

Assignment 1: Matrix Theory

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Assignment1

Abstract—This assignment solves a problem to find the slope of a line.

Download all python codes from

<https://github.com/Alok0895/Assignment1/blob/master/Assignment1.py>

and latex-tikz codes from

<https://github.com/Alok0895/Assignment1/blob/master/Assignment1.tex>

since it passes through (0,0) therefore:-

$$(m \ 1) \begin{pmatrix} 0 \\ 0 \end{pmatrix} - (1 \ m) \begin{pmatrix} -1 \\ 2 \end{pmatrix} = 0 \quad (2.0.1)$$

$$\Rightarrow (-1 + 2m) = 0 \quad (2.0.2)$$

$$\Rightarrow m = \frac{1}{2} \quad (2.0.3)$$

$$\Rightarrow m = 0.5 \quad (2.0.4)$$

Hence, the value of m and c are obtained as 0.5 and 2.5 respectively.

$$(-0.5 \ 1) \begin{pmatrix} x \\ y \end{pmatrix} = c \quad (2.0.5)$$

$$\Rightarrow (-0.5 \ 1) \begin{pmatrix} -1 \\ 2 \end{pmatrix} = c \quad (2.0.6)$$

$$\Rightarrow c = 2.5$$

Hence, the value of m and c are obtained as 0.5 and 2.5 respectively.

1 PROBLEM

The perpendicular from the origin to the line $(-m \ 1)\mathbf{x} = c$ meets it at the point $\mathbf{P} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$. find the value of m and c .

2 SOLUTION

According to the question, the given line can be expressed as:-

$$L_1 \Rightarrow (-m \ 1)\mathbf{x} = c$$

Direction vector of line L_2 perpendicular to L_1 should be $\begin{pmatrix} 1 \\ m \end{pmatrix}$ such that the equation of line should be:-

$$L_2 \Rightarrow (1 \ m)^T (\mathbf{x} - (-1 \ 2)) = 0$$

Therefore L_2 can be expressed as:-

$$\Rightarrow (1 \ m) \left(\mathbf{x} - \begin{pmatrix} -1 \\ 2 \end{pmatrix} \right) = 0$$

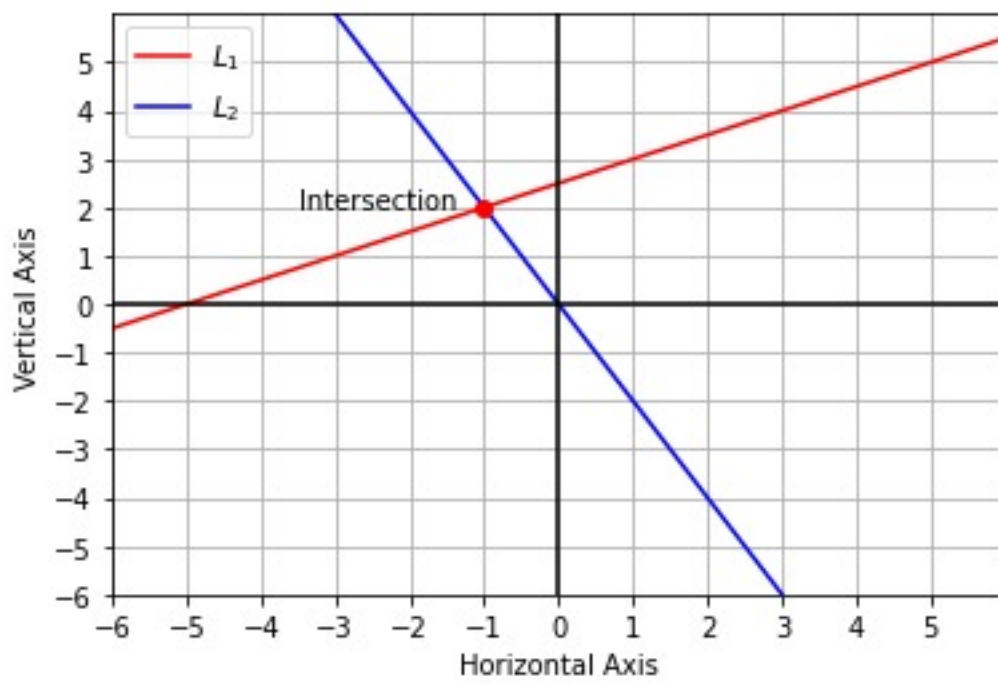


Fig. 0: Perpendicular Lines crossing