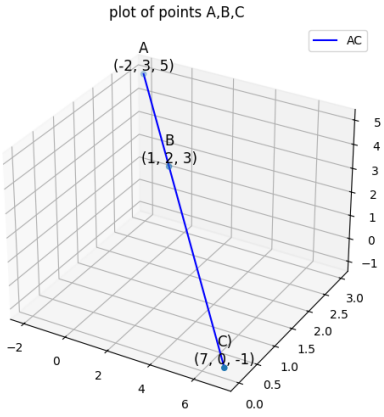


Fig. 1: Plot of the points A,B,C