

Assignment No.1

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Download all python codes from

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

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

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 $\mathbf{B} = \begin{pmatrix} 3 \\ 6 \end{pmatrix}$ and let \mathbf{n} be the normal vector then

$$\mathbf{n}^T \mathbf{A} = 1 \quad (2.0.1)$$

$$\mathbf{n}^T \mathbf{B} = 1 \quad (2.0.2)$$

from Equations(2.0.1) and (2.0.2)

$$\mathbf{A}^T \mathbf{n} = 1 \quad (2.0.3)$$

$$\mathbf{B}^T \mathbf{n} = 1 \quad (2.0.4)$$

$$\begin{pmatrix} \mathbf{A}^T \\ \mathbf{B}^T \end{pmatrix} \mathbf{n} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} \quad (2.0.5)$$

$$\mathbf{n} = \begin{pmatrix} \mathbf{A}^T \\ \mathbf{B}^T \end{pmatrix}^{-1} \begin{pmatrix} 1 \\ 1 \end{pmatrix} \quad (2.0.6)$$

For a Square Matrix \mathbf{X}

$$\mathbf{X}^{-1} = \frac{adj \mathbf{X}}{\det \mathbf{X}} \quad (2.0.7)$$

To calculate inverse of matrix the determinant of a matrix should not be zero then unique solution exists

$$\det \begin{pmatrix} \mathbf{A}^T \\ \mathbf{B}^T \end{pmatrix} = \begin{vmatrix} 1 & 2 \\ 3 & 6 \end{vmatrix} = 6 - 6 = 0 \quad (2.0.8)$$

Inverse of Matrix does not exist.

Hence The lines formed with equations(2.0.1) and (2.0.2) have same slope and have infinite solutions

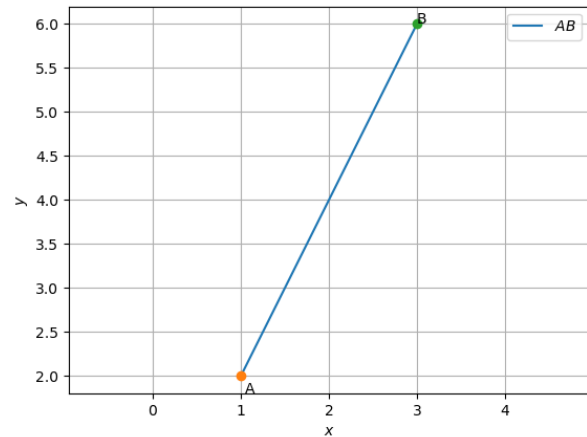


Fig. 0: line formed with points(1,2) and (3,6) using Python