

# ASSIGNMENT-5

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Download all python codes from

<https://github.com/BOJJAVOYINAANUSHA/Assignment5/blob/main/assignment5.py>

and latex-tikz codes from

<https://github.com/BOJJAVOYINAANUSHA/Assignment5/blob/main/ASSIGNMENT5.tex>

## 1 QUESTION No-2.55 (LINEAR FORMS)

If  $\mathbf{O}$  be the origin and the coordinates of  $\mathbf{P}$  be  $\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$ , then find the equation of the plane passing through the point  $\mathbf{P}$  and perpendicular to  $\mathbf{OP}$ .

### 2 SOLUTION

Given points  $\mathbf{O} = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$ ,  $\mathbf{P} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$

$$\overrightarrow{OP} = 1 - 0, 2 - 0, 3 - 0 \quad (2.0.1)$$

$$= 1, 2, 3 \quad (2.0.2)$$

$\therefore$  The normal vector to the plane is  $\mathbf{n} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$ .

Equation of the plane is given by

$$\mathbf{n}^T (\mathbf{x} - \mathbf{P}) = 0 \quad (2.0.3)$$

$$\begin{pmatrix} 1 & 2 & 3 \end{pmatrix} \mathbf{x} = \begin{pmatrix} 1 & 2 & 3 \end{pmatrix} \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \quad (2.0.4)$$

$$\begin{pmatrix} 1 & 2 & 3 \end{pmatrix} \mathbf{x} = 14 \quad (2.0.5)$$

- Plot of the plane

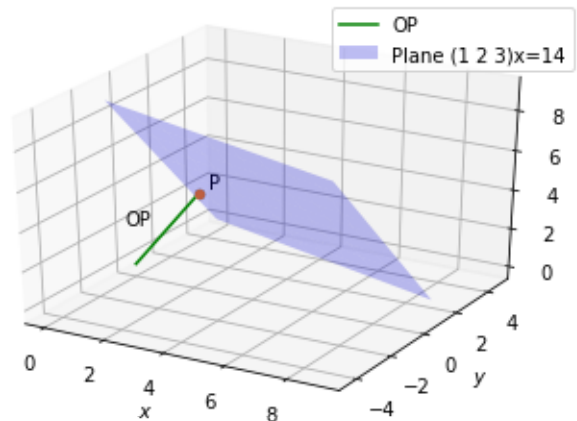


Fig. 2.1: Plot of the plane