

Sheet 6

$$WL = 1$$

$$VL = 100$$

$$WR = 16$$

$$VR = 400$$

$$WT = 12$$

$$VT = 200$$

$$WB = 2$$

$$VB = 100$$

$$S_x = \frac{V.R - VL}{WR - WL}, \quad S_y = \frac{VT - VB}{WT - WB}$$

$$S_x = 20$$

$$S_y = 10$$

$$P_0(3, 2)$$

$$V_x = S_x (W_x - W_L) + VL$$

$$P_1(10, 7.5)$$

$$V_y = S_y (W_y - W_B) + VB$$

$$P_2(5, 5)$$

$$P_0' = (140, 100)$$

$$P_1' = (280, 155)$$

$$P_2' = (180, 130) \quad \#$$

② Eye (2, 1, 1) / Reference (0, 0, 0) / Up (0, 1, 0)

NOTES.

P_0

P_{ref}

V

$$N = P_0 - P_{ref}$$

$$= (2, 1, 1)$$

$$n = \frac{N}{|N|} = \left(\frac{\sqrt{6}}{3}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6} \right)$$

$$U = \frac{V \times n}{|V|} = \left(\frac{1}{\sqrt{6}}, 0, -\frac{\sqrt{2}}{3} \right)$$

$$V = n \times U = \left(-\frac{1}{3}, \frac{5}{6}, \frac{1}{6} \right)$$

$$M_{wc, vc} = R^T$$

$$= \begin{bmatrix} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} \frac{1}{\sqrt{6}}, 0, -\frac{\sqrt{2}}{3}, 0 \\ -\frac{1}{3}, \frac{5}{6}, -\frac{1}{6}, 0 \\ \frac{\sqrt{6}}{3}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, 0 \\ 0, 0, 0, 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

③

NOTES

$$M_{vc} = RT$$

$$= \begin{bmatrix} U_x & U_y & U_z & 0 \\ V_x & V_y & V_z & 0 \\ n_x & n_y & n_z & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$U = (0, -1, 0)$$

$$V = \frac{(1, 0, 0)}{1} = (1, 0, 0)$$

$$n = \frac{(0, 0, -2)}{2} = (0, 0, -1)$$

$$④ P_0 = (3, 4, 3), \quad z \text{ axis} = (1, -2, 1), \quad V_{np}(1, -2, 0)$$

↓
 n

$$U = \frac{(-2, -1, 0)}{\sqrt{5}} = \left(-\frac{2}{\sqrt{5}}, -\frac{1}{\sqrt{5}}, 0 \right)$$

$$V = n \times U = (0.447, -0.894, -2.24)$$

$$M = \begin{bmatrix} -\frac{2}{\sqrt{5}} & -\frac{1}{\sqrt{5}} & 0 & 0 \\ 0.447 & -0.894 & -2.24 & 0 \\ 1 & -2 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & -3 \\ 0 & 1 & 0 & -4 \\ 0 & 0 & 1 & -3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

⑤

$$Z_{vp} = 10$$

NOTES

$$X_p = \frac{Z_{vp}}{Z} \times X$$

$$y_p = \frac{Z_{vp}}{Z} y$$

$$T = \begin{bmatrix} 1 & 0 & 0 & 5 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$P \times T = \begin{bmatrix} 4.5 & 4.5 & 4.5 & 4.5 & 5.5 & 5.5 & 5.5 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

$$P \cdot T = \begin{bmatrix} 4.5 & 5.5 & 4.5 & 4.5 & 4.5 & 5.5 & 5.5 & 5.5 \\ 4.5 & 4.5 & 5.5 & 5.5 & 4.5 & 4.5 & 5.5 & 5.5 \\ 0.5 & 0.5 & 0.5 & 0.5 & 0.5 & 0.5 & 0.5 & 0.5 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

$$P' = P' \text{ Given}$$

Add on

~~$A_P = I$~~

$$A_P = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$$

2×1

$$H = \begin{bmatrix} a & b \\ c & d \\ e & f \end{bmatrix}$$

3×2

$$B_P = \begin{bmatrix} -2 \\ -1 \\ 1 \end{bmatrix}$$

$$a - 3b = -2$$

$$c - 3d = -1$$

$$e - 3f = 1$$

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