

Assignment No.1

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Download all python codes from

<https://github.com/Sekharjala/Assignments/blob/main/code>

and pdf from

<https://github.com/Sekharjala/Assignments/blob/main/Assignment1.pdf>

Thus, from the above row reduced form we can conclude that the given system of lines has solution iff $c \equiv 0$ and points are collinear.

$$\begin{pmatrix} 1 & 2 & 0 \\ 0 & 0 & 0 \end{pmatrix} \quad (2.0.9)$$

$$(1 \ 2)\mathbf{n} = 0 \quad (2.0.10)$$

The normal vector \mathbf{n} to a line is orthogonal to the direction vector \mathbf{m} then

$$\mathbf{m}^T \mathbf{n} = 0 \quad (2.0.11)$$

Directional vector is

$$\mathbf{m} = \begin{pmatrix} 1 \\ 2 \end{pmatrix} \quad (2.0.12)$$

Normal vector

$$\mathbf{n} = \begin{pmatrix} -2 \\ 1 \end{pmatrix} \quad (2.0.13)$$

Equation of straight line is

$$(-2 \ 1)\mathbf{x} = 0 \quad (2.0.14)$$

1 QUESTION NO.MATRICES 1.76.1

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

2 SOLUTION

To construct a line joining $\mathbf{A} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} 3 \\ 6 \end{pmatrix}$, let \mathbf{n} be the normal vector then

$$\mathbf{n}^T \mathbf{A} = c \quad (2.0.1)$$

$$\mathbf{n}^T \mathbf{B} = c \quad (2.0.2)$$

from Equations (2.0.1) and (2.0.2)

$$\mathbf{A}^T \mathbf{n} = c \quad (2.0.3)$$

$$\mathbf{B}^T \mathbf{n} = c \quad (2.0.4)$$

$$\begin{pmatrix} \mathbf{A}^T \\ \mathbf{B}^T \end{pmatrix} \mathbf{n} = \begin{pmatrix} c \\ c \end{pmatrix} \quad (2.0.5)$$

$$\begin{pmatrix} 1 & 2 \\ 3 & 6 \end{pmatrix} \mathbf{n} = \begin{pmatrix} c \\ c \end{pmatrix} \quad (2.0.6)$$

Augmented Matrix is

$$\begin{pmatrix} 1 & 2 & c \\ 3 & 6 & c \end{pmatrix} \quad (2.0.7)$$

$$\begin{pmatrix} 1 & 2 & c \\ 3 & 6 & c \end{pmatrix} \xrightarrow{3R_1 - R_2 \rightarrow R_2} \begin{pmatrix} 1 & 2 & c \\ 0 & 0 & -2c \end{pmatrix} \quad (2.0.8)$$

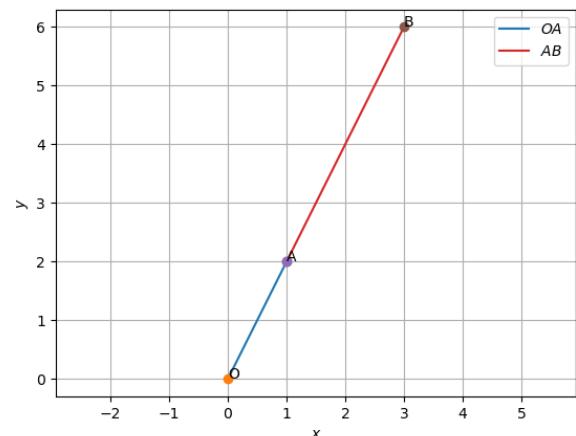


Fig. 0: line formed with points $(1 \ 2)$ and $(3 \ 6)$ using Python