

Ch 16 Review

$$\textcircled{11} \quad 2A - 3B = 2 \begin{bmatrix} 2 & -3 \\ 4 & 1 \\ -5 & 0 \\ 2 & -3 \end{bmatrix} - 3 \begin{bmatrix} -1 & 0 \\ 4 & -6 \\ -3 & -2 \\ 1 & -7 \end{bmatrix}$$

$$= \begin{bmatrix} 4 & -6 \\ 8 & 2 \\ -10 & 0 \\ 4 & -6 \end{bmatrix} + \begin{bmatrix} 3 & 0 \\ -12 & 18 \\ 9 & 6 \\ -3 & 21 \end{bmatrix}$$

$$= \begin{bmatrix} 7 & -6 \\ -4 & 20 \\ -1 & 6 \\ 1 & 15 \end{bmatrix}$$

$$\textcircled{15} \quad \begin{bmatrix} -0.1 & 0.7 \\ 0.2 & 0.0 \\ 0.4 & -0.1 \end{bmatrix} \begin{bmatrix} 0.1 & -0.4 & 0.5 \\ 0.5 & 0.1 & 0.0 \end{bmatrix}$$

$$= \begin{bmatrix} 0.34 & 0.11 & -0.05 \\ 0.02 & -0.08 & 0.10 \\ -0.01 & -0.17 & 0.20 \end{bmatrix}$$

(17)

$$A = \begin{bmatrix} 2 & -5 \\ 2 & -4 \end{bmatrix}$$

$$\det A = -8 - (-10) \\ = 2$$

$$A^{-1} = \frac{1}{2} \begin{bmatrix} -4 & 5 \\ -2 & 2 \end{bmatrix} \quad \text{or} \quad \begin{bmatrix} -2 & 5/2 \\ -1 & 1 \end{bmatrix}$$

(21)

 $[A | I]$

$$\left[\begin{array}{ccc|ccc} 1 & 1 & -2 & 1 & 0 & 0 \\ -1 & -2 & 1 & 0 & 1 & 0 \\ 0 & 3 & 4 & 0 & 0 & 1 \end{array} \right]$$

$$R_2 + R_1 \quad \left[\begin{array}{ccc|ccc} 1 & 1 & -2 & 1 & 0 & 0 \\ 0 & -1 & -1 & 1 & 1 & 0 \\ 0 & 3 & 4 & 0 & 0 & 1 \end{array} \right]$$

$$\frac{R_2}{(-1)} \quad \left[\begin{array}{ccc|ccc} 1 & 1 & -2 & 1 & 0 & 0 \\ 0 & 1 & 1 & -1 & -1 & 0 \\ 0 & 3 & 4 & 0 & 0 & 1 \end{array} \right]$$

$$R_1 - R_2 \quad \left[\begin{array}{ccc|ccc} 1 & 0 & -3 & 2 & 1 & 0 \\ 0 & 1 & 1 & -1 & -1 & 0 \\ 0 & 0 & 1 & 3 & 3 & 1 \end{array} \right]$$

 $R_3 - 3R_2$

$$\begin{array}{l} R_1 + 3R_3 \\ R_2 - R_3 \end{array} \quad \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 11 & 10 & 3 \\ 0 & 1 & 0 & -4 & -4 & -1 \\ 0 & 0 & 1 & 3 & 3 & 1 \end{array} \right]$$

$$\begin{array}{c} \uparrow \\ I \end{array}$$

$$\begin{array}{c} \uparrow \\ A^{-1} \end{array}$$

(29) Find A^{-1} then $X=A^{-1}B$

$$\left[\begin{array}{ccc|ccc} 2 & -3 & 2 & 1 & 0 & 0 \\ 3 & 1 & -3 & 0 & 1 & 0 \\ 1 & 4 & 1 & 0 & 0 & 1 \end{array} \right]$$

$$R_1 \leftrightarrow R_3 \left[\begin{array}{ccc|ccc} 1 & 4 & 1 & 0 & 0 & 1 \\ 3 & 1 & -3 & 0 & 1 & 0 \\ 2 & -3 & 2 & 1 & 0 & 0 \end{array} \right]$$

$$\begin{array}{l} R_2 - 3R_1 \\ R_3 - 2R_1 \end{array} \left[\begin{array}{ccc|ccc} 1 & 4 & 1 & 0 & 0 & 1 \\ 0 & -11 & -6 & 0 & 1 & -3 \\ 0 & -11 & 0 & 1 & 0 & -2 \end{array} \right]$$

$$R_2 \leftrightarrow R_3 \left[\begin{array}{ccc|ccc} 1 & 4 & 1 & 0 & 0 & 1 \\ 0 & -11 & 0 & 1 & 0 & -2 \\ 0 & -11 & -6 & 0 & 1 & -3 \end{array} \right]$$

$$\frac{R_2}{(-11)} \left[\begin{array}{ccc|ccc} 1 & 4 & 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & \frac{-1}{11} & 0 & \frac{2}{11} \\ 0 & -11 & -6 & 0 & 1 & -3 \end{array} \right]$$

$$\begin{array}{l} R_1 - 4R_2 \\ R_3 + 11R_2 \end{array} \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & \frac{4}{11} & 0 & \frac{3}{11} \\ 0 & 1 & 0 & \frac{-1}{11} & 0 & \frac{2}{11} \\ 0 & 0 & -6 & -1 & 1 & -1 \end{array} \right]$$

$$\frac{R_3}{(-6)} \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & \frac{4}{11} & 0 & \frac{3}{11} \\ 0 & 1 & 0 & \frac{-1}{11} & 0 & \frac{2}{11} \\ 0 & 0 & 1 & \frac{1}{6} & \frac{-1}{6} & \frac{1}{6} \end{array} \right]$$

$$R_1 - R_3 \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & \frac{13}{66} & \frac{1}{6} & \frac{7}{66} \\ 0 & 1 & 0 & \frac{-1}{11} & 0 & \frac{2}{11} \\ 0 & 0 & 1 & \frac{1}{6} & \frac{-1}{6} & \frac{1}{6} \end{array} \right]$$

↑
I

↑
 A^{-1}

Now $X=A^{-1}B$

$$\begin{bmatrix} u \\ v \\ w \end{bmatrix} = \begin{bmatrix} \frac{13}{66} & \frac{1}{6} & \frac{7}{66} \\ \frac{-1}{11} & 0 & \frac{2}{11} \\ \frac{1}{6} & \frac{-1}{6} & \frac{1}{6} \end{bmatrix} \begin{bmatrix} 7 \\ -6 \\ -13 \end{bmatrix} = \begin{bmatrix} -1 \\ -3 \\ 0 \end{bmatrix}$$

45

$$\left[\begin{array}{ccc|c} 3 & -2 & 1 & 6 \\ 2 & 0 & 3 & 3 \\ 4 & -1 & 5 & 6 \end{array} \right]$$

$$\frac{R_1}{3} \left[\begin{array}{ccc|c} 1 & -\frac{2}{3} & \frac{1}{3} & 2 \\ 2 & 0 & 3 & 3 \\ 4 & -1 & 5 & 6 \end{array} \right]$$

$$\begin{array}{l} R_2 - 2R_1 \\ R_3 - 4R_1 \end{array} \left[\begin{array}{ccc|c} 1 & -\frac{2}{3} & \frac{1}{3} & 2 \\ 0 & \frac{4}{3} & \frac{7}{3} & -1 \\ 0 & \frac{5}{3} & \frac{11}{3} & -2 \end{array} \right]$$

$$\frac{3}{4} \times R_2 \left[\begin{array}{ccc|c} 1 & -\frac{2}{3} & \frac{1}{3} & 2 \\ 0 & 1 & \frac{7}{4} & -\frac{3}{4} \\ 0 & \frac{5}{3} & \frac{11}{3} & -2 \end{array} \right]$$

$$R_1 + \frac{2}{3} R_2 \left[\begin{array}{ccc|c} 1 & 0 & \frac{3}{2} & \frac{3}{2} \\ 0 & 1 & \frac{7}{4} & -\frac{3}{4} \\ 0 & 0 & \frac{3}{4} & -\frac{3}{4} \end{array} \right]$$

$$R_3 - \frac{5}{3} R_2 \left[\begin{array}{ccc|c} 1 & 0 & \frac{3}{2} & \frac{3}{2} \\ 0 & 1 & \frac{7}{4} & -\frac{3}{4} \\ 0 & 0 & 1 & -1 \end{array} \right]$$

$$\frac{4}{3} \times R_3 \left[\begin{array}{ccc|c} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & -1 \end{array} \right]$$

$$\begin{array}{l} R_1 - \frac{3}{2} R_3 \\ R_2 - \frac{7}{4} R_3 \end{array} \left[\begin{array}{ccc|c} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & -1 \end{array} \right]$$

$$(x, y, z) = (3, 1, -1)$$