

P1) $m_I = \begin{bmatrix} 1 & 2 & 2 & 3 \\ 1 & 0 & -2 & 0 \\ 3 & -1 & 1 & -2 \\ 4 & -3 & 0 & 2 \end{bmatrix}$ $\text{TRAZ}(m_I) = 1 + 0 + 1 + 2 = 4$

P2) $C = \underbrace{\begin{bmatrix} 4 & 3 & 2 \\ 5 & 1 & 9 \end{bmatrix}}_{A \text{ } 2 \times 3} \times \underbrace{\begin{bmatrix} 5 & 4 & 1 \\ 7 & 9 & 3 \\ 2 & 1 & 2 \end{bmatrix}}_{B \text{ } 3 \times 3} = \begin{bmatrix} 45 & 45 & 17 \\ 50 & 38 & 26 \end{bmatrix}$

P3) $A_2 = \begin{bmatrix} 1 & -1 & 1 \\ 2 & -1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ $(A_2)^{100} = \begin{bmatrix} 1 & -1 & 1 \\ 2 & -1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$

P4) $n = \begin{bmatrix} 1 & 2 & 2 & 3 \\ 1 & 0 & -2 & 0 \\ 3 & -1 & 1 & -2 \\ 4 & -3 & 0 & 2 \end{bmatrix} \rightarrow |n| = \begin{vmatrix} 1 & 2 & 2 & 3 \\ 1 & 0 & -2 & 0 \\ 3 & -1 & 1 & -2 \\ 4 & -3 & 0 & 2 \end{vmatrix} \xrightarrow{\substack{f_2 - f_1 \\ f_3 - 3f_1 \\ f_4 - 4f_1}} \begin{vmatrix} 1 & 2 & 2 & 3 \\ 0 & -2 & -4 & -3 \\ 0 & -7 & -5 & -11 \\ 0 & -11 & -8 & -10 \end{vmatrix} \xrightarrow{\substack{= 1(-1)^{1+1} \\ \downarrow}} \begin{vmatrix} -2 & -4 & -3 \\ -7 & -5 & -11 \\ -11 & -8 & -10 \end{vmatrix}$

$$= -(-18 \times 7 - (-5 \times 1)) = |7| = -131$$

P5) $D = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ $D^{-1} = ?$ $D_{11} = (-1)^{1+1} \begin{vmatrix} 2 & 3 \\ 3 & 4 \end{vmatrix} = -1$; $D_{12} = (-1)^{1+2} \begin{vmatrix} 1 & 3 \\ 1 & 4 \end{vmatrix} = -1$

$$D_{13} = (-1)^{1+3} \begin{vmatrix} 1 & 2 \\ 1 & 3 \end{vmatrix} = -1; \quad D_{21} = (-1)^{2+1} \begin{vmatrix} 1 & 1 \\ 3 & 4 \end{vmatrix} = -1; \quad D_{22} = (-1)^{2+2} \begin{vmatrix} 1 & 1 \\ 1 & 4 \end{vmatrix} = 3; \quad D_{23} = (-1)^{2+3} \begin{vmatrix} 1 & 1 \\ 1 & 3 \end{vmatrix} = -2$$

$$D_{31} = (-1)^{3+1} \begin{vmatrix} 1 & 1 \\ 2 & 3 \end{vmatrix} = 1; \quad D_{32} = (-1)^{3+2} \begin{vmatrix} 1 & 1 \\ 1 & 3 \end{vmatrix} = -2; \quad D_{33} = (-1)^{3+3} \begin{vmatrix} 1 & 1 \\ 1 & 2 \end{vmatrix} = 1$$

$$\text{cof}(D) = \begin{bmatrix} -1 & -1 & 1 \\ -1 & 3 & -2 \\ 1 & -2 & 1 \end{bmatrix} \rightarrow \Delta^T J(D) = (\text{cof}(D))^T = \begin{bmatrix} -1 & -1 & 1 \\ -1 & 3 & -2 \\ 1 & -2 & 1 \end{bmatrix}$$

$$|D| = \begin{vmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 2 & 3 & 1 & 2 \\ 1 & 3 & 4 & 1 & 3 \end{vmatrix} = 8 + 3 + 3 - (2 + 9 + 4) = -1$$

$$D^{-1} = \frac{\Delta \text{DJ}(D)}{|D|} = \frac{\begin{bmatrix} -1 & -1 & 1 \\ -1 & 3 & -2 \\ 1 & -2 & 1 \\ -1 \end{bmatrix}}{-1} \rightarrow D^{-1} = \begin{bmatrix} 1 & 1 & -1 \\ 1 & -3 & 2 \\ -1 & 2 & -1 \end{bmatrix}$$