EE3900-Assignment 4

W Vaishnavi
AI20BTECH11025

Download all latex-tikz codes from

https://github.com/vaishnavi−w/EE3900/blob/main/
Assignment4/latex4.tex

and python codes from

https://github.com/vaishnavi−w/EE3900/blob/main/
Assignment4/codes/linesplot.tex

1 LINEAR FORMS Q.2.32

If the co-ordinates of the points A,B,C and D be
$\begin{pmatrix}1\\2\\3\end{pmatrix}, \begin{pmatrix}4\\5\\7\end{pmatrix}, \begin{pmatrix}-4\\3\\-6\end{pmatrix}, \begin{pmatrix}2\\9\\2\end{pmatrix}$. Then find the angle between
lines AB and CD

2 SOLUTION

The direction vector for the line AB is

$$\mathbf{m_1} = \mathbf{B} - \mathbf{A} \qquad (2.0.1)$$

$$\implies \mathbf{m_1} = \begin{pmatrix}4\\5\\7\end{pmatrix} - \begin{pmatrix}1\\2\\3\end{pmatrix} \qquad (2.0.2)$$

$$\implies \mathbf{m_1} = \begin{pmatrix}3\\3\\4\end{pmatrix} \qquad (2.0.3)$$

The direction vector for the line CD is

$$\mathbf{m_2} = \mathbf{D} - \mathbf{C} \qquad (2.0.4)$$

$$\implies \mathbf{m_2} = \begin{pmatrix}2\\9\\2\end{pmatrix} - \begin{pmatrix}-4\\3\\-6\end{pmatrix} \qquad (2.0.5)$$

$$\implies \mathbf{m_2} = \begin{pmatrix}6\\6\\8\end{pmatrix} = 2\begin{pmatrix}3\\3\\4\end{pmatrix} = 2\mathbf{m_1} \qquad (2.0.6)$$

We have,

$$\mathbf{m_2} = \lambda\mathbf{m_1} \qquad (2.0.7)$$

where $\lambda = 2$. The lines are scalar multiples of one
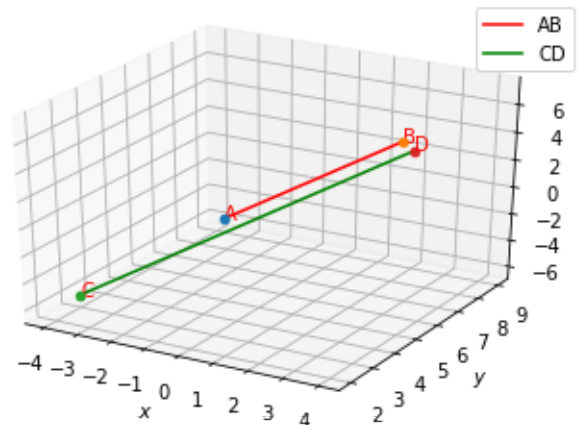another. Hence, they are parallel.
Since $\lambda = 2 > 0$, the angle between the lines is $0°$

Fig. 0: Plot of lines AB and CD