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1: Course Feedback Form

2:

$\overrightarrow{O'p'} \cdot (\overrightarrow{O'O} \times \overrightarrow{Op}) = 0$

$\Rightarrow x' \cdot [t \times (Rx)] = 0$

$\Rightarrow x'^T \cdot [t_\times] Rx = 0$

又 $\because E = [t_\times] R$

$\therefore x'^T \cdot E \cdot x = 0$

3:

a) Based on similarity triangle,

$$\begin{cases} \dfrac{x_l}{f} = \dfrac{x_p}{z_p} \\ \dfrac{x_r}{f} = \dfrac{x_p - b}{z_p} \end{cases} \Rightarrow b = \frac{z_p x_l}{f} - \frac{z_p x_r}{f}$$

又 $\because d = |x_l - x_r)$

$\therefore b = \dfrac{z_p}{f}(x_l - x_r) = \dfrac{z_p}{f} d$

$$\therefore z_p = \frac{bf}{d} = 6cm$$

b):

$$d = \frac{bf}{z_p} \leq 0.01mm \quad \Rightarrow \quad z_p \geq 100bf = 60m$$

c):

$$E = [t_\times]R = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & -T \\ 0 & T & 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & +6 \\ 0 & -6 & 0 \end{bmatrix}$$

$$x = P_1 Q^T = \begin{bmatrix} I & 0 \end{bmatrix} \begin{bmatrix} 3 \\ 0 \\ 3 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} 3 \\ 0 \\ 3 \\ 1 \end{bmatrix} = \begin{bmatrix} 3 \\ 0 \\ 3 \end{bmatrix}$$

$$\therefore Ex = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & +6 \\ 0 & -6 & 0 \end{bmatrix} \cdot \begin{bmatrix} 3 \\ 0 \\ 3 \end{bmatrix} = \begin{bmatrix} 0 \\ +18 \\ 0 \end{bmatrix}$$