Assignment 5

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Download all python codes from

https://github.com/kavyakamal66/IITH-INTERNSHIP/blob/main/Assignment5/code5.py

and latex codes from

https://github.com/kavyakamal66/IITH-INTERNSHIP/blob/main/Assignment5/assignment5.tex

1 Question No.Matrices 1.76

Question 1: Find equation of line joining (1,2) and (3,6) using determinants.

2 Solution

Given,

$$\mathbf{A} = \begin{pmatrix}1\\2\end{pmatrix}, \mathbf{B} = \begin{pmatrix}3\\6\end{pmatrix} \tag{2.0.1}$$

Let ,

$$\mathbf{C} = \begin{pmatrix}x\\y\end{pmatrix} \tag{2.0.2}$$

be a point on the line joining **A** and **B**
Area matrix is,

$$\begin{pmatrix}1 & 1 & 1\\ \mathbf{A} & \mathbf{B} & \mathbf{C}\end{pmatrix} \tag{2.0.3}$$

Area of triangle formed by collinear points is 0 ie,

$$\begin{vmatrix}1 & 1 & 1\\ \mathbf{A} & \mathbf{B} & \mathbf{C}\end{vmatrix} = 0 \tag{2.0.4}$$

$$\implies \begin{vmatrix}1 & 1 & 1\\ 1 & 3 & x\\ 2 & 6 & y\end{vmatrix} = 0 \tag{2.0.5}$$

ie,Equation of line from (3.0.5)

$$\begin{pmatrix}-4 & 2\end{pmatrix}\mathbf{x} = 0 \tag{2.0.6}$$

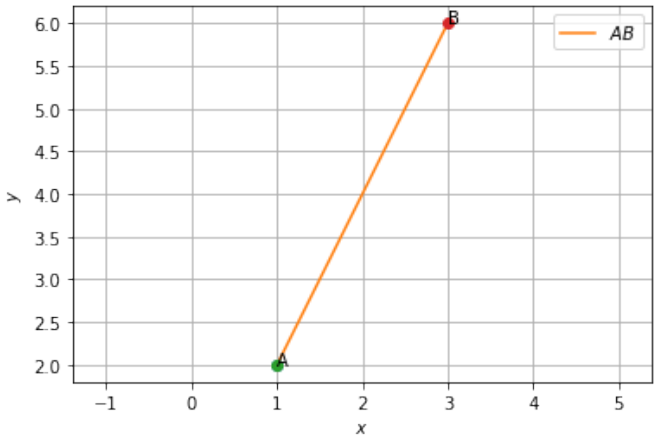

Fig. 0: Line AB

Question 2: Find equation of line joining (3,1) and (9,3) using determinants.

3 Solution

Given,

$$\mathbf{A} = \begin{pmatrix}3\\1\end{pmatrix}, \mathbf{B} = \begin{pmatrix}9\\3\end{pmatrix} \tag{3.0.1}$$

Let ,

$$\mathbf{C} = \begin{pmatrix}x\\y\end{pmatrix} \tag{3.0.2}$$

be a point on the line joining **A** and **B**
Area matrix is,

$$\begin{pmatrix}1 & 1 & 1\\ \mathbf{A} & \mathbf{B} & \mathbf{C}\end{pmatrix} \tag{3.0.3}$$

Area of triangle formed by collinear points is 0 ie,

$$\begin{vmatrix}1 & 1 & 1\\ \mathbf{A} & \mathbf{B} & \mathbf{C}\end{vmatrix} = 0 \tag{3.0.4}$$

$$\implies \begin{vmatrix}1 & 1 & 1\\ 3 & 9 & x\\ 1 & 3 & y\end{vmatrix} = 0 \tag{3.0.5}$$

ie,Equation of line from (3.0.5)

$$\begin{pmatrix} -2 & 6 \end{pmatrix} \mathbf{x} = 0 \tag{3.0.6}$$

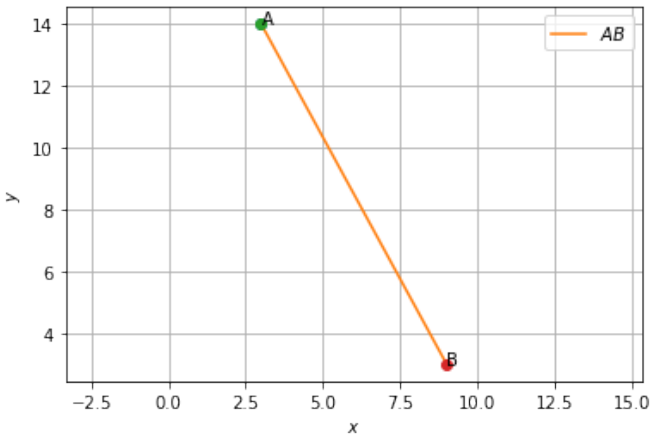

Fig. 0: Line AB