Matrix Theory EE5609
Assignment-1

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1 Problem 53

Let the slope of the line m, which is passing through the point A(-1,2).

So, the equation of the line is :

$$y - 2 = m(x + 1) \tag{1}$$

Also the given equation of the line is:

$$x + y = 4 \tag{2}$$

Consider these two lines meet at a point B.

From (1) and (2),

$$B = (\frac{m+6}{m+1}, \frac{3m-2}{m+1})$$

Now, Given that AB = 3

$\implies AB^2 = 9 \implies (\frac{m+6}{m+1} + 1)^2 + (\frac{3m-2}{m+1} - 2)^2 = 9$

$\implies 2m^2 - m - 28 = 0$

$\implies m = 4, m = -3.5$

$\implies tan\theta = 4 \; or \; tan\theta = -3.5$

Hence, the direction angle $\theta = 75.96^\circ$ *or* $\theta = -74.05^\circ$

Now, consider $m = 4$ *and the equations are* :

$$4x - y + 6 = 0$$

$$x + y - 4 = 0$$

The plot is as follows: