2: Min $Z = a + 2b + c$

S.a

$r_1 = 3a + 3b + 3c \geq 40$ $\quad 3a + 3b + 3c - h_1 + A_1 = 40$

$r_2 = b - c \leq 20$ $\quad b - c + h_2 = 20$

$r_3 = a + 2b + 3c \geq 50$ $\quad a + 2b + 3c - h_3 + A_2 = 50$

$r_4 = a \geq 10$ $\quad a - h_4 + A_3 = 10$

$r_5 = b, c \geq 0$

$Z = a + 2b + c + 0h_1 + 0h_2 + 0h_3 + 0h_4 + MA_1 + MA_2 + MA_3$

C_j	1	2	1	0	0	0	0	M	M	M		
	a	b	c	h_1	h_2	h_3	h_4	A_1	A_2	A_3		
A_1 M	3	3	3	-1	0	0	0	1	0	0	40	40/3
h_2 0	0	1	-1	0	1	0	0	0	0	0	20	-20
A_2 M	1	2	3	0	0	-1	0	0	1	0	50	50/3
A_3 M	1	0	0	0	0	0	-1	0	0	1	10	0
Z_j	5M	5M	6M	-M	0	-M	-M	M	M	M	100M	
$C_j - Z_j$	1-5M	2-5M	1-6M	M	0	M	M	0	0	0		
	1	2	1	0	0	0	0	M	M	M		
C'	1	1	1	-1/3	0	0	0	1/3	0	0	40/3	-40
$C + h_2$ 0	1	2	0	-1/3	1	0	0	1/3	0	0	100/3	-100
$-3C + A_2$ M	-2	-1	0	1	0	-1	0	-1	1	0	10	10
A_3 M	1	0	0	0	0	0	-1	0	0	1	10	Ø
Z_j	1-M	1-M	1	-1/3+M	0	-M	-M	1/3-M	M	M	40/3 + 20M	
$C_j - Z_j$	M	M	0	1/3-M	0	M	M	-1/3+2M	0	0		
	1	2	1	0	0	0	0	M	M	M		
$+\frac{1}{3}h_1 + C'$	1/3	2/3	1	0	0	-1/3	0	0	1/3	0	30/3	30
$+\frac{1}{3}h_1 + h_2$ 0	1/3	5/3	0	0	1	-1/3	0	0	1/3	0	110/3	110
h_1 0	-2	-1	0	1	0	-1	0	-1	1	0	10	-5
$= A_3$ M	1	0	0	0	0	0	-1	0	0	1	10	10
Z_j	1/3+M	2/3	1	0	0	-1/3	-M	0	1/3	M	30/3 + 10M	
$C_j - Z_j$	2/3-M	4/3	0	0	0	1/3	M	M	-1/3+M	0		
	1	2	1	0	0	0	0	M	M	M		
$-\frac{1}{3}a + C'$ 1	0	2/3	1	0	0	-1/3	1/3	0	1/3	-1/3	40/3	
$-\frac{1}{3}a + h_2$ 0	0	5/3	0	0	1	-1/3	1/3	0	1/3	-1/3	100/3	
$2a + h_1$ 0	0	-1	0	1	0	-1	2	-1	1	2	30	
a 1	1	0	0	0	0	0	-1	0	0	1	10	
Z_j	1	2/3	1	0	0	-1/3	-2/3	0	1/3	2/3	70/3	
$C_j - Z_j$	0	4/3	0	0	0	1/3	2/3	M	-1/3+M	-2/3+M		

Resultados

$a = 10$ $\quad h_1 = 30$ $\quad A_1 = 0$

$b = 0$ $\quad h_2 = 100/3$ $\quad A_2 = 0$

$c = 40/3$ $\quad h_3 = 0$ $\quad A_3 = 0$

$h_4 = 0$

$3a + 3b + 3c - h_1 + A_1 = 40 \rightarrow 3(10) + 3(0) + 3(40/3) - 30 + \emptyset$

$30 + 0 + 40 - 30 = 40$ ✓

$b - c + h_2 = 20 \rightarrow (0) - 40/3 + \frac{100}{3} = \frac{60}{3} = 20$ ✓

$a + 2b + 3c - h_3 + A_2 = 50 \rightarrow (10) + 2(0) + 3(40/3) - \emptyset + \emptyset$

$10 + 0 + 40 = 50$ ✓

$a - h_4 + A_3 = 10 \rightarrow (10) - \emptyset + \emptyset = 10$ ✓

$Min = (10, 0, 40/3)$ ✓

3. Min $z = 3h - 3i$

S.a:

r_1: $2h - 2i \geq 25$ → $2h - 2i + h_1 + A_1 = 25$

r_2: $h + 2i \leq 50$ → $h + 2i + h_2 = 50$

r_3: $4h + 3i \geq 120$ → $4h + 3i - h_3 + A_2 = 120$

r_4: $h \geq 0$

r_5: $i \geq 0$

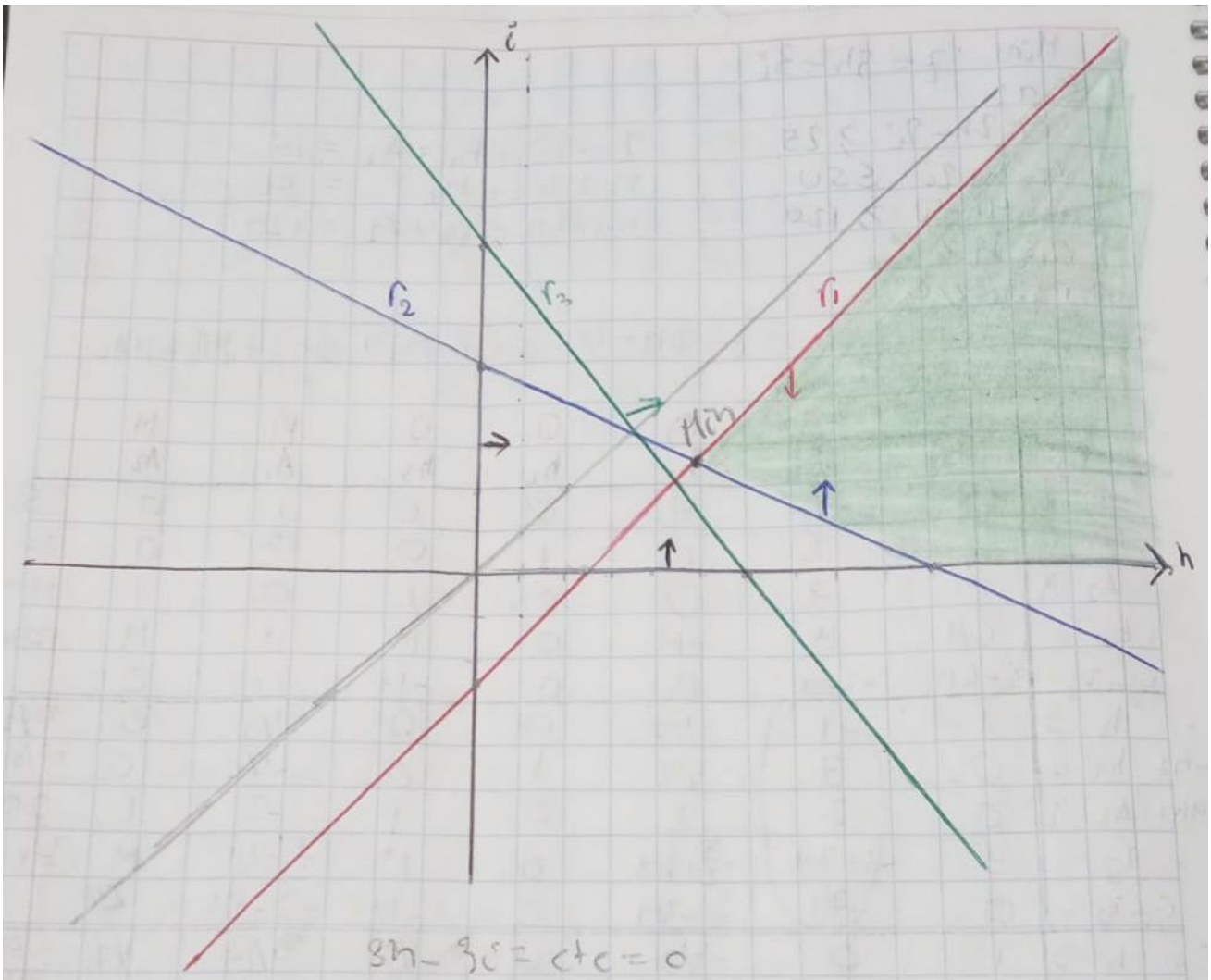
$z = 3h - 3i + 0h_1 + 0h_2 + 0h_3 + MA_1 + MA_2$

	C_j		3	-3	0	0	0	M	M	
			h	i	h_1	h_2	h_3	A_1	A_2	
	A_1	M	2	-2	-1	0	0	1	0	25
	h_2	0	1	2	0	1	0	0	0	50
	A_2	M	4	3	0	0	-1	0	1	120
	z_j		6M	M	-M	0	M	M	M	125M
	$C_j - z_j$		3-6M	-3-M	M	0	-M	0	0	
	h	3	1	-1	-1/2	0	0	1/2	0	25/2
$-h+$	h_2	0	0	3	1/2	1	0	-1/2	0	75/2
$-4h+$	A_2	M	0	7	2	0	1	-2	1	20
	z_j		3	-3+7M	-3/2+2M	0	M	3/2-2M	M	25/2+70M
	$C_j - z_j$		0	-7M	3/2-2M	0	-M	-3/2+3M	0	
$i+$	h	3	1	0	-3/14	0	1/7	3/14	1/7	45/2
$-3i+$	h_2	0	0	0	-5/14	1	-3/7	-19/14	-3/7	15/2
	i	-3	0	1	3/7	0	1/7	-2/7	1/7	10
	z_j		3	-3	-3/2	0	0	3/2	0	75/2
	$C_j - z_j$		0	0	3/2	0	0	M-3/2	M	

$h = 45/2$ $\quad h_1 = 0$ $\quad A_1 = 0$

$i = 10$ $\quad h_2 = 15/2$ $\quad A_2 = 0$

$h_3 = 0$



$3h - 3i = ctc = 0$

$3h = 3i$

$h = i$

r_2 y r_1:

$2h - 2i = 25$

$h + 2i = 50$

$3h = 75$

$h = 25$

$i = 23/2$