GEOMETRY

Shristy Sharma (EE22BNITS11001)

1 PROBLEM 1

1. Find the equation of the plane with an intercept 3 on the Y-axis and parallel to ZOX-Plane.

SOLUTION:

Parameters of the ZOX plane is,

$$\mathbf{n} = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} \quad (1.0.1)$$

Since, Y-axis has the intercept 3

$$\mathbf{x} = \begin{pmatrix} 0 \\ 3 \\ 0 \end{pmatrix} \quad (1.0.2)$$

Equation of the plane is given by,

$$\mathbf{n}^\top \mathbf{x} = c \quad (1.0.3)$$

$$\implies c = \begin{pmatrix} 0 & 1 & 0 \end{pmatrix} \begin{pmatrix} 0 \\ 3 \\ 0 \end{pmatrix} \quad (1.0.4)$$

$$\implies c = 3 \quad (1.0.5)$$

Therefore, the required equation of the line is,

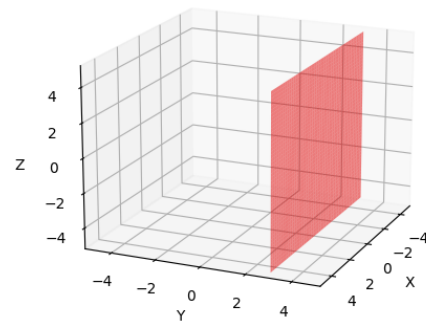$$\begin{pmatrix} 0 & 1 & 0 \end{pmatrix} \mathbf{x} = \begin{pmatrix} 0 \\ 3 \\ 0 \end{pmatrix} \quad (1.0.6)$$

Fig. 0: plane with intercept 3 on Y-axis