

更正版

$\max z = 3x_1 + 4x_2 + 2x_3$   
 满足  $2x_1 + 3x_2 + x_3 \leq 30$   
 $x_1 + x_2 + 2x_3 \leq 20$   
 $x_1 + 2x_2 + x_3 \leq 25$

← Standard 标准型

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Linear Programming  
Examples 2

解 (① 转为标准型)

$\max z = 3x_1 + 4x_2 + 2x_3 + 0 \cdot x_4 + 0 \cdot x_5 + 0 \cdot x_6$

s.t.

$2x_1 + 3x_2 + x_3 + x_4 = 30$

$x_1 + x_2 + 2x_3 + x_5 = 20$

$x_1 + 2x_2 + x_3 + x_6 = 25$

(Slack Form)

$x_i \geq 0, i=1,2,3,4,5,6$

\*  $x_4, x_5, x_6$ :  
Basic 变量

② 表格

	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	b
$x_4$	2	3	1	1	0	0	30
$x_5$	1	1	2	0	1	0	20
$x_6$	1	2	1	0	0	1	25
C	3	4	2	0	0	0	Z

$30/3 = 10$

$20/1 = 20$

$25/2 = 12.5$

把  $x_4$  变 1

把  $x_5$  变 0

	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	b
① $x_4$	$2/3$	1	$1/3$	$1/3$	0	0	10
② $x_5$	$1/3$	0	$5/3$	$-1/3$	1	0	10
③ $x_6$	$-1/3$	0	$1/3$	$-2/3$	0	1	5
④ C	$1/3$	0	$2/3$	$-4/3$	0	0	Z-40

①  $\times \frac{1}{3}$ , ②  $-①$ , ③  $-① \times 2$ , ④  $-① \times 4$

	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	b
① $x_4$	$\frac{2}{3}$	1	$\frac{1}{3}$	$\frac{1}{3}$	0	0	10
② $x_5$	$1/3$	0	$5/3$	$-1/3$	1	0	10
③ $x_6$	$-1/3$	0	$1/3$	$-2/3$	0	1	5
④ C	$1/3$	0	$2/3$	$-4/3$	0	0	Z-40

$10/1/3 = 30$

$10/5/3 = 6$

$5/1/3 = 15$

$$\downarrow \quad \frac{0}{5} \quad 0 \quad \frac{2}{3} \quad -\frac{2}{5} \quad \frac{2}{5} \quad 0 \quad 4$$

	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$b$
① $x_4$	$\frac{3}{5}$	1	0	$\frac{2}{5}$	$-\frac{1}{5}$	0	8
② $x_5$	$\frac{1}{5}$	0	1	$-\frac{1}{5}$	$\frac{3}{5}$	0	6
③ $x_6$	$-\frac{3}{5}$	0	0	$-\frac{3}{5}$	$-\frac{1}{5}$	1	3
④ $C$	$1/5$	0	0	$-\frac{6}{5}$	$-\frac{2}{5}$	0	$Z=44$

$$\textcircled{2} \times \frac{3}{5}, \quad \textcircled{1} - \textcircled{2} \times \frac{1}{3}, \quad \textcircled{3} - \textcircled{2} \times \frac{1}{3}, \quad \textcircled{4} - \textcircled{2} \times \frac{2}{3}$$

	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$b$
① $x_4$	$\frac{3}{5}$	1	0	$\frac{2}{5}$	$-\frac{1}{5}$	0	8
② $x_5$	$\frac{1}{5}$	0	1	$-\frac{1}{5}$	$\frac{3}{5}$	0	6
③ $x_6$	$-\frac{3}{5}$	0	0	$-\frac{3}{5}$	$-\frac{1}{5}$	1	3
④ $C$	$1/5$	0	0	$-\frac{6}{5}$	$-\frac{2}{5}$	0	$Z=44$

$$\frac{8}{\frac{3}{5}} \quad \checkmark \quad \frac{40}{3}$$

$$\frac{6}{\frac{1}{5}} \quad 30$$

$$\frac{3}{-\frac{3}{5}} \quad -\frac{15}{2}$$

负数开数

	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$b$
$x_4$	1	$5/3$	0	$2/3$	$-1/3$	0	$\frac{40}{3}$
$x_5$	0	$-5/3$	5	$-5/3$	$10/3$	0	$50/3$
$x_6$	0	$10/3$	0	$-5/3$	$-5/3$	5	$\frac{125}{3}$
$C$	0	$-\frac{1}{3}$	0	$-4/3$	$-1/3$	0	$Z = \frac{140}{3}$

$$\textcircled{1} \times \frac{5}{3}, \quad (\textcircled{2} - \textcircled{1} \times \frac{1}{5}), \quad \textcircled{3} \times 5 + \textcircled{1} \times 2, \quad \textcircled{4} - \textcircled{1} \times \frac{1}{5}$$

②  $\times 5 - \textcircled{1}$  消除未知数

(为33不要换数)

得

$$0 \cdot x_1 - \frac{1}{3} \cdot x_2 + 0 \cdot x_3 - \frac{4}{3} x_4 - \frac{1}{3} x_5 + 0 \cdot x_6 = Z - 46\frac{2}{3}$$

$$\text{当 } x_2 = x_4 = x_5 = 0 \text{ 时, } Z_{\max} = 46\frac{2}{3}$$