Matrix Theory EE5609
Assignment-1

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1 Problem 53: Find the direction in which a straight line must be drawn through the point ($\begin{matrix} -1 \\ 2 \end{matrix}$) so that its point of intersection with the line

$$(1 \quad 1)x = 4$$

may be the distance of 3 units from this point.

Solution:

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

So, the equation of the line is :

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

Also the given equation of the line is:

$$(1 \quad 1)x = 4 \tag{2}$$

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 the distance $(AB) = 3$

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

Desired equation of the line is : $\quad (4 \quad -1)x = -6$

And the plot is as follows:

lines and planes

Q2
Q1
P2
P1

x+y=4
4x-y=-6

x axis

y axis