

1.5.8

EE25BTECH11020 - Darsh Pankaj Gajare

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Question:

Line joining the points $(3, -4)$ and $(-2, 6)$ is perpendicular to the line joining the points $(-3, 6)$ and $(9, -18)$.

Solution:

Table: Given Data

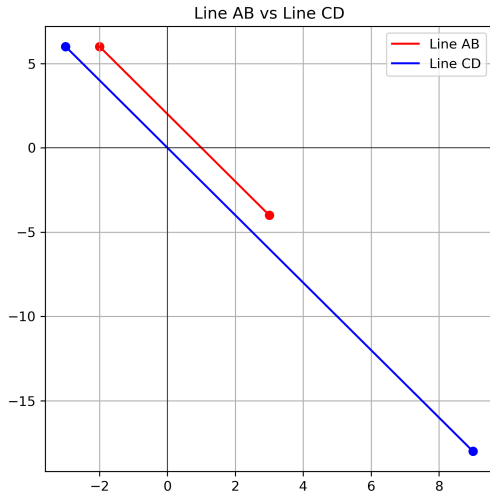
A	$\begin{pmatrix} 3 \\ -4 \end{pmatrix}$
B	$\begin{pmatrix} -2 \\ 6 \end{pmatrix}$
C	$\begin{pmatrix} -3 \\ 6 \end{pmatrix}$
D	$\begin{pmatrix} 9 \\ -18 \end{pmatrix}$

$$\mathbf{A} - \mathbf{B} = \begin{pmatrix} 5 \\ -10 \end{pmatrix}, \mathbf{C} - \mathbf{D} = \begin{pmatrix} -12 \\ 24 \end{pmatrix} \quad (0.1)$$

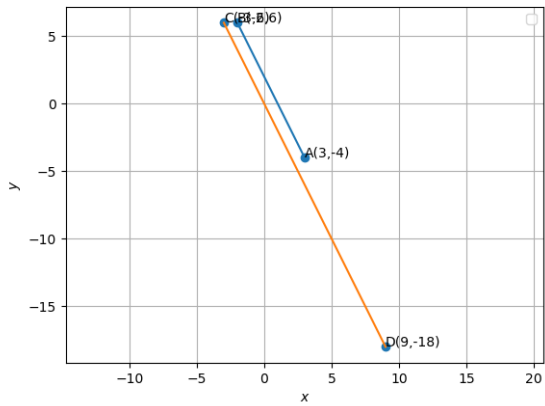
For lines to be perpendicular their inner product should be 0

$$(\mathbf{A} - \mathbf{B})^T (\mathbf{C} - \mathbf{D}) = (5 \quad -10) \begin{pmatrix} -12 \\ 24 \end{pmatrix} = -300 \quad (0.2)$$

Hence the lines are not perpendicular



Plot using C libraries



Plot using Python