Matrix Theory EE5609
Assignment-1

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Problem: Find the direction in which a straight line must be drawn through the point $\begin{pmatrix}-1\\2\end{pmatrix}$ 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

$$\vec{A} = \begin{pmatrix}3\\1\end{pmatrix}, \vec{m} = \begin{pmatrix}1\\-1\end{pmatrix}$$

and

$$\vec{B} = \begin{pmatrix}-1\\2\end{pmatrix}$$

Now, the given equation in parametric form is:

$$\vec{X} = \vec{A} + \lambda\vec{m} \tag{1}$$

Given that the distance is 3 units.

$$\implies \left\|\vec{X} - \vec{B}\right\| = 3 \tag{2}$$

$$\implies \lambda^2 + 5\lambda + 4 = 0 \tag{3}$$