

ASSIGNMENT 4

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Download all python codes from

https://github.com/ArunSiddardha/EE3900/blob/main/Assignment_2/code/Assignment_3.py

and latex-tikz codes from

https://github.com/ArunSiddardha/EE3900/blob/main/Assignment_2/Assignment_3.tex

1 LINEAR FORMS/Q.2.21

The perpendicular from the origin to a line meets it at a point $\begin{pmatrix} -2 \\ 9 \end{pmatrix}$, find the equation of the line.

2 SOLUTION

Let the equation of line be

$$\mathbf{n}^T (\mathbf{x} - \mathbf{P}) = 0 \quad (2.0.1)$$

So the perpendicular from the origin meets the line at $\mathbf{P} = \begin{pmatrix} -2 \\ 9 \end{pmatrix}$. Since,

$$\mathbf{n} = \mathbf{P} - \mathbf{O} \quad (2.0.2)$$

$$= \begin{pmatrix} -2 - 0 \\ 9 - 0 \end{pmatrix} \quad (2.0.3)$$

$$= \begin{pmatrix} -2 \\ 9 \end{pmatrix} \quad (2.0.4)$$

is the normal vector where \mathbf{O} is the origin then is the direction vector, Hence the equation of line is given by

$$\begin{pmatrix} -2 & 9 \end{pmatrix} \left(\mathbf{x} - \begin{pmatrix} -2 \\ 9 \end{pmatrix} \right) = 0 \quad (2.0.5)$$

normal vector perpendicular to the line is given by
(The desired line is given by)

$$\begin{pmatrix} -2 & 9 \end{pmatrix} \mathbf{x} = 85 \quad (2.0.6)$$

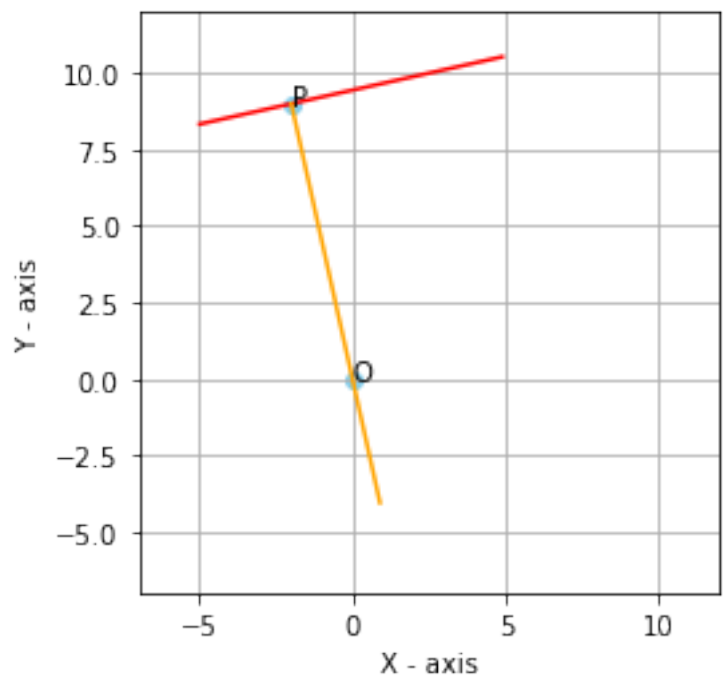


Fig. 0: graph