

Assignment 1

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Download all python codes from

<https://github.com/cmapsi/AI1103-Probability-and-random-variables/tree/main/Assignment-9/codes>

and latex-tikz codes from

<https://github.com/cmapsi/AI1103-Probability-and-random-variables/blob/main/Assignment-9/main.tex>

1 PROBLEM

Determine if the points

$$\begin{pmatrix} 1 \\ 5 \end{pmatrix}, \begin{pmatrix} 2 \\ 3 \end{pmatrix}, \begin{pmatrix} -2 \\ -11 \end{pmatrix} \quad (1.0.1)$$

are collinear

2 SOLUTION

If the the points are collinear then assuming the points are represented by vectors \mathbf{A} , \mathbf{B} , \mathbf{C} then for some $\lambda \in \mathbb{R} - \{0\}$

$$(\mathbf{A} - \mathbf{B}) = \lambda (\mathbf{A} - \mathbf{C}) \quad (2.0.1)$$

Here

$$\mathbf{A} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}, \quad (2.0.2)$$

$$\mathbf{B} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}, \quad (2.0.3)$$

$$\mathbf{C} = \begin{pmatrix} -2 \\ -11 \end{pmatrix} \quad (2.0.4)$$

The vectors

$$\mathbf{A} - \mathbf{B} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}, \quad (2.0.5)$$

$$\mathbf{A} - \mathbf{C} = \begin{pmatrix} 3 \\ 16 \end{pmatrix} \quad (2.0.6)$$

Clearly, (2.0.1) doesn't hold. Therefore the given points are not collinear.

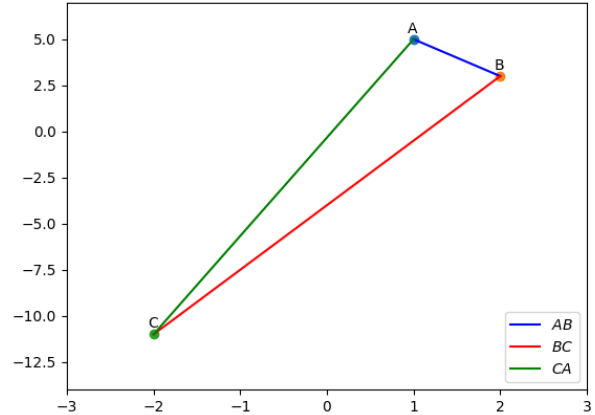


Fig. 0: Plot of the points