

$$\frac{\text{ĐỀ 2}}{1, \{A\} \xrightarrow[X_A, 45^\circ]{} \{C\} \xrightarrow[C_P = [2, -3, 5]^T]{\text{Tính tần}} \{B\}}$$

$${}^A T_B = \text{Rot}(X_A, 45^\circ) \cdot \text{Trans}(2, -3, 5).$$

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

$$= \begin{bmatrix} 1 & 0 & 0 & 2 \\ 0 & \frac{\sqrt{2}}{2} & -\frac{\sqrt{2}}{2} & -4\sqrt{2} \\ 0 & \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$${}^A T_B = \begin{bmatrix} {}^A R^T & -{}^A R^T A_P_{BD} \\ B & B \cdot A_P_{BD} \\ 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & -2 \\ 0 & \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & 3 \\ 0 & -\frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & -5 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$${}^B T_C = \begin{bmatrix} 1 & 0 & 0 & -2 \\ 0 & \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & 3 \\ 0 & -\frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & -5 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \frac{\sqrt{3}}{2} & -\frac{1}{2} & 0 & 4 \\ \frac{1}{2} & \frac{\sqrt{3}}{2} & 0 & 0 \\ 0 & 0 & 1 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} \frac{\sqrt{3}}{2} & -\frac{1}{2} & 0 & 2 \\ \frac{\sqrt{2}}{4} & \frac{\sqrt{6}}{4} & \frac{\sqrt{2}}{2} & 3+2\sqrt{2} \\ -\frac{\sqrt{2}}{4} & -\frac{\sqrt{6}}{4} & \frac{\sqrt{2}}{2} & -5+2\sqrt{2} \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$A_P = {}^A T_B B_P = \begin{bmatrix} 1 & 0 & 0 & 2 \\ 0 & \frac{\sqrt{2}}{2} & -\frac{\sqrt{2}}{2} & -4\sqrt{2} \\ 0 & \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 \\ 2 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 2 \\ -3\sqrt{2} \\ 2\sqrt{2} \\ 1 \end{bmatrix}$$

$$C_P = {}^C T_B B_P = \begin{bmatrix} \frac{\sqrt{3}}{2} & \frac{\sqrt{2}}{4} & -\frac{\sqrt{2}}{4} & -\sqrt{3}-2\sqrt{2} \\ -\frac{1}{2} & \frac{\sqrt{6}}{4} & -\frac{\sqrt{6}}{4} & 1-2\sqrt{6} \\ 0 & \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & \sqrt{2}-4 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 \\ 2 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} -\sqrt{3}-\frac{3}{2}\sqrt{2} \\ 1-\frac{3}{2}\sqrt{6} \\ 2\sqrt{2}-4 \\ 1 \end{bmatrix}$$