

# 4.8.19

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## QUESTION

If the distance of the point  $(1, 1, 1)$  from the plane  $x - y + z + \lambda = 0$  is  $\frac{5}{\sqrt{3}}$ , find the value(s) of  $\lambda$ .

## Solution:

Equation of plane is given by

$$n^T x = -\lambda; \quad (0.1)$$

where  $n^T = (1 \quad -1 \quad 1)$ .

Let the distance of point  $P(1,1,1)$  from the plane is  $d$ .

$$d = \frac{||n^T P + \lambda||}{||n||} \quad (0.2)$$

then value of  $\lambda$  is given by

$$\lambda = +d||n|| - n^T P \text{ or} \quad (0.3)$$

$$\lambda = -d||n|| - n^T P \quad (0.4)$$

Solving these Equations we get

$$\implies \lambda = +4 \quad (0.5)$$

$$= -6 \quad (0.6)$$

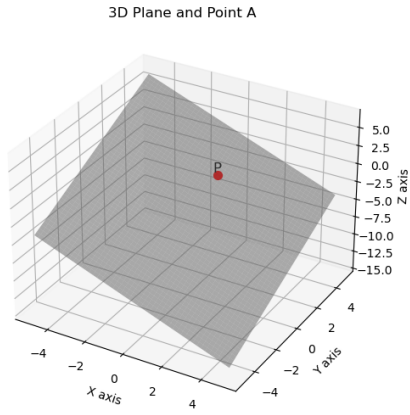


Fig. 0.1: plane

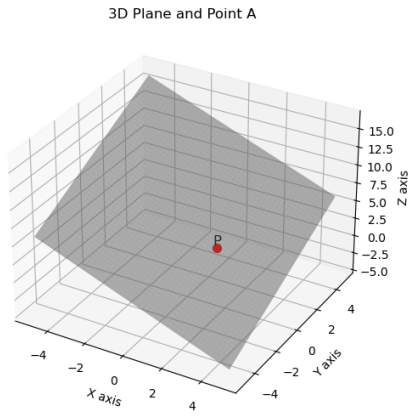


Fig. 0.2: plane