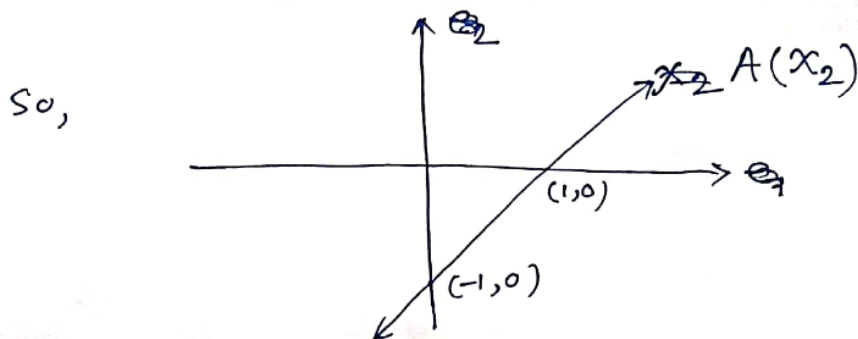


$$\therefore Ax = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_1-1 \end{bmatrix} = \begin{bmatrix} x_1 \\ x_1-1 \end{bmatrix} \text{ for all } x \in X_2$$

$$\Rightarrow A(X_2) = \{ (x_1, x_1-1) : x_1 \in \mathbb{R} \} = X_2$$



Now, for  $A = \begin{bmatrix} 1 & 1 \\ 0 & -1 \end{bmatrix}$  and  $x \in X_1$

$$X_1 = \{ x \mid x_1 + x_2 = 1, x \in \mathbb{R}^2 \}$$

$$= \{ x = (x_1, 1-x_1) : x_1 \in \mathbb{R} \}$$

$$\therefore A(x) = \begin{bmatrix} 1 & 1 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ 1-x_1 \end{bmatrix} = \begin{bmatrix} x_1 + (1-x_1) \\ -(1-x_1) \end{bmatrix} = \begin{bmatrix} 1 \\ x_1-1 \end{bmatrix}$$

$$\Rightarrow A(X_1) = \{ (1, x_1-1) : x_1 \in \mathbb{R} \}$$

$$= \{ (1, t) : t+1 \in \mathbb{R} \}$$

$$= \{ (1, t) : t \in \mathbb{R} \}$$

