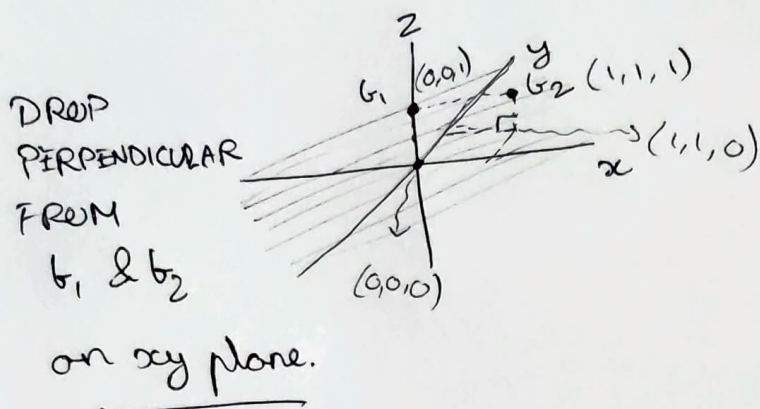


Q2)

$$A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \\ 0 & 0 \end{bmatrix}$$

column space of A
= xy plane.



For b_1 , on dropping perpendicular nearest vector to b_1 on xy plane, $(0, 1, 0)$.

$$\Rightarrow \underline{0} \times \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} + \underline{0} \times \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

Hence $\hat{x}_1 = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$

For b_2 , on dropping perpendicular nearest vector to b_2 on xy plane
= $(1, 1, 0)$

$$\Rightarrow \underline{0} \times \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} + \underline{1} \times \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$$

Hence $\hat{x}_2 = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$