

ASSIGNMENT 4

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Download all python codes from

<https://github.com/AmulyaTallamraju/EE3900/blob/main/Assignment-4/codes/Assignment-4.py>

and latex-tikz codes from

<https://github.com/AmulyaTallamraju/EE3900/blob/main/Assignment-4/Assignment-4.tex>

Substituting the value of λ we have the point of contact as

$$\mathbf{x} = \begin{pmatrix} 5 \\ 1 \\ 6 \end{pmatrix} - \frac{5}{2} \begin{pmatrix} 2 \\ -3 \\ 5 \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 0 \\ 17 \\ -13 \end{pmatrix} \quad (2.0.8)$$

1 LINEAR FORMS 2.36

Find the coordinates of the point where the line through $\begin{pmatrix} 5 \\ 1 \\ 6 \end{pmatrix}$ and $\begin{pmatrix} 3 \\ 4 \\ 1 \end{pmatrix}$ crosses the YZ-plane.

2 SOLUTION

The equation of the line is

$$\mathbf{x} = \mathbf{A} + \lambda(\mathbf{B} - \mathbf{A}) \quad (2.0.1)$$

$$= \begin{pmatrix} 5 \\ 1 \\ 6 \end{pmatrix} + \lambda \begin{pmatrix} 2 \\ -3 \\ 5 \end{pmatrix} \quad (2.0.2)$$

The equation of the YZ plane can be represented as

$$\mathbf{n}^T \mathbf{x} = c \quad (2.0.3)$$

Where

$$\mathbf{n} = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} \quad (2.0.4)$$

$$c = 0 \quad (2.0.5)$$

As the point satisfies the plane equation

$$(1 \quad 0 \quad 0) \left(\begin{pmatrix} 5 \\ 1 \\ 6 \end{pmatrix} + \lambda \begin{pmatrix} 2 \\ -3 \\ 5 \end{pmatrix} \right) = 0 \quad (2.0.6)$$

Solving the above we get

$$\lambda = \frac{-5}{2} \quad (2.0.7)$$

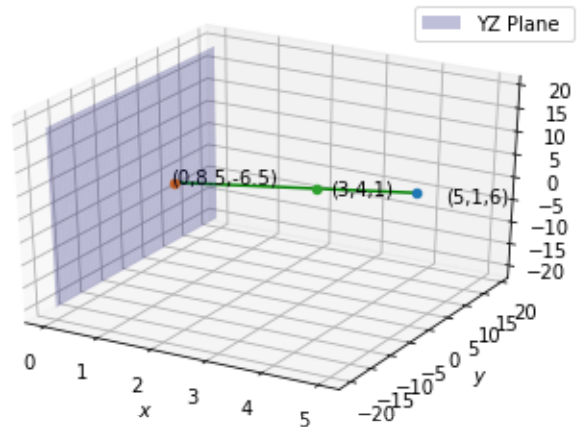


Fig. 0: Line and point of intersection