2.4.15

EE25BTECH11020 - Darsh Pankaj Gajare

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 I: Given Data

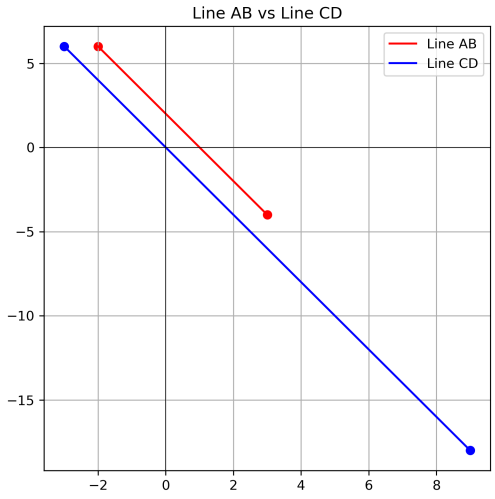
A	$\begin{pmatrix}3\\-4\end{pmatrix}$
B	$\begin{pmatrix}-2\\6\end{pmatrix}$
C	$\begin{pmatrix}-3\\6\end{pmatrix}$
D	$\begin{pmatrix}9\\-18\end{pmatrix}$

$$\mathbf{A}-\mathbf{B}=\begin{pmatrix}5\\-10\end{pmatrix},\ \mathbf{C}-\mathbf{D}=\begin{pmatrix}-12\\24\end{pmatrix} \tag{1}$$

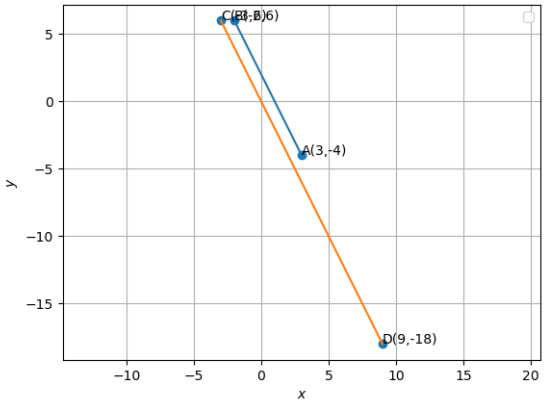
For lines to be perpendicular their inner product should be 0

$$(\mathbf{A}-\mathbf{B})^{T}(\mathbf{C}-\mathbf{D})=\begin{pmatrix}5 & -10\end{pmatrix}\begin{pmatrix}-12\\24\end{pmatrix}=-300 \tag{2}$$

Hence the lines are not perpendicular
Plot using C libraries:



Plot using Python:


C(-3,6)
B(-2,6)
A(3,-4)
D(9,-18)
y
x
5
0
−5
−10
−15
−10
−5
0
5
10
15
20