Assignment No.2

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Download all python codes from

https://github.com/Nagarajunaddi/Assignment_2

and latex codes from

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1 Question No:2.21

Question : 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

Solution :

Let OC be perpendicular to the line AB at $\begin{pmatrix}-2\\9\end{pmatrix}$

Given that OC is perpendicular to AB.

m = Direction Vector of AB

n = Normal Vector of AB

Where **n** is perpendicular to **m**

Then Equation of Line AB is

$$\mathbf{n}^{\mathbf{T}}\mathbf{x} = c \tag{2.0.1}$$

$$\mathbf{n} = \textit{Direction Vector of } OC = \mathbf{C} - \mathbf{O} \tag{2.0.2}$$

$$\mathbf{n} = \begin{pmatrix}-2-0\\9-0\end{pmatrix} \tag{2.0.3}$$

$$\mathbf{n} = \begin{pmatrix}-2\\9\end{pmatrix} \tag{2.0.4}$$

From Equation (2.0.1), The Equation of Line AB is

$$\begin{pmatrix}-2 & 9\end{pmatrix}\mathbf{x} = c \tag{2.0.5}$$

On the Line AB a point $\begin{pmatrix}-2\\9\end{pmatrix}$ exists

$$\begin{pmatrix}-2 & 9\end{pmatrix}\begin{pmatrix}-2\\9\end{pmatrix} = c \tag{2.0.6}$$

$$c = 85 \tag{2.0.7}$$

Substitute c value in Equation (2.0.1)

$$\begin{pmatrix}-2 & 9\end{pmatrix}\mathbf{x} = 85 \tag{2.0.8}$$

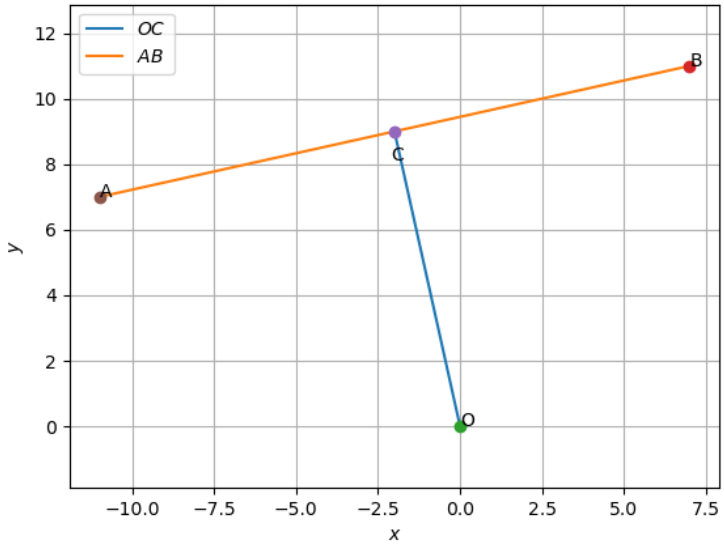

Fig. 0: Equation of Line