

Nhóm 05:

Họ tên các thành viên trong nhóm

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Bài tập 1:

- Bổ sung thêm biến bù ta có bài toán tương đương:

$$\begin{aligned} \max \quad & 10x_1 - 5x_2 - 9x_3 - 29x_4 \\ \text{s.t.} \quad & \frac{1}{2}x_1 - \frac{11}{2}x_2 - \frac{5}{2}x_3 + 9x_4 + x_5 = 0 \\ & \frac{1}{2}x_1 - \frac{3}{2}x_2 - \frac{1}{2}x_3 + x_4 + x_6 = 0 \\ & x_1 + x_7 = 1 \end{aligned}$$

$$x_1, x_2, x_3, x_4, x_5, x_6, x_7 \geq 0.$$

Bảng đơn vị:

$$\begin{array}{ccccccc|c} \frac{1}{2} & -\frac{11}{2} & -\frac{5}{2} & 9 & 1 & 0 & 0 & 0 \\ \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ \hline 10 & -52 & -9 & -29 & 0 & 0 & 0 & 0 \end{array}$$

- Áp dụng quy tắc Bland ~~trong~~ và thực hiện dưới các phép xoay không ứng:

$$\begin{array}{ccccccc|c}
 \frac{1}{2} & -\frac{11}{2} & -\frac{5}{2} & 9 & 1 & 0 & 0 & 0 \\
 \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & 1 & 0 & 1 & 0 & 0 \\
 1 & 0 & 0 & 0 & 0 & 0 & 2 & 1 \\
 \hline
 20 & -57 & -9 & -29 & 0 & 0 & 0 & 0
 \end{array}$$

Hướng xoáy ←
 ↓
 cột xoáy

Từ đó

$$\Rightarrow \begin{array}{ccccccc|c} \frac{1}{2} & -\frac{11}{2} & -\frac{5}{2} & 9 & 1 & 0 & 0 & 0 \\ 0 & 4 & 2 & -8 & -1 & 1 & 0 & 0 \\ 0 & 11 & 5 & -18 & -2 & 0 & 1 & 1 \end{array}$$

$$\begin{array}{ccccccc|c} 0 & 53 & 41 & -204 & -20 & 0 & 0 & 0 \end{array}$$

$$\begin{array}{cccccc} 1 & -11 & -5 & 18 & 2 & \\ & 0 & 11 & 5 & -18 & \\ & 0 & 0 & 0 & 0 & 0 \end{array}$$

H₁ x 2
Hàng xoay

$$\Rightarrow \begin{array}{ccccccc|c} 1 & -11 & -5 & 18 & 2 & 0 & 0 & 0 \\ 0 & 4 & 2 & -8 & -2 & 1 & 0 & 0 \\ 0 & 11 & 5 & -18 & -2 & 0 & 1 & 1 \end{array}$$

$$\begin{array}{ccccccc|c} 0 & 53 & 41 & -204 & -20 & 0 & 0 & 0 \end{array}$$

H₁ x 2
Hàng xoay

cột xoay

$$\Rightarrow \begin{array}{ccccccc|c} 1 & 0 & \frac{1}{2} & -4 & -\frac{3}{4} & \frac{11}{4} & 0 & 0 \\ 0 & 4 & 2 & -8 & -1 & 1 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 4 & \frac{3}{4} & -\frac{11}{4} & 1 & 1 \end{array}$$

$$\begin{array}{ccccccc|c} 0 & 0 & \frac{29}{2} & -98 & -\frac{27}{4} & -\frac{53}{4} & 0 & 0 \end{array}$$

$$\Rightarrow \begin{array}{ccccccc|c} 1 & 0 & \frac{1}{2} & -4 & -\frac{3}{4} & \frac{11}{4} & 0 & 0 \\ 0 & 1 & \frac{1}{4} & -2 & -\frac{1}{4} & \frac{1}{4} & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 4 & \frac{3}{4} & -\frac{11}{4} & 1 & 1 \end{array}$$

$$\begin{array}{ccccccc|c} 0 & 0 & \frac{29}{2} & -98 & -\frac{27}{4} & -\frac{53}{4} & 0 & 0 \end{array}$$

H₂/4
Hàng xoay
cột xoay

\Rightarrow

$$\begin{array}{ccccccc|c}
 1 & 0 & \frac{1}{2} & -4 & -\frac{3}{4} & \frac{11}{4} & 0 & 0 \\
 \cancel{1} & 1 & 0 & 2 & \frac{1}{2} & -\frac{5}{2} & 0 & 0 \\
 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\
 \hline
 -29 & 0 & 0 & 18 & 15 & -93 & 0 & 0
 \end{array}$$

$H_2 \times 2$

\Rightarrow Hàng Xoa

$$\begin{array}{ccccccc|c}
 2 & 0 & 1 & -8 & -\frac{3}{2} & \frac{11}{2} & 0 & 0 \\
 -1 & 1 & 0 & 2 & \frac{1}{2} & -\frac{5}{2} & 0 & 0 \\
 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\
 \hline
 -29 & 0 & 0 & 18 & 15 & -93 & 0 & 0
 \end{array}$$

\downarrow
Cột Xoa

\Rightarrow

$$\begin{array}{cccc|ccc|c}
 -2 & 4 & 1 & 0 & \frac{1}{2} & -\frac{9}{2} & 0 & 0 \\
 -1 & 1 & 0 & 2 & \frac{1}{2} & -\frac{5}{2} & 0 & 0 \\
 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\
 \hline
 -20 & -9 & 0 & 0 & \frac{21}{2} & -\frac{141}{2} & 0 & 0
 \end{array}$$

$H_2/2$ Hàng Xoa

$$\begin{array}{cccc|ccc|c}
 -2 & 4 & 1 & 0 & \frac{1}{2} & -\frac{9}{2} & 0 & 0 \\
 -\frac{1}{2} & \frac{1}{2} & 0 & 1 & \frac{1}{4} & -\frac{5}{4} & 0 & 0 \\
 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\
 \hline
 -20 & -9 & 0 & 0 & \frac{21}{2} & -\frac{141}{2} & 0 & 0
 \end{array}$$

\downarrow
Cột Xoa

⇒

$$\begin{array}{ccccccc|c} -2 & 4 & 1 & 0 & \frac{1}{2} & -\frac{9}{2} & 0 & 0 \\ \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ \hline 22 & -93 & -22 & 0 & 0 & 24 & 0 & 0 \end{array}$$

$H_1 \times 2$

⇒ Hàng
xoay

$$\begin{array}{ccccccc|c} -4 & 8 & 2 & 0 & 1 & -9 & 0 & 0 & \text{Ty lệ?} \\ \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & 1 & 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 \\ \hline 22 & -93 & -22 & 0 & 0 & 24 & 0 & 0 & 0 \end{array}$$

⇒

$$\begin{array}{ccccccc|c} 0 & -4 & -2 & 8 & 1 & -9 & 0 & 0 \\ \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & 1 & 0 & 1 & 0 & 0 \\ 0 & 3 & 1 & -2 & 0 & -2 & 1 & 1 \\ \hline 0 & -27 & 1 & -22 & 0 & -20 & 0 & 0 \end{array}$$

$H_2 \times 2$

⇒

Hàng
xoay

$$\begin{array}{ccccccc|c} 0 & -4 & -2 & 8 & 1 & -9 & 0 & 0 & \text{Ty lệ?} \\ 1 & -3 & -1 & 2 & 0 & 1 & 0 & 0 \\ 0 & 3 & 1 & -2 & 0 & -2 & 1 & 1 & 1 \\ \hline 0 & -27 & 1 & -22 & 0 & -20 & 0 & 0 \end{array}$$

↓

Cột xoay

\Rightarrow

$$\begin{array}{ccccccc|c} 0 & 2 & \leq 0 & 4 & 1 & -13 & 2 & 2 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 3 & 1 & -2 & 0 & -2 & 1 & 1 \\ \hline 0 & -30 & 0 & -20 & 0 & -18 & -1 & -1 \end{array}$$

Như vậy, giá trị nghiệm cơ sở tối ưu là (x_1, x_2, x_3) và ta có nghiệm tối ưu:

$$(x_1, x_2, x_3, x_4, x_5, x_6, x_7) = (1, 0, 1, 0, 2, 0, 0).$$

Giá trị tối ưu là 1.