Assignment-1

Chittepu Rutheesh Reddy
cs21btech11014

4b[ICSE 2018]

If the straight lines $3x - 5y = 7$ and $4x + ay + 9 = 0$ are perpendicular to one another, find the value of a.

Solution

If two lines are perpendicular, then dot product of their direction vectors is 0.

Parametric vector form of 3x - 5y =7
is **r1** = $\begin{pmatrix}4\\1\end{pmatrix} + t1\begin{pmatrix}5\\3\end{pmatrix}$, with $\begin{pmatrix}5\\3\end{pmatrix}$ as direction vector.

Parametric vector form of 4x+ay+9=0 is
r2 = $\begin{pmatrix}\frac{-9}{4}\\0\end{pmatrix} + t2\begin{pmatrix}a\\-4\end{pmatrix}$, with $\begin{pmatrix}a\\-4\end{pmatrix}$ as direction vector.

As $\begin{pmatrix}5\\3\end{pmatrix}.\begin{pmatrix}a\\-4\end{pmatrix} = 0$

5a - 12 = 0

So $a = (\frac{12}{5})$