Chapter 1.

$\boxed{\text{e.g. 3}}$

$$\max z = +x_1' - 4x_2 - 5\cancel{x_3}(x_3' - x_3'') \underline{\underline{+0x_4 + 0x_5}}$$

DO NOT FORGET!

$$\begin{cases} +4x_1' + x_2 + x_3 + x_4 = 15 \\ +3x_1' + 3x_2 + 2x_3 - x_5 = 11 \\ +3x_1' + 2x_2 + 6x_3 = 8 \\ x_1, x_2, x_3', x_3'', \underline{\underline{x_4, x_5}} \geq 0 \end{cases}$$

$\boxed{\text{e.g. 4}}$

$$\begin{pmatrix} 2 & 2 & 1 & 0 & 0 & 0 \\ 1 & 2 & 0 & 1 & 0 & 0 \\ 4 & 0 & 0 & 0 & 1 & 0 \\ 0 & 4 & 0 & 0 & 0 & 1 \end{pmatrix} \quad (P_3, P_4, P_5, P_6)$$

$\boxed{\text{e.g. 5.}}$

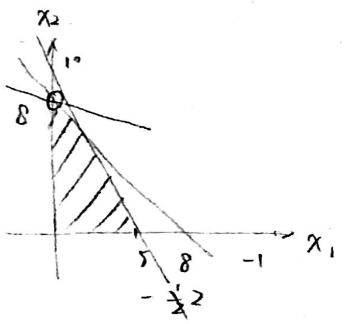
$$\max z = 2x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5 + 0x_6$$

$$\begin{cases} 2x_1 + 2x_2 + x_3 = 12 \\ x_1 + 2x_2 + x_4 = 8 \\ 4x_1 + x_5 = 16 \\ 4x_2 + x_6 = 12 \\ x_1, x_2 \cdots x_6 \geq 0. \end{cases}$$

	c_j		2	3	0	0	0	0
0	x_3	~~12~~6	2	~~2~~0	1			-1/2
0	x_4	~~8~~2	1	~~2~~0		1		-1/2
0	x_5	16	4	0			1	0
0	x_6	3~~12~~	0	[~~4~~]1				1/4
	σ.		2	3	0	0	0	0

习题一

$\boxed{1.1.}$ (a).



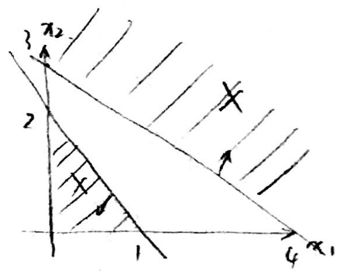
$x_2 \leq -x_1 + 8$

$x_2 \leq -2x_1 + 10$

$x_2 = -\frac{2}{3}x_1 + \frac{1}{3}z$.

唯一最优解.

(b).

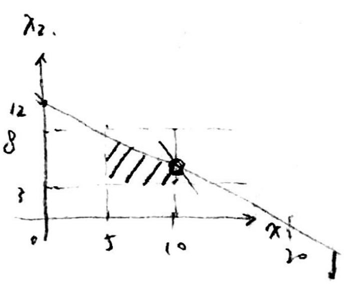


$x_2 \leq -2x_1 + 2$

$x_2 \geq -\frac{3}{4}x_1 + 3$

无可行解.

(c)



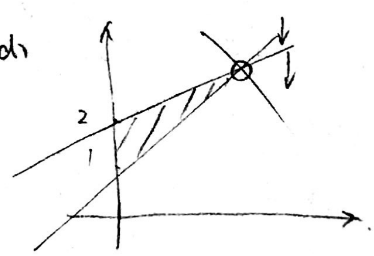
$x_2 \leq -\frac{3}{5}x_1 + 12$

5×4 2

$x_2 = -x_1 + z$

唯一最优解

(d).



$x_2 \leq x_1 + 1$

$x_2 \leq 0.5x_1 + 2$

$x_2 = -x_1 + \frac{1}{2}z$

唯一最优解

$\boxed{1.2.}$ (a)

$$\begin{pmatrix} 12 & 3 & 6 & 3 & 0 \\ 8 & 1 & -4 & 0 & 2 \end{pmatrix}$$

$\forall$2个列都是基

(b)

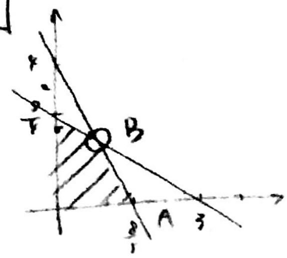
$$\begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 2 & 1 & 2 \end{pmatrix}$$

$\forall$2列都是基

~~?是不是必须连着?~~

不是

$\boxed{1.3.\ (a)}$

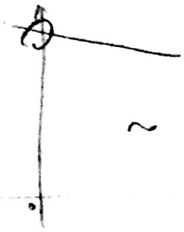


$x_2 \le -\frac{3}{4}x_1 + \frac{9}{4}$

$x_2 \le -\frac{5}{2}x_1 + 4$

$x_2 = -2x_1 + \frac{2}{5}$

(b)



$\sim$

$x_2 \le -\frac{2}{7}x_1 + 3$

$x_2 \le -\frac{7}{2}x_1 + \cancel{3}\frac{21}{2}$

$x_2 = -\frac{4}{14}x_1 + \frac{\cancel{1}2}{14}$

化标准. $\max z = 10x_1 + 5x_2 + 0x_3 + 0x_4$

$$\begin{cases} 3x_1 + 4x_2 + x_3 = 9 \\ 5x_1 + 2x_2 \qquad + x_4 = 8 \end{cases}$$

化标准. $\max z = 4x_1 + 14x_2 + 0x_3 + 0x_4$

$$\begin{cases} 2x_1 + 7x_2 + x_3 = 21 \\ 7x_1 + 2x_2 + x_4 = 21 \end{cases}$$

$\underline{\mathrm{Min}\left(\frac{b}{a}\right)}$

C.			10	5	0	0
0	x_3	9	3	4	1	0
0	x_4	8	[5]	2	0	1
			10	5	0	0
0	x_3	$9-\frac{8}{5}\times3$	0	$[4-\frac{6}{5}]$	1	$-\frac{3}{5}$
10	x_1	$\frac{8}{5}$	1	$\frac{2}{5}$	0	$\frac{1}{5}$
			0	$\cancel{5}$ 3	0	-2.

↑

C_j			4	14	0	0
0	x_3	21	2	[7]	1	0
0	x_4	21	7	2	0	1
			4	14	0	0
14	x_2	3	$\frac{2}{7}$	1	$\frac{1}{7}$	0
0	x_4	15	$7-\frac{4}{7}$	0	$-\frac{2}{7}$	1
			0	0	-2.	0 ✓

(0, 3)

4 -

$\boxed{1.4.}$ $-\frac{c}{d} \in (-\infty, -\frac{5}{2})\ (-\frac{5}{2}, -\frac{3}{4})\ (-\frac{3}{4}, +\infty)$ 如图所示

A　　B　　C.

$\boxed{1.5.}$ 图解法 is OK

$\boxed{1.6.}$ (a).

$$\begin{aligned} &2x_1 + 3x_2 - 4x_3 + x_4 = 12 \\ &4x_1 + x_2 + 2x_3 \qquad - x_5 = 8 \\ &3x_1 - x_2 + 3x_3 = 6 \end{aligned}$$

$\Rightarrow$

$\max z = 2x_1 - x_2' + x_2'' - 2x_3' + 0x_4 + 0x_5 - Mx_6 - Mx_7$

$$\begin{cases} 2x_1 + 3x_2' - 3x_2'' + 4x_3' + x_4 = 12 \\ 4x_1 + x_2' - x_2'' - 2x_3' - x_5 + x_6 = 8 \\ 3x_1 - x_2' + x_2'' - 3x_3' + x_7 = 6 \\ x_1, x_2', x_2'', x_3', x_4, x_5 \ge 0 \end{cases}$$

$x_2 = x_2' - x_2''$, $x_3' = -x_3$

初始单纯形表:

C_B	基	b	2	-1	1	-2	0	0	-M	-M
0	x_4	12	[2]	3	-3	4	1	0	0	0
0	x_6	8	4	1	-1	-2	0	-1	1	0
-M	x_7	6	3	-1	1	-3	0	0	0	1
			2+3M	-1-M	1+M	-2-3M	0	0	0	0

↑

Chapter 第1 $\underset{\sim\sim\sim}{\text{min} \rightarrow \text{max is step 1}}$

$\boxed{1.6(b)}$

$$\begin{aligned} x_1 - x_2 + 2x_3 + x_4 - x_5 &= 9 \\ 2x_2 + x_3 - x_4 + x_6 &= 5 \\ +2x_1 - x_2 + 3x_3 - x_4 - x_7 &= +1 \end{aligned} \xrightarrow{x_3 = x_3' - x_3''}$$

$$\max W = -3x_1 - 5x_2 + x_3' - x_3'' + 0x_4 + 0x_5 - Mx_6 + 0x_7 + 0x_8 - Mx_9$$

$$\begin{aligned} x_1 - x_2 + 2x_3' - 2x_3'' + x_4 - x_5 + \underline{x_6} &= 9 \\ 2x_2 + x_3' - x_3'' - x_4 + x_7 &= 5 \\ 2x_1 - x_2 + 3x_3' - 3x_3'' - x_4 - x_8 + \underline{x_9} &= 1 \end{aligned}$$

$\boxed{1.7.}$ (a). $\max Z = 2x_1 - x_2 + 2x_3 + 0x_4 + 0x_5 + 0x_6 - Mx_7 - Mx_8 - Mx_9$.

$$\begin{aligned} x_1 + x_2 + x_3 - x_4 + x_7 &= 6 \\ -2x_1 + x_3 - x_5 + x_8 &= 2 \\ 2x_2 - x_3 - x_6 + x_9 &= 0 \end{aligned}$$

		c_j	2	-1	2	0	0	0	-M	-M	-M
-M	x_7	6	1	1	1	-1	0	0	1	0	0
-M	x_8	2	-2	0	1	0	-1	0	0	1	0
-M	x_9	0	0	2	-1	0	0	-1	0	0	1

(b). $\max Z = -2x_1 - 3x_2 - x_3 + 0x_4 + 0x_5 - Mx_6 - Mx_7 - Mx_8$.

$$\begin{aligned} x_1 + 4x_2 + 2x_3 - x_4 + x_6 &= 8 \\ 3x_1 + 2x_2 - x_5 + x_7 &= 6. \\ x_8 &= 0. \end{aligned}$$

		c_j	-2	-3	-1	0	0	-M	-M	-M
-M	x_6	8	1	4	2	-1	0	1	0	0
-M	x_7	6	3	2	0	0	-1	0	1	0
-M	x_8	0	0	0	0	0	0	0	0	1

$\boxed{1.8}$ 見书上 $\boxed{1.9}$ 不考. $\boxed{1.10 \sim 1.13}$ 应用题不考 Chapter 1.

Chapter 2.

$\boxed{2.1}$ (a) 令 $z' = -z$，$x_3 = x_3' - x_3''$

$\max z' = -2x_1 - 2x_2 - 4x_3' + 4x_3''$

$$\begin{cases} x_1 + 3x_2 + 4x_3' - 4x_3'' - x_4 = 5 \\ 2x_1 + x_2 + 3x_3' - 3x_3'' + x_5 = 7 \\ x_1 + 4x_2 + 3x_3' - 3x_3'' = 12 \\ x_1, x_2, x_3', x_3'' \cancel{\geq 0}\ x_4, x_5 \geq 0. \end{cases}$$

(b) 令 $x_1 = x_1' - x_1''$，$x_3' = -x_3$

$\max z = 5x_1' - 5x_1'' + 6x_2 - 3x_3'$

$$\begin{cases} x_1' - x_1'' + 2x_2 - 2x_3' = 8 \\ -x_1' + x_1'' + 5x_2 + x_3' - x_4 = 4 \\ 4x_1' - 4x_1'' + 7x_2 - 3x_3' + x_5 = 10 \\ x_1', x_1'', x_2, x_3', x_4, x_5 \geq 0 \end{cases}$$

(c) (d) 略

$\boxed{2.2}$ × × × √ （极大极小问题中的弱对称性）.

$\boxed{2.1}$ (a) $\min w = 5y_1 + 7y_2 + 12y_3$

$$\begin{cases} y_1 + 2y_2 + y_3 \leq 2. \\ 3y_1 + y_2 + 4y_3 \overset{\leq}{\cancel{\geq}} 2. \\ 4y_1 + 3y_2 + 3y_3 = 12 \\ \cancel{y_1, y_2 \geq 0},\ y_1 \geq 0, y_2 \leq 0, y_3 \text{无约束} \end{cases}$$

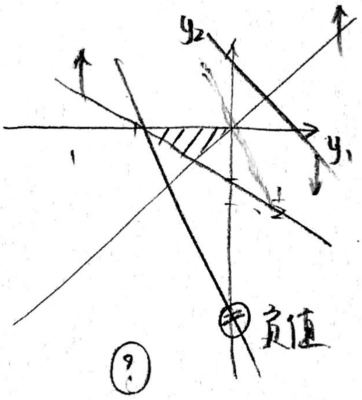
(b) $\min w = 8y_1 + 4y_2 + 10y_3$

$$\begin{cases} y_1 - y_2 + y_3 = \cancel{0}\ 5 \\ 2y_1 + 5y_2 + 7y_3 \leq \cancel{0}\ 6 \\ 2y_1 - y_2 + 3y_3 \geq \cancel{0}\ 3 \\ y_1 \text{无约束}, y_2 \geq 0, y_3 \leq 0 \end{cases}$$

$\boxed{2.3}$ 对偶 Question.

$\min w = 2y_1 + y_2$

$$\begin{cases} -y_1 - 2y_2 \leq 1 \\ y_1 + y_2 \leq 1 \\ y_1 - y_2 \leq 0 \\ y_1 \leq 0, y_2 \leq 0. \end{cases}$$



$y_2 \geq -\frac{1}{2}y_1 - \frac{1}{2}$

$y_2 \leq -y_1 + 1$

$y_2 \geq y_1$

$y_2 = -2y_1 + w.$

对偶问题无解.

故原问题有无界解.

$\begin{pmatrix} 8 \\ 6 \\ 6 \\ 8 \end{pmatrix}$ $2+6$ $4+2$

$\boxed{2.4}$ (a) $\min w = 8y_1 + 6y_2 + 6y_3 + 9y_4$

?

$$\begin{cases} y_1 + 2y_2 + y_4 \leq 2 \\ 3y_1 + y_2 + y_3 + y_4 \leq 4 \\ y_3 + y_4 \leq 1 \\ y_1 + y_3 \leq 1 \\ y_1, y_2, y_3, y_4 \geq 0. \end{cases}$$

(b) $X^* = (2, 2, 4, 0)^T$

$$Ax^* - b = \begin{pmatrix} 1 & 3 & 0 & 1 \\ 2 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 \\ 1 & 1 & 1 & 0 \end{pmatrix} \begin{pmatrix} 2 \\ 2 \\ 4 \\ 0 \end{pmatrix} - \begin{pmatrix} 8 \\ 6 \\ 6 \\ 9 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 0 \\ -1 \end{pmatrix}$$

4×4 4×1

$(y_1, y_2\ y_3\ y_4)\, x^* = -y_4 = 0$

$$A^T y^* = \begin{pmatrix} 1 & 2 & 0 & 1 \\ 3 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 \\ 1 & 0 & 1 & 0 \end{pmatrix} \begin{pmatrix} y_1 \\ y_2 \\ y_3 \\ 0 \end{pmatrix} - \begin{pmatrix} 2 \\ 4 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} y_1 + 2y_2 - 2 \\ 3y_1 + y_2 + y_3 - 4 \\ y_3 - 1 \\ y_1 + y_3 - 1 \end{pmatrix}^T \begin{pmatrix} 2 \\ 2 \\ 4 \\ 0 \end{pmatrix} = 0.$$

$\boxed{2.6}$ (a). $\max w = 3y_1 + 5y_2$

$$\begin{cases} y_1 \le 4 \\ y_2 \le 12 \\ 3y_1 + 2y_2 \le 18 \\ y_1 \ge 0, y_2 \ge 0 \end{cases}$$

$\xrightarrow{\text{standard}}$

$\max w = 3y_1 + 5y_2 + 0y_3 + 0y_4 + 0y_5$

$$\begin{cases} y_1 + y_3 = 4 \\ y_2 + y_4 = 12 \\ 3y_1 + 2y_2 + y_5 = 18 \end{cases}$$

$\frac{b}{a}$ 最小

	C_j		3	5	0	0	0
0	y_3	4	1	0	1	0	0
0	y_4	12	0	1	0	1	0
0	y_5	18	3	[2]	0	0	1
			3	5	0	0	0
0	y_3	4	1	0	1	0	0
0	y_4	3	$-\frac{3}{2}$	0	0	1	$-\frac{1}{2}$
5	y_2	9	$\frac{3}{2}$	1	0	0	$\frac{1}{2}$
			<0	0	0	0	$-\frac{5}{2}<0$ ✓

$y^* = (0, 9, 4, 3, 0)$, $Z = \underline{45}$

And then?

(b). $\max w = 3y_1 + 4y_2 + 0y_3 + 0y_4 + 0y_5$

$$\begin{cases} y_1 + 2y_2 + y_3 = 5 \\ 2y_1 - y_2 + y_4 = 2 \\ y_1 + 3y_3 + y_5 = 4 \end{cases}$$

	C_j		3	4	0	0	0
0	y_3	5	1	2	1	0	0
0	y_4	2	2	-1	0	1	0
0	y_5	4	1	[3]	0	0	1
			3	4	0	0	0
0	y_3	$5-\frac{8}{3}$	$1-\frac{2}{3}$	0	1	0	$-\frac{2}{3}$
0	y_4	$2+\frac{4}{3}$	$2+\frac{1}{3}$	0	0	1	$\frac{1}{3}$
4	y_2	$\frac{4}{3}$	$\frac{1}{3}$	1	0	0	$\frac{1}{3}$

$y^* = (0, \frac{4}{3}, \frac{10}{3}, \frac{7}{3}, 0)$

And then?

$\boxed{2.7}$ $\max w = 2y_1 + 4y_2 + 3y_3 + 0y_4 + 0y_5 + 0y_6$

$$\begin{cases} 3y_1 + 4y_2 + 2y_3 + y_4 = 60 \\ 2y_1 + y_2 + 2y_3 + y_5 = 40 \\ y_1 + 3y_2 + 2y_3 + y_6 = 80 \\ y_i \ge 0 \end{cases}$$

E.G. Chapter 3.

Vogel 法. Page 11

	B_1	B_2	B_3	B_4					
A_1	3	11	3 $\boxed{5}$	10 $\boxed{2}$	7	0	0	0	0
A_2	1 $\boxed{3}$	9	2	8 $\boxed{1}$	~~4~~	1	1	1	1
A_3	7	4 $\boxed{6}$	10	5 $\boxed{3}$	9 (3)	1	2		
	3	6	5	6 (3)					
	2	5	1	3					
	2		1	3					
	2		1	2					
	2		1						

Page.20. 例(位势法).

	B_1	B_2	B_3	B_4	
A_1	(2)	(9)	3	10	1
A_2	1	(8)	2	(9)	0
A_3	(-3)	4	(-2)	5	-4
	1	8	2	9	

step 1. 列新表

step 2. 求位势

step 3 运价表减去 ⇒ 得检验数表

step 4. 最小的检验数，用闭回路调整.

$$\Rightarrow \begin{pmatrix} 1 & 2 & 0^{+1} & 0^{-1} \\ 0 & 1 & 0^{-1} & -1^{+1} \\ 10 & 0 & 12 & 0 \end{pmatrix}$$

习题 3.1. Vogel 法.

	B_1	B_2	B_3	B_4					
A_1	10	[2]	20	11	12	8	9		
A_2	12	[7]	[9]	20	27	2	2	2	11
A_3	[2]	14	16	18	6	12	~~2~~	2	2
	5	15	15	10					
	8	5	7	7					
		5	7	7					
		7	7	2					
			7	2					

	B_1	B_2	B_3	B_4	
A_1		12			12
A_2		3	15	4	27
A_3	5			6	6
	5	15	15	10	

调整后

$$\rightarrow \begin{pmatrix} & 8 & & 4 \\ & 7 & 15 & \\ 5 & & & 6 \end{pmatrix}$$

调整.

$$\begin{pmatrix} (0) & 2 & (4) & (15) \\ (1) & 7 & 9 & 20 \\ 2 & (1) & (7) & 18 \end{pmatrix} \begin{matrix} -1 \\ 4 \\ 2 \end{matrix}$$

$$\begin{matrix} 1 & 3 & 5 & 16 \end{matrix}$$

$$\rightarrow \begin{pmatrix} 10 & 0^{-4} & 16 & 4^{+4} \\ 7 & 0^{+4} & & 0^{-4} \\ 9 & 9 & & \end{pmatrix}$$

3.1 table 3.37 (Vogel法)

~~8~~	~~4~~	~~(1)~~	~~2~~	~~1~~
6	9	(4)	7	2 2 2 2
5	(3)	4	(3)	0 0 1 1
1	1	3	1	
1	7	0	4	
1		0	4	
1		0		

		7		7
9		13		25
1	10		15	26
10	10	20	15	
		1		

位势

$$\begin{array}{c} \begin{pmatrix} (3) & (1) & 1 & (1) \\ 6 & (4) & 4 & (4) \\ 5 & 3 & (3) & 3 \end{pmatrix} \begin{array}{c} 2 \\ 5 \\ 4 \end{array} \\ \begin{array}{cccc} 1 & -1 & -1 & -1 \end{array} \end{array} \longrightarrow \begin{pmatrix} 5 & 3 & 0 & 1 \\ 0 & 5 & 0 & 3 \\ 0 & 0 & 1 & 0 \end{pmatrix}$$

<u>均大于0</u> ✓

E.G. Chapter 4.

Page.87、e.g.2

把其他0也给划掉.

$$
\begin{pmatrix} 2 & 10 & 9 & 7 \\ 15 & 4 & 14 & 8 \\ 13 & 14 & 16 & 11 \\ 4 & 15 & 13 & 9 \end{pmatrix}
\rightarrow
\begin{array}{c c}
\begin{matrix} -2 & -2 & 0 & 0 \end{matrix} & \\
\begin{pmatrix} 0 & 8 & 7 & 5 \\ 11 & 0 & 5 & 4 \\ 2 & 3 & 0 & 0 \\ 0 & 11 & 4 & 5 \end{pmatrix} & \begin{matrix} 2 \\ 2 \\ 0 \\ 2 \end{matrix}
\end{array}
\rightarrow
\begin{array}{c c}
\begin{matrix} -2 & -2 & -2 & 0 \end{matrix} & \\
\begin{pmatrix} 0 & 8 & 0 & 3 \\ 11 & (0) & 3 & 2 \\ 4 & 5 & (0) & (0) \\ (0) & (0) & 3 & 3 \end{pmatrix} & \begin{matrix} 2 \\ 2 \\ ③\ 0 \\ 2 \end{matrix} \\
\begin{matrix} ② & ⓪ & ④ & \end{matrix} &
\end{array}
$$

$$
\rightarrow
\begin{array}{c c}
\begin{pmatrix} 0 & 8 & 0 & 1 \\ 11 & 0 & 3 & 0 \\ 6 & 7 & 2 & 0 \\ 0 & 0 & 2 & 1 \end{pmatrix} & \begin{matrix} ② \\ \\ \\ \\ \end{matrix} \\
\begin{matrix} ④ & ③ & & ① \end{matrix} &
\end{array}
\quad \checkmark
$$

A.M.
Chapter. 4、5、6
P.M.
SUMMARY. CHAP
1~3

Price = 32

Pdf、Page.18、e.g.

闭回路

$$
\begin{pmatrix} 12 & 7 & 9 & 7 & 9 \\ 8 & 9 & 6 & 6 & 6 \\ 7 & 17 & 12 & 14 & 9 \\ 15 & 14 & 6 & 6 & 10 \\ 4 & 10 & 7 & 10 & 9 \end{pmatrix}
\rightarrow
\begin{array}{c c}
\begin{pmatrix} 5 & 0 & 2 & 0 & 2 \\ 2 & 3 & 0 & 0 & 0 \\ 0 & 10 & 5 & 7 & 2 \\ 7 & 8 & 0 & 0 & 4 \\ 0 & 6 & 3 & 6 & 5 \end{pmatrix} & \begin{matrix} ② \\ ③ \\ \\ ④ \\ \\ \end{matrix} \\
\begin{matrix} ① & & & & \end{matrix} &
\end{array}
\rightarrow
\begin{array}{c c}
\begin{pmatrix} 7 & 0 & 2 & 0 & 2 \\ 4 & 3 & 0 & 0 & 0 \\ 0 & 8 & 3 & 5 & 0 \\ 11 & 8 & 0 & 0 & 4 \\ 0 & 4 & 1 & 4 & 3 \end{pmatrix} & \begin{matrix} ② \\ \\ \\ \\ \\ \end{matrix} \\
\begin{matrix} ① & & ④ & ⑧ & ③ \end{matrix} &
\end{array}
\quad \checkmark
$$

Pdf. Page.45. eg

~~7.25×3+5~~

$\max\ z = 3x_1 + 2x_2$

$$\begin{cases} 2x_1 + x_2 \le 9 \\ 2x_1 + 3x_2 \le 14 \end{cases}$$

整数

$\rightarrow$ (L_0) ——

$$\begin{cases} \text{——} \\ \text{——} \\ x_1, x_2 \ge 0. \end{cases}$$

$\rightarrow$ 最优解 (3.25, 2.5)

$0 \le z \le 14.75$

定界 ☆

(L_1). $\max = 3x_1 + 2x_2$

$$\begin{cases} 2x_1 + x_2 \le 9 \\ 2x_1 + 3x_2 \le 14 \\ x_2 \le 2. \end{cases}$$

$z = 14.5$

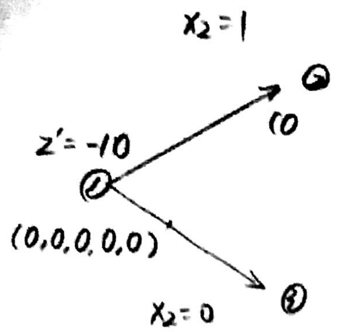
(L_2) ——

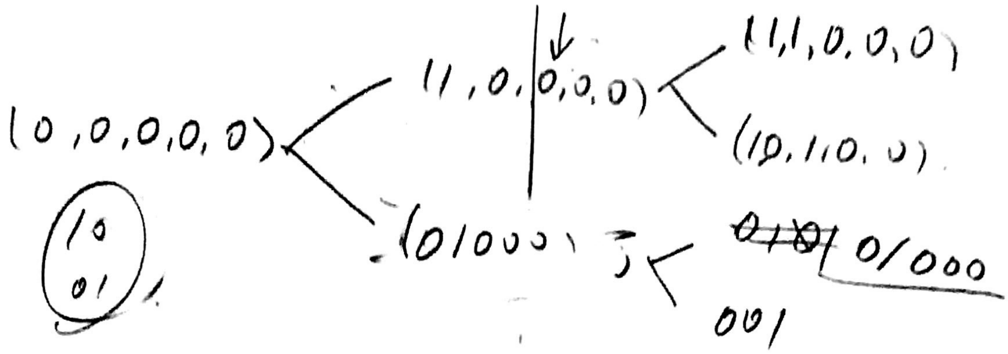
$$\begin{cases} \text{——} \\ \text{——} \\ x_2 \ge 3. \end{cases}$$

$z = 13.5.$

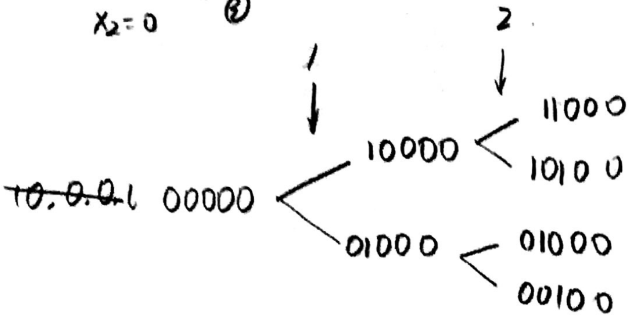
先定界，再剪枝

Pdt Page.55 e.g





璧克TQL



Pdt. Page.58.e.g.

$$\max z = 120x_1+10x_2+100x_3 -5000y_1-2000y_2-1000y_3$$

$$\begin{cases} 5x_1+x_2+4x_3\le 2000 \\ 3x_1\le 300 \\ 0.5x_2\le 300 \\ 2x_3\le 300 \\ x_1,x_2,x_3 \text{为整数} \\ y_1 y_2 y_3 \text{为}0/1 \end{cases}$$

Page.59.e.g

h_i：身高，x_i是否出场

$$\max z=\sum_{i=1}^{8} h_i x_i$$

$$\begin{cases} x_1+x_2 = 1 \\ \cancel{x_1} \end{cases}$$

只能有1 ⟺ 有且仅有1

$\max z = 8x_1 + 10x_2$

$$\begin{cases} 2x_1 + x_2 \le 11 \\ x_1 + 2x_2 \le 10 \\ x_1, x_2 \ge 0 \text{ 且为整数} \end{cases}$$

$\min z = P_1 d_1^+ + P_2(d_2^+ + d_2^-) + P_3(d_3^-)$

$x_1 - x_2 + d_1^- - d_1^+ = 0$

$2x_1 + x_2 \le 11$

$x_1 + 2x_2 + d_2^- - d_2^+ = 10$

$8x_1 + 10x_2 + d_3^- - d_3^+ = 56$

(最好小于: $\underline{\min}\ d^+$; 最好大于 $\underline{\min}\ d^-$)

最好满足比例 $\underline{P_3 + 3P_3}$

$\min z = P_1 d_1^+ + P_2 d_2^- + 80P_3(d_3^- + d_3^+) + 20P_3(d_4^- + d_4^+) + P_4 d_5^+ + P_5 d_6^-$

甲 $2x_1 + x_2 + d_3^- - d_3^+ \le 120$ (80/h)

乙 $x_1 + 3x_2 + d_4^- - d_4^+ \le 150$ (20/h)

~~彩检~~ $50x_1 + 30x_1 + d_1^- - d_1^+ = 4600$ ①

~~电检~~ $\cancel{30x_2}$ $x_1 + d_2^- - d_2^+ = \cancel{80}\ 50$ ②

$100x_1 + 75x_2$

$\cancel{50x_1}$ $x_1 \to 50$

$x_2 \to 80$

$x_2 + d_6^- - d_6^+ = 80$ ⑥

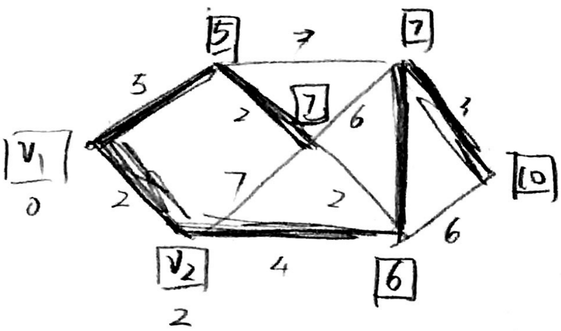
$\cancel{2x_1 + x_2 + d_3^- + d_4^+ = 12}$ ≤ 140

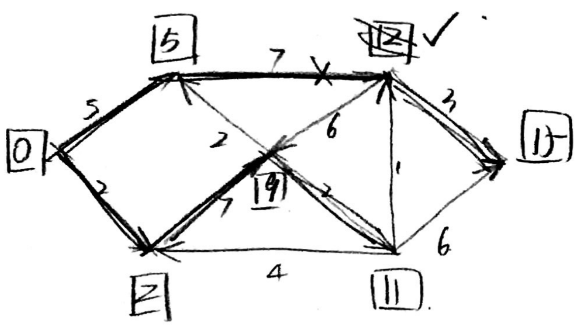
(先把 $d_1\ d_2 \cdots$ 写上)

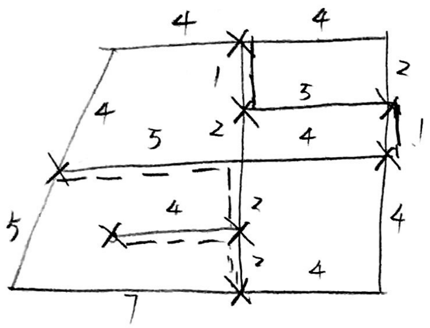
$2x_1 + x_2 + d_1^- - d_1^+ = 12$

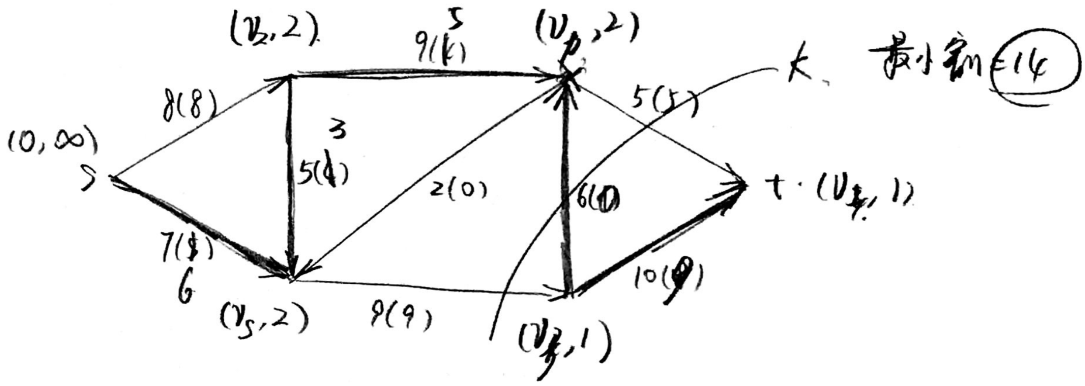
☆ 加班限制

$d_1^+ + d_6^- - d_6^+ = 20$

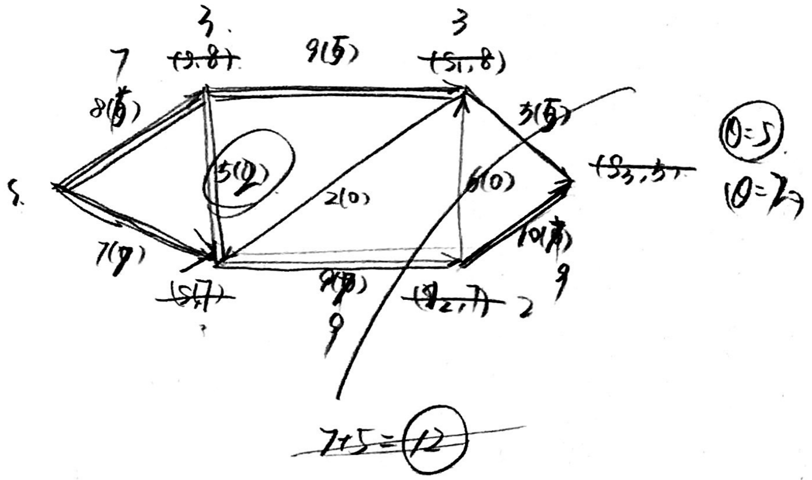






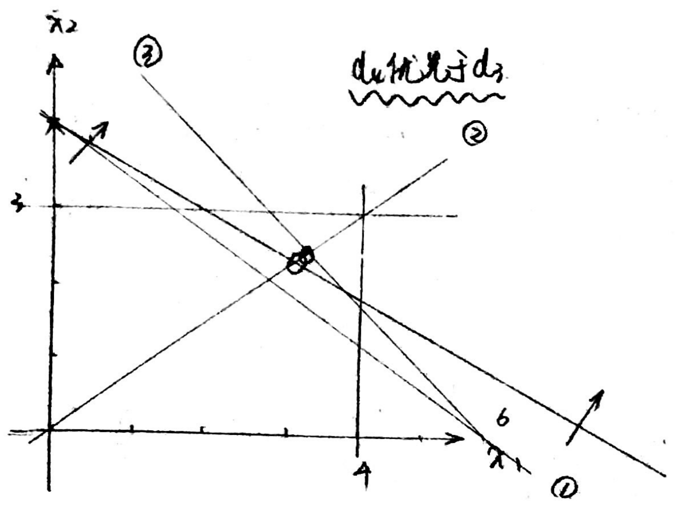


增广: $s \to v_2 \to v_1 \to v_3 \to v_4 \to t$. $\theta=1$



Chapter 5.

[ex.2]



$$3x_2 = -2x_1 - d_1^- + d_1^+ + 12$$

$x_1 \le 4$

$x_2 \le 3$

d_1^-

$x_2 = -\frac{2}{3}x_1 + 4 = 0 \Rightarrow x_1 = 6$

$x_2 = \frac{3}{4}x_1$

$x_2 = -x_1 + 6 \quad d_3$

$x_2 = -\frac{1}{2}x + 4 \quad$ Result : $\left\{\begin{matrix} ② \\ ③ \end{matrix}\right.$