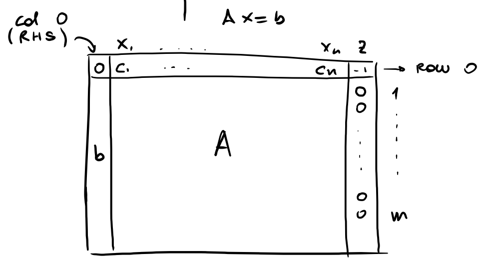
Tableau format

$$x_B = B^{-1}b - B^{-1}F x_F$$

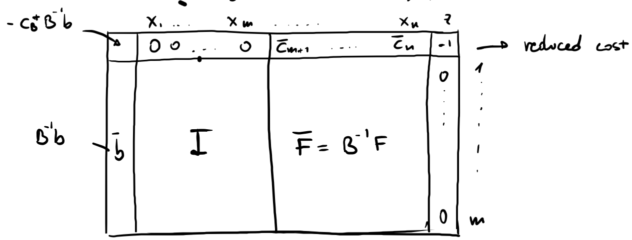
$$z = c_B^T B^{-1} b + 0^T x_B + (c_F^T - c_B^T B^{-1} F)\, x_F$$

Original system $\left\{ \begin{array}{l} \min\ c^T x = z \\ Ax = b \end{array} \right.$ $\Rightarrow$ $c^T x - z = 0 \rightarrow$ RHS

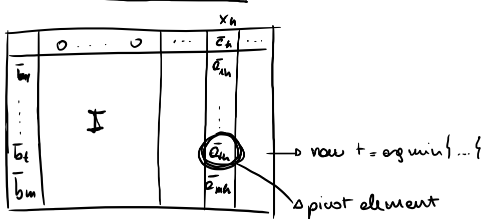


Canonical Tableau $\quad B^{-1}b = I x_B + B^{-1}F x_F$

$$-c_B^T B^{-1} b = 0^T x_B + (c_F^T - c_B^T B^{-1} F) x_F - z$$



At each iteration $\bar b \geq 0$



I want to turn $\bar a_{1h} \dots \bar a_{mh}$ to $(0 0 0 \dots 1 \dots 0 0 0)$ ↳ h

ES)

$$\begin{cases} \min\ t = -x_1 - x_2 \\ 6x_1 + 4x_2 + x_3 = 24 \\ 3x_1 - 2x_2 + x_4 = 6 \\ x_{1,2,3,4} \geq 0 \end{cases} \Rightarrow$$

0	-1	-1	0	0	-1
24	6	4	1	0	0
6	3	-2	0	1	0

already a canonical tableaux

		x_1	x_2	x_3	x_4	
$-z =$	0	-1	-1	0	0	-1
$x_3 =$	24	6	4	1	0	0
$x_4 =$	6	3	-2	0	1	0

Bfs = $x_1, x_2 = 0 \Rightarrow x_3 = 24$

$x_4 = 6$

$\bar{c}_1 = \bar{c}_2 = -1 \Rightarrow$ I choose : x_1 enters the basis

$$\vartheta_1 = \frac{24}{6} = 4 \qquad \vartheta_2 = 2$$

$$t = \text{argmin} \{ \vartheta_1, \vartheta_2 \} = 2$$

$x_{\beta[2]}$ leaves the basis

↳ x_4

combination of the rows to get the values of the variable entering the basis right.

		(B)	(N)	(B)	(N)	
		x_1	x_2	x_3	x_4	
$-z =$	2	0	-5/3	0	1/3	-1
$x_3 =$	12	0	8	1	-2	0
$x_1 =$	2	1	-2/3	0	1/3	0

→ last column can be forgotten since it's always [-1, 0, 0 ... 0]

↳ lin. comb. of rows to get 1 on the variable entering the basis (x_1)

new row 0 = previous row 0 + α (new pivot row)

↳ chosen s.t. $\bar{c}_i$ corresponding to the variable entering the basis is 0. ($\bar{c}_1$ in this case)

$\bar{c}_2$ is < 0 $\Rightarrow$ opt. test failed (search a new basis)

ETC .....

Choice of the entering var x_h | $\bar{c}_h < 0$

1) Take the first h | $\bar{c}_h < 0$ $\rightarrow$ $O(n)$

2) Take h | $h = \arg\max \{ |\bar{c}_i| \mid c_i < 0 \}$ $\rightarrow$ $O(n)$

3) Take h | $h = \arg\max \{ |\bar{c}_i| \vartheta_i \mid \bar{c}_i < 0 \}$ $\rightarrow$ $O(nm)$

4) Random choice $\rightarrow$ $O(1)$