

MSSV: 22220157; Nguyễn Văn Khoa

Bài 1:

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & 0 & 2 \\ 3 & 1 & -2 \end{pmatrix}$$

$$C = \begin{pmatrix} 1 & -2 & 3 \\ -2 & 1 & -2 \end{pmatrix}, \quad D = \begin{pmatrix} -2 \\ 2 \\ 2 \end{pmatrix}$$

③ $A^2 = \begin{pmatrix} 7 & 2 & -2 \\ 6 & 1 & 1 \end{pmatrix}$

④ $A \cdot (3B + C)$

$$3B + C = 3 \cdot \begin{pmatrix} 1 & 0 & 2 \\ 3 & 1 & -2 \end{pmatrix} + \begin{pmatrix} 1 & -2 & 3 \\ -2 & 1 & -2 \end{pmatrix}$$

$$= \begin{pmatrix} 4 & -2 & 9 \\ 7 & 4 & -2 \end{pmatrix}$$

$$\Rightarrow A \cdot (3B + C) = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix} \cdot \begin{pmatrix} 4 & -2 & 9 \\ 7 & 4 & -2 \end{pmatrix}$$

$$= \begin{pmatrix} 18 & 6 & -5 \\ 19 & -2 & 20 \end{pmatrix}$$



HÒA BÌNH

$$\textcircled{2} A \bar{B} C = \textcircled{3} A_{2 \times 2} \cdot B_{2 \times 2} = X_{2 \times 3}$$

Mà $C_{2 \times 3} \Rightarrow$ Khẳng định rằng $X, 0 = A, B, C$

$$\textcircled{3} B^T \cdot A = \begin{pmatrix} 1 & 3 \\ 0 & 1 \\ 2 & -2 \end{pmatrix} \cdot \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix} = \begin{pmatrix} 10 & 5 \\ 3 & 1 \\ -4 & 2 \end{pmatrix}$$

$$\textcircled{4} B \cdot C^T = \begin{pmatrix} 1 & 0 & 2 \\ 3 & 1 & -2 \end{pmatrix} \cdot \begin{pmatrix} 1 & -2 \\ -2 & 1 \\ 3 & -2 \end{pmatrix} = \begin{pmatrix} 7 & -9 \\ -5 & -3 \end{pmatrix}$$

Bài 2

$$a) (A | I_3) = \left(\begin{array}{ccc|ccc} 1 & 2 & 1 & 1 & 0 & 0 \\ 3 & 7 & 3 & 0 & 1 & 0 \\ 2 & 3 & 9 & 0 & 0 & 1 \end{array} \right)$$

$$\xrightarrow{d_2 - d_1 - 3d_3} \left(\begin{array}{ccc|ccc} 1 & 2 & 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & -3 & 1 & 0 \\ 0 & -1 & 2 & 1 & -2 & 0 \end{array} \right)$$

$$\xrightarrow{d_1 + d_2 - 2d_3} \left(\begin{array}{ccc|ccc} 1 & 0 & 1 & 1 & -2 & 0 \\ 0 & 1 & 0 & -3 & 1 & 0 \\ 0 & 0 & 2 & -5 & 1 & 1 \end{array} \right)$$

$$\xrightarrow{d_3 - \frac{1}{2}d_2} \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & \frac{19}{2} & -\frac{5}{2} & 0 \\ 0 & 1 & 0 & -3 & 1 & 0 \\ 0 & 0 & 1 & \frac{5}{2} & \frac{1}{2} & \frac{1}{2} \end{array} \right) = (I | A^{-1})$$

$$\text{Vg } A^{-1} = \left(\begin{array}{ccc} \frac{19}{2} & -\frac{5}{2} & 0 \\ -3 & 1 & 0 \\ -\frac{5}{2} & \frac{1}{2} & \frac{1}{2} \end{array} \right)$$



HÒA BÌNH

$$b) (B^{-1} I_3) = \left(\begin{array}{ccc|ccc} 1 & -1 & 2 & 1 & 0 & 0 \\ 1 & 1 & -2 & 0 & 1 & 0 \\ 1 & 1 & 4 & 0 & 1 & 0 \end{array} \right) \xrightarrow{\begin{array}{l} d_1 - d_2 - d_3 \\ d_3 - d_1 + d_2 \\ d_5 - d_3 - 2d_2 \end{array}} \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & -2 & -\frac{1}{2} & \frac{1}{2} & 0 \\ 0 & 0 & 6 & 0 & -1 & 1 \end{array} \right)$$

$$\xrightarrow{\begin{array}{l} d_3 - 1/6 d_3 \\ d_2 - d_2 + 2d_3 \end{array}} \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & \frac{1}{2} & \frac{1}{2} & 0 \\ 0 & 1 & 0 & -\frac{1}{2} & \frac{1}{6} & \frac{1}{3} \\ 0 & 0 & 1 & 0 & -\frac{1}{6} & \frac{1}{6} \end{array} \right) = (I_3 | B^{-1})$$

$$c) (C^{-1} I_3) = \left(\begin{array}{ccc|ccc} 1 & 2 & 3 & 1 & 0 & 0 \\ 2 & 5 & 3 & 0 & 1 & 0 \\ 1 & 0 & 8 & 0 & 0 & 1 \end{array} \right) \xrightarrow{\begin{array}{l} d_1 - d_2 - d_3 \\ d_3 - d_1 + d_2 \end{array}} \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & -3 & -2 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{array} \right)$$

$$\xrightarrow{\begin{array}{l} d_2 - d_3 - 2d_1 \\ d_3 - d_1 + 2d_2 \end{array}} \left(\begin{array}{ccc|ccc} 1 & 2 & 3 & 1 & 0 & 0 \\ 0 & 1 & -3 & -2 & 1 & 0 \\ 0 & -7 & 5 & -1 & 0 & 1 \end{array} \right) \xrightarrow{\begin{array}{l} d_1 - d_2 - 2d_3 \\ d_2 - d_3 + 2d_1 \end{array}} \left(\begin{array}{ccc|ccc} 1 & 0 & 9 & 5 & -5 & 2 \\ 0 & 1 & -3 & 2 & 1 & 0 \\ 0 & 0 & 1 & -1 & -5 & 2 \end{array} \right)$$

$$\xrightarrow{\begin{array}{l} d_2 - d_3 \\ d_1 - d_2 + d_3 \\ d_1 - d_2 - d_3 \end{array}} \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & -40 & 16 & 9 \\ 0 & 1 & 0 & 13 & -5 & 3 \\ 0 & 0 & 1 & 5 & -2 & -1 \end{array} \right) = (I_3 | C^{-1})$$

$$\Rightarrow (DTT_3) = \left(\begin{array}{ccc|ccc} -1 & 3 & -4 & 1 & 0 & 0 \\ 2 & 4 & 1 & 0 & 1 & 0 \\ -4 & 2 & -9 & 0 & 0 & 1 \end{array} \right) \xrightarrow{\begin{array}{l} d_2 \rightarrow d_2 + d_1 \\ d_3 \rightarrow d_3 - 2d_1 \\ d_1 \rightarrow -d_1 \end{array}}$$

$$\left(\begin{array}{ccc|ccc} 1 & -3 & 4 & -1 & 0 & 0 \\ 0 & 10 & -7 & 2 & 1 & 0 \\ 0 & -10 & 7 & -4 & 0 & 1 \end{array} \right) \xrightarrow{d_3 \rightarrow d_3 + d_2}$$

$$\left(\begin{array}{ccc|ccc} 1 & -3 & 4 & -1 & 0 & 0 \\ 0 & 10 & -7 & 2 & 1 & 0 \\ 0 & 0 & 0 & -2 & 1 & 1 \end{array} \right) \rightarrow \text{Đpcm} \quad \text{số hạng }\frac{1}{2}$$

Bài 3) $x = (1, 2, 3)$, $y = (y_1, y_2, y_3)$, $z = (4, 2, 1)$

Tính $2x, -3y, x + 2y - 3z$

$$\textcircled{1} \quad 2x = (2, 4, 6)$$

$$\textcircled{2} \quad -3y = (-3y_1, -3y_2, -3y_3)$$

$$\textcircled{3} \quad x + 2y - 3z = (1, 2, 3) + 2(y_1, y_2, y_3) - 3(4, 2, 1)$$

$$= (2y_1 + 1, 2y_2 + 2, 2y_3 + 3) - 3(4, 2, 1)$$

$$= (2y_1 - 11, 2y_2 - 4, 2y_3)$$