

②  $\text{Max } 5u - y + z - 10m + 7v$

$$\begin{cases} 3u - y - z = 4 \\ u - y + z + m = 1 \\ 2u + y + 2z + v = 7 \end{cases} \quad \begin{cases} 3u - y - z + a_1 = 4 \\ u - y + z + u = 1 \\ 2u + y + 2z + v = 7 \end{cases}$$

	u	y	z	m	v	a <sub>1</sub>	
a <sub>1</sub>	3	-1	-1	0	0	1	4 (4/3)
m	1	-1	1	1	0	0	1 (1)
v	2	1	2	0	1	0	7 (7/2)
min a <sub>1</sub>	0	0	0	0	0	1	0
	-3	1	1	0	0	0	-4

A 1ª Solução  
arranjada tem  
os valores de  
 $a_1=4$ ;  $m=1$ ;  $v=7$   
para as variáveis  
básicas e  $u=y=z=0$   
para as não básicas.

	u	y	z	m	v	a <sub>1</sub>	
a <sub>1</sub>	0	2	-4	-3	0	1	1 (1/2)
u	1	-1	1	1	0	0	1 (-)
v	0	3	0	-2	1	0	5 (5/3)
min a <sub>1</sub>	0	-2	4	3	0	0	-1

	u	y	z	m	v	a <sub>1</sub>	
(1) y	0	1	-2	-3/2	0	1/2	1/2
(2) u	1	0	-1	-1/2	0	1/2	3/2
(3) v	0	0	6	5/2	1	-3/2	7/2
min a <sub>1</sub>	0	0	0	0	0	1	0
f. obj.	-5	+1	-1	+10	-7		0
5x(2)	5	0	-5	-5/2	0		15/2
-1x(1)	0	-1	2	3/2	0		-1/2
7x(3)	0	0	42	35/2	+7		49/2
	0	0	38	53/2	0		63/2
	(+)	(+)					

1ª Solução básica

$y = 1/2$

$u = 3/2$

$v = 7/2$

obedece a todas  
as restrições de  
igualdade

$25 + 3/2 =$

Ótimo da função  
objectivo

② Máx  $5u - y + z - 10m + 7v$

Problema n.º 2

$$3u - y - z = 4$$

$$u - y + z + m = 1$$

$$2u + y + 2z + v = 7$$

$$3u - y - z + a_1 = 4$$

$$u - y + z + m + a_2 = 1$$

$$2u + y + 2z + v + a_3 = 7$$

$$u, y, z, m, v \geq 0$$

	$u$	$y$	$z$	$m$	$v$	$a_1$	$a_2$	$a_3$	
$a_1$	3	-1	-1	0	0	1	0	0	4 ( $\frac{4}{3}$ )
$a_2$	①	-1	1	1	0	0	1	0	1 (1)
$a_3$	2	1	2	0	1	0	0	1	7 ( $\frac{7}{2}$ )
f.o.	-5	+1	-1	+10	-7	0	0	0	0
$\min a_1 + a_2 + a_3$	0	0	0	0	0	1	1	1	0
$-(1)-(2)-(3)$	-6	+1	-2	-1	-1	<u>0</u>	<u>0</u>	<u>0</u>	-12

	$u$	$y$	$z$	$m$	$v$	$a_1$	$a_2$	$a_3$	
$a_1$	0	②	-4	-3	0	1	-3	0	1 $\frac{1}{2}$
$u$	1	-1	1	1	0	0	1	0	1 (-)
$a_3$	0	3	0	-2	1	0	-2	1	5 ( $\frac{5}{4}$ )
$\min a_1 + a_2 + a_3$	0	-5	4	5	-1	0	6	0	-6

	u	y	z	u	v	a <sub>1</sub>	a <sub>2</sub>	a <sub>3</sub>		
y	0	1	-2	-3/2	0	1/2	-3/2	0	1/2	(-)
u	1	0	-1	-1/2	0	1/2	-1/2	0	3/2	(-)
a <sub>3</sub>	0	0	6	5/2	1	-3/2	5/2	1	7/2	(+)
min a <sub>1</sub> +a <sub>2</sub> +a <sub>3</sub>	0	0	-6	-5/2	-1	5/2	-3/2	0	-7/2	

$$-12 + 5 = -7$$

	u	y	z	u	v	a <sub>1</sub>	a <sub>2</sub>	a <sub>3</sub>		
(1) y	0	1	0	-14/6	1/3	*	*	*	10/6	$(\frac{10}{6} \times 3 = 5)$
(2) u	1	0	0	-1/12	1/6	*	*	*	25/12	$(\frac{25}{12} \times 6 = 12,5)$
(3) z	0	0	1	5/12	1/6	-1/4	5/12	1/6	7/12	$(\frac{7}{12} \times 6 = 3,5)$
min a <sub>1</sub> +a <sub>2</sub> +a <sub>3</sub>	0	0	0	0	0	1	1	1	0	
f. objetivo	-5	+1	-1	+10	-7				0	
5x(2)	+5	0	0	-5/12	5/6				125/12	
-1x(1)	0	-1	0	14/6	-1/3				-10/6	
1x(3)	0	0	+1	5/12	1/6				7/12	
	<u>0</u>	<u>0</u>	<u>0</u>	+74/6	-19/3				112/12	



	u	y	z	u	v	
y	0	1	-2	-3/2	0	1/2
u	1	0	-1	-1/2	0	3/2
v	0	0	6	5/2	1	7/2
	<u>0</u>	<u>0</u>	38	?	<u>0</u>	63/2

← ótimo de função objetivo

③ Min  $-u + 2y$

$$5u - 2y \leq 3$$

$$u + y \leq 1$$

$$-3u + y \leq 3$$

$$-3u - 3y \leq 2$$

$$u, y \geq 0$$

Min  $-u + 2y$

$$5u - 2y + u_1 = 3$$

$$u + y + u_2 = 1$$

$$-3u + y + u_3 = 3$$

$$-3u - 3y + u_4 = 2$$

	$u$	$y$	$u_1$	$u_2$	$u_3$	$u_4$	
$u_1$	5	-2	1	0	0	0	3 $(\frac{3}{5})$
$u_2$	1	1	0	1	0	0	1 $(1)$
$u_3$	-3	1	0	0	1	0	3 $(-)$
$u_4$	-3	-3	0	0	0	1	2 $(-)$
	-1	+2	0	0	0	0	0

	$u$	$y$	$u_1$	$u_2$	$u_3$	$u_4$	
$u$	1	$-\frac{2}{5}$	$\frac{1}{5}$	0	0	0	$\frac{3}{5}$
$u_2$	0	$\frac{7}{5}$	$-\frac{1}{5}$	1	0	0	$\frac{2}{5}$
$u_3$	0	$-\frac{1}{5}$	$\frac{3}{5}$	0	1	0	$\frac{24}{5}$
$u_4$	0	$-\frac{21}{5}$	$\frac{3}{5}$	0	0	1	$\frac{19}{5}$
	0	$\frac{8}{5}$	$\frac{1}{5}$	0	0	0	$\frac{3}{5}$

O ponto óptimo que minimiza a função ocorre para  $u = \frac{3}{5}$ ,  $y = 0$

O valor do óptimo  $z = -\frac{3}{5} + 2 \times 0 = -\frac{3}{5}$

De notar que no cálculo do mínimo, o valor do óptimo aparece com sinal trocado.