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	$\begin{pmatrix}9\\-18\end{pmatrix}$

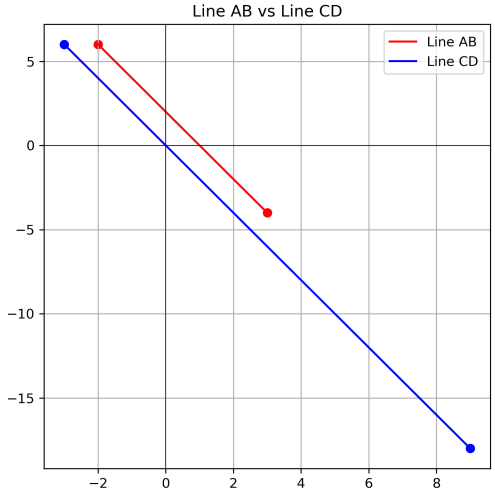
Let θ be the angle between the lines

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

$$cos\theta=\frac{(\mathbf{A}-\mathbf{B})^{T}(\mathbf{C}-\mathbf{D})}{\|\mathbf{A}-\mathbf{B}\|\,\|\mathbf{C}-\mathbf{D}\|} \tag{2}$$

$$cos\theta=1 \tag{3}$$

For lines to be perpendicular, $cos\theta$ should be $=0$, hence the lines are not perpendicular
Plot using C libraries:



Plot using Python: