

CHAPTER 7.3

①

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$$5x - 2y = 20.9$$

$$-x + 4y = -19.3$$

$$\left[\begin{array}{cc|c} 5 & -2 & 20.9 \\ -1 & 4 & -19.3 \end{array} \right]$$

$$\downarrow L_2 = L_1 + L_2 \cdot 5$$

$$\left[\begin{array}{cc|c} 5 & -2 & 20.9 \\ 5 - 1 \cdot 5 & -2 + 4 \cdot 5 & 20.9 - 19.3 \cdot 5 \end{array} \right]$$

\downarrow

$$\left[\begin{array}{cc|c} 5 & -2 & 20.9 \\ 0 & 18 & -76.5 \end{array} \right]$$

$$y = -76.5 / 18 = -4.2$$

$$x = \frac{20.9 + 2(-4.2)}{5} = 2.5$$

(2)

(3)

$$0.5x + 3.5y = 5.7$$

$$-x + 5.0y = 7.8$$



$$\left[\begin{array}{cc|c} 0.5 & 3.5 & 5.7 \\ -1 & 5.0 & 7.8 \end{array} \right]$$

↓ $L_2 = L_1 + \frac{1}{2} L_2$

$$\left[\begin{array}{cc|c} 0.5 & 3.5 & 5.7 \\ 0.5 - \frac{1}{2} & 3.5 + \frac{5}{2} & 5.7 + \frac{7.8}{2} \end{array} \right]$$



$$\left[\begin{array}{cc|c} 0.5 & 3.5 & 5.7 \\ 0 & 6 & 9.6 \end{array} \right]$$

$$y = 9.6/6 = 1.6$$

$$x = \frac{5.7 - 3.5 \cdot 1.6}{0.5} = 0.2$$

(5)

$$0.8x + 1.2y - 0.6z = -7.8$$

$$2.6x + 1.7z = 15.3$$

$$4.0x - 7.3y - 1.5z = 1.1$$

③

$$\left[\begin{array}{ccc|c} 0.8 & 1.2 & -0.6 & -7.8 \\ 2.6 & 0 & 1.7 & 15.3 \\ 4.0 & -7.3 & -1.5 & 1.1 \end{array} \right]$$

$$\downarrow L_3 = L_3 - L_2 \cdot \frac{4}{2.6}$$

$$\left[\begin{array}{ccc|c} 0.8 & 1.2 & -0.6 & -7.8 \\ 2.6 & 0 & 1.7 & 15.3 \\ 4 - 2.6 \cdot \frac{4}{2.6} & -7.3 - 0 & -1.5 - 1.7 \cdot \frac{4}{2.6} & 1.1 - 15.3 \cdot \frac{4}{2.6} \end{array} \right]$$

\downarrow

$$\left[\begin{array}{ccc|c} 0.8 & 1.2 & -0.6 & -7.8 \\ 2.6 & 0 & 1.7 & 15.3 \\ 0 & -7.3 & -4.12 & -22.44 \end{array} \right]$$

$$\downarrow L_2 = L_2 - L_1 \cdot \frac{2.6}{0.8}$$

$$\left[\begin{array}{ccc|c} 0.8 & 1.2 & -0.6 & -7.8 \\ 0 & -3.9 & 3.65 & 15.3 \\ 0 & -7.3 & -4.12 & -22.44 \end{array} \right]$$

$$\downarrow L_3 = L_3 + L_2 \cdot \frac{7.3}{3.9}$$

(4)

$$\left[\begin{array}{ccc|c} 0.8 & 1.2 & -0.6 & -7.8 \\ 0 & -3.9 & 3.65 & 40.65 \\ 0 & 0 & 2.71 & 53.65 \end{array} \right]$$

$$z = \frac{53.65}{2.71} = 19.8$$

$$y = \frac{40.65 - 3.65 \cdot 19.8}{-3.9} = 8.11$$

$$x = \frac{-7.8 + 0.6 \cdot 19.8 - 1.2 \cdot 8.11}{0.8} = -7.06$$

(7)

$$y + z = -2$$

$$4y + 6z = -12$$

$$x + y + z = 2$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 0 & 4 & 6 & -12 \\ 0 & 1 & 1 & -2 \end{array} \right]$$

$$\downarrow L_3 = L_2 - 4L_3$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 0 & 4 & 6 & -12 \\ 0 & 0 & 2 & -4 \end{array} \right]$$

$$z = -4/2 = -2$$

$$y = \frac{-12 - 6(-2)}{4} = 0$$

$$x = \frac{2 - (-2)}{1} = 4$$

(11)

$$\left. \begin{aligned} 2x - y + 3z &= -1 \\ -4x + 2y - 6z &= 2 \end{aligned} \right\}$$

UNDETERMINED \Rightarrow

$m < n$

||

2 equations

 \leadsto 3 variables (x, y, z)

(5)

(13)

$$\left. \begin{aligned} x + y - 2z &= 0 \\ -4w - x - y - 2z &= -4 \\ -2w + 3x + 3y - 6z &= -2 \end{aligned} \right\}$$

UNDETERMINED \Rightarrow

$m < n$

 \downarrow

3 equations

4 variables
(w, x, y, z)