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

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

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

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

The line crosses the YZ plane for $x_1 = 0 \implies \lambda = -\frac{5}{2}$. Thus, the desired point is

$$\begin{pmatrix}5\\1\\6\end{pmatrix} - \frac{5}{2}\begin{pmatrix}2\\-3\\5\end{pmatrix} = \frac{1}{2}\begin{pmatrix}0\\17\\-13\end{pmatrix} \tag{2.0.3}$$

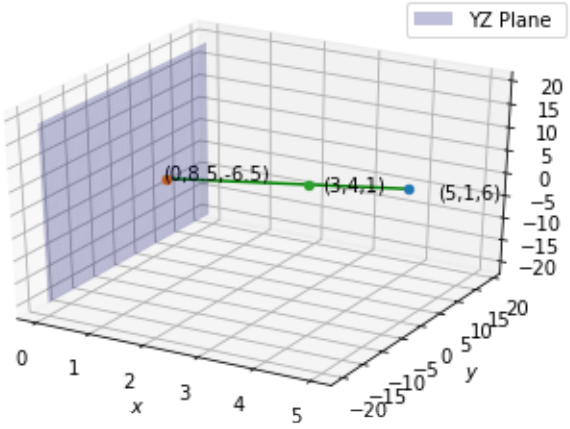

Fig. 0: Line and point of intersection