Quiz - 3 - Sec 16

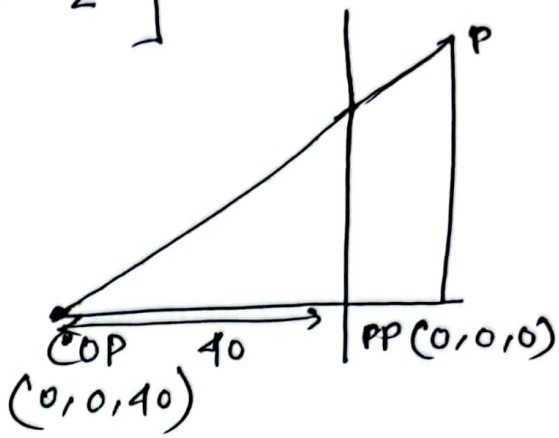
(1) Given, that,

$$\begin{bmatrix} 1 & 0 & -0.2 & 10 \\ 0 & 1 & 0.5 & -20 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & -0.025 & 2 \end{bmatrix}$$

$$\frac{-1}{d} = -0.025$$

$$\frac{1}{d} = 0.025$$

$$d = 40$$



(a) $d = 40$, positive value,

This indicates PP is at origin.

Hence, COP = (0,0,40)

(b) $d = 40$ units

(c)
$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{-1}{40} & 1 \end{bmatrix} \begin{bmatrix} 60 \\ 25 \\ 85 \\ 1 \end{bmatrix} = \begin{bmatrix} 60 \\ 25 \\ 0 \\ -\frac{9}{8} \end{bmatrix}$$

$$= \begin{bmatrix} -53.3 \\ -22.2 \\ 0 \\ 1 \end{bmatrix}$$

(2) Given that,

Point P = (5, 25, -30)

$\beta = 30^\circ$

XY plane

$\alpha = 45^\circ$

$$\begin{bmatrix} 1 & 0 & \left(\frac{\cos\beta}{\tan\alpha}\right) & 0 \\ 0 & 1 & \left(\frac{\sin\beta}{\tan\alpha}\right) & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 0 & 0.866 & 0 \\ 0 & 1 & 0.5 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} 5 \\ 25 \\ -30 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} -20.98 \\ 10 \\ 0 \\ 1 \end{bmatrix}$$

Ans:

Alternative:

$$\begin{bmatrix} 1 & 0 & \nearrow\cos\beta & 0 \\ 0 & 1 & \nearrow\sin\beta & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} 5 \\ 25 \\ -30 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0 & 0 & 0.866 & 0 \\ 0 & 1 & 0.5 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} 5 \\ 25 \\ -30 \\ 1 \end{bmatrix} = \begin{bmatrix} -20.98 \\ 10 \\ 0 \\ 1 \end{bmatrix}$$

(3) the size is preserved as the projectors are parallel to each other and they don't converge in a single point.

[Explain this concept]