ASSIGNMENT 4

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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

$$\mathbf{n}^\top (\mathbf{x} - \mathbf{P}) = 0 \qquad (2.0.1)$$

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

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

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

$$\begin{pmatrix} -2 & 9 \end{pmatrix} \left(\mathbf{x} - \begin{pmatrix} -2 \\ 9 \end{pmatrix} \right) = 0 \qquad (2.0.3)$$

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

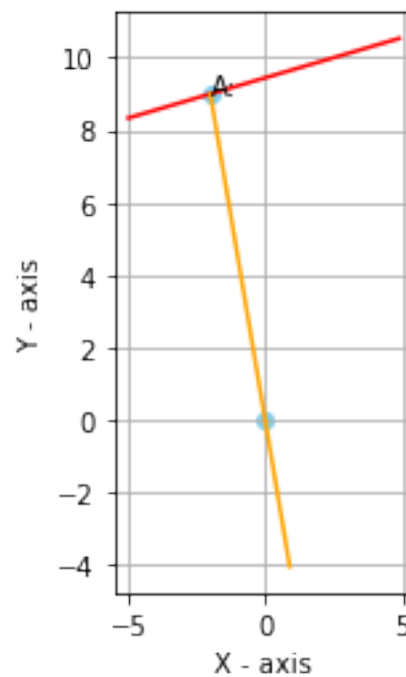$$\begin{pmatrix} -2 & 9 \end{pmatrix} \mathbf{x} = 85 \qquad (2.0.4)$$

Fig. 0: Figure