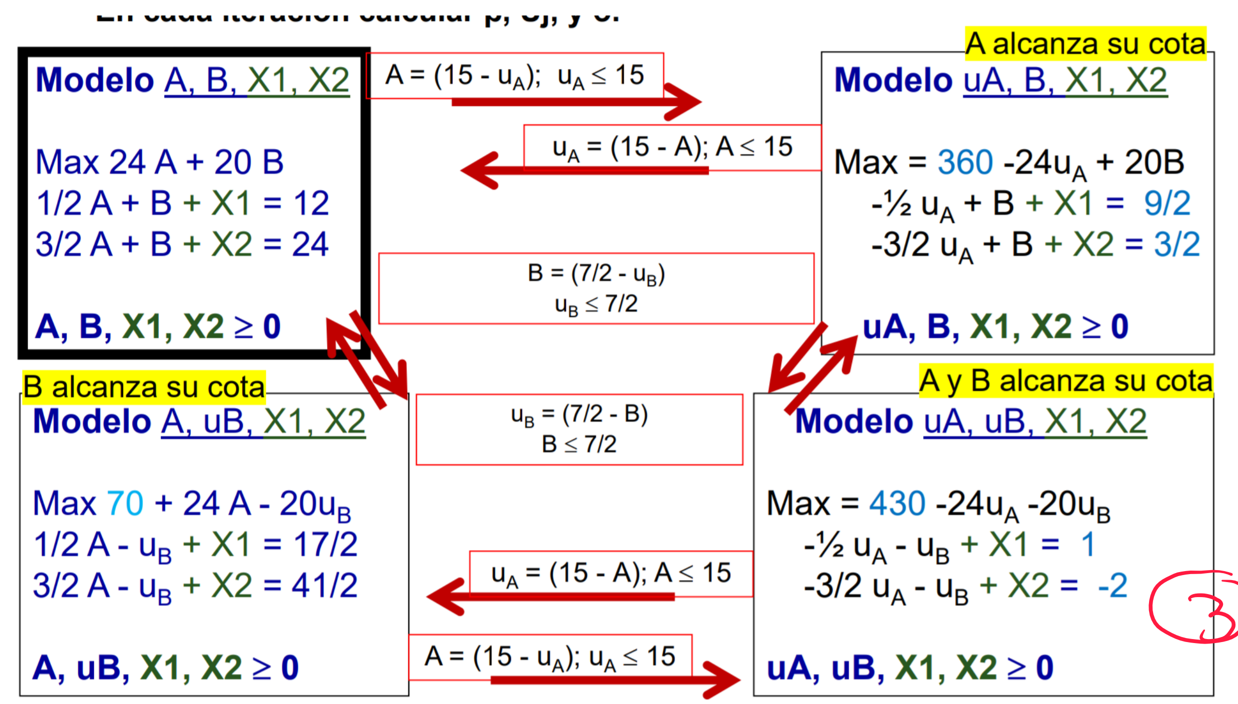
$u_A = 15$
$u_B = 7/2$

$A = \begin{pmatrix} 1/2 & 1 & 1 & 0 \\ 3/2 & 1 & 0 & 1 \end{pmatrix}$
$b = \begin{pmatrix} 12 \\ 24 \end{pmatrix}$

$A = \begin{pmatrix} -1/2 & 1 & 1 & 0 \\ -3/2 & 1 & 0 & 1 \end{pmatrix}$
$b = \begin{pmatrix} 9/2 \\ 3/2 \end{pmatrix}$



① **Modelo** A, B, X1, X2

Max 24 A + 20 B
1/2 A + B + X1 = 12
3/2 A + B + X2 = 24

A, B, X1, X2 ≥ 0

A = (15 - u_A); u_A ≤ 15

u_A = (15 - A); A ≤ 15

② A alcanza su cota

Modelo uA, B, X1, X2

Max = 360 -24u_A + 20B
-½ u_A + B + X1 = 9/2
-3/2 u_A + B + X2 = 3/2

uA, B, X1, X2 ≥ 0

B = (7/2 - u_B)
u_B ≤ 7/2

u_B = (7/2 - B)
B ≤ 7/2

④ B alcanza su cota

Modelo A, uB, X1, X2

Max 70 + 24 A - 20u_B
1/2 A - u_B + X1 = 17/2
3/2 A - u_B + X2 = 41/2

A, uB, X1, X2 ≥ 0

u_A = (15 - A); A ≤ 15

A = (15 - u_A); u_A ≤ 15

③ A y B alcanza su cota

Modelo uA, uB, X1, X2

Max = 430 -24u_A -20u_B
-½ u_A - u_B + X1 = 1
-3/2 u_A - u_B + X2 = -2

uA, uB, X1, X2 ≥ 0

$A = \begin{pmatrix} 1/2 & -1 & 1 & 0 \\ 3/2 & -1 & 0 & 1 \end{pmatrix}$
$b = \begin{pmatrix} 17/2 \\ 41/2 \end{pmatrix}$

$A = \begin{pmatrix} -1/2 & -1 & 1 & 0 \\ -3/2 & -1 & 0 & 1 \end{pmatrix}$
$b = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$

$Y_j = B^{-1} a_j$

V.B	B^{-1}		X_B	Y_A	X_B/Y_A
x_1	1	0	12	1/2	24
x_2	0	1	24	3/2	16
$c_B^t B^{-1}$	0	0	0		

$c_A - z_A = 24 - (0\ 0)\begin{pmatrix} 1/2 \\ 3/2 \end{pmatrix} = 24$

$c_B - z_B = 20 - 0 = 20$

$\left.\begin{aligned} \beta &\to 16 \\ u_A &\to 15 \\ \delta &\to \infty \end{aligned}\right\} u_A$

Cambio a modelo ②

$\left.\begin{aligned} \beta &= 3/2 \\ u_B &= 7/2 \\ \delta &= \infty \end{aligned}\right\} 3/2 = \beta$

$c_{u_A} - z_{u_A} = -24 - 0 = -24$

$c_B - z_B = 20 - 0 = 20$

V.B	B^{-1}		X_B	Y_B	X_B/Y_B
x_1	1	0	9/2	1	9/2
x_2	0	1	3/2	1	3/2
$c_B^t B^{-1}$	0	0	360		

$X_B = B^{-1} b = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} 9/2 \\ 3/2 \end{pmatrix} = \begin{pmatrix} 9/2 \\ 3/2 \end{pmatrix}$

$Y_B = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

$B_a^{-1} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \begin{matrix} ① \\ ② \end{matrix}$

②' = ②/1 = ② = (0 1)
①' = ① − 1·②' = (1 −1)

$B^{-1} = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix}$

$c_B^t = (0\ 20)$

$c_B^t B^{-1} = (0\ 20)$

$X_B = B^{-1} \cdot b = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} 9/2 \\ 3/2 \end{pmatrix} = \begin{pmatrix} 6/2 \\ 3/2 \end{pmatrix}$

$Z = c_B^t X_B = (0\ 20)\begin{pmatrix} 6/2 \\ 3/2 \end{pmatrix} = 30 + 360 = 390$

V.B	B^{-1}		X_B	Y_{u_A}	X_B/Y_{u_A}
x_1	1	−1	6/2	1	6/2
B	0	1	3/2	−3/2	−
$c_B^t B^{-1}$	0	20	390		

$\left.\begin{aligned} \beta &= 6/2 = 3 \\ u_{u_A} &= 15 \\ \delta &= \frac{3/2 - 7/2}{(-3/2)} = \frac{-4/2}{-3/2} = 4/3 \end{aligned}\right\} \delta = 4/3$

$c_{u_A} - z_{u_A} = -24 - (0\ 20)\begin{pmatrix} -1/2 \\ -3/2 \end{pmatrix} = 6$

$c_{x_2} - z_{x_2} = 0 - (0\ 20)\begin{pmatrix} 0 \\ 1 \end{pmatrix} = -20$

$Y_{u_A} = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} -1/2 \\ -3/2 \end{pmatrix} = \begin{pmatrix} 1 \\ -3/2 \end{pmatrix}$

Cambio de modelo y base

③

$Y_{u_A} \begin{pmatrix} 1 \\ -3/2 \end{pmatrix}$

$B_a^{-1} = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix} \begin{matrix} ① \\ ② \end{matrix}$

②' = ②/(−3/2) = (0 −2/3)
①' = ① − 1·②' = (1 −1/3)

$B^{-1} = \begin{pmatrix} 1 & -1/3 \\ 0 & -2/3 \end{pmatrix}$

$c_B^t = (0\ 24)$

$c_B^t B^{-1} = (0\ -24)\begin{pmatrix} 1 & -1/3 \\ 0 & -2/3 \end{pmatrix} = (0\ 16)$

$X_B = B^{-1} b = \begin{pmatrix} 1 & -1/3 \\ 0 & -2/3 \end{pmatrix}\begin{pmatrix} 1 \\ -2 \end{pmatrix} = \begin{pmatrix} 5/3 \\ 4/3 \end{pmatrix}$

$Z = 430 + (0\ -24)\begin{pmatrix} 5/3 \\ 4/3 \end{pmatrix} = 398$

$c_{u_B} - z_{u_B} = -4$

$c_{x_2} - z_{x_2} = 0 - (0\ 16)\begin{pmatrix} 0 \\ 1 \end{pmatrix} = -16$

V.B	B^{-1}		X_B
x_1	1	−1/3	5/3
u_A	0	−2/3	4/3
$c_B^t B^{-1}$	0	16	398

→ Deshacer cambios