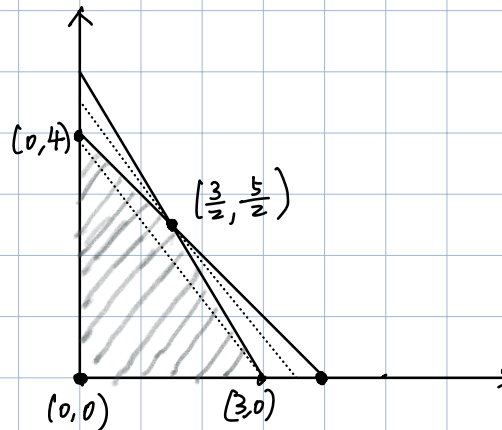


$$\text{Maximize } z = 4x + 3y$$

$$\text{Subject to } \begin{aligned} x + y &\leq 4 \\ 5x + 3y &\leq 15 \\ x \geq 0, y &\geq 0 \end{aligned}$$

$$\text{Canonical form: } \begin{aligned} x + y + u &= 4 \\ 5x + 3y + v &= 15 \\ (x, y, u, v) &\geq 0 \end{aligned}$$



$$A = \begin{pmatrix} 1 & 1 & 0 & 0 \\ 5 & 3 & 0 & 1 \end{pmatrix} \quad b = \begin{pmatrix} 4 \\ 15 \end{pmatrix} \quad Ax = b \quad z = 4x + 3y$$

$$\begin{aligned} &\downarrow \\ z - 4x - 3y &= 0 \\ &+ 0u + 0v \end{aligned}$$

Initial Tableau

	x	y	u	v	
u	1	1	1	0	4
v	5	3	0	1	15
objective row	-4	-3	0	0	0

$$\Leftrightarrow (x, y, u, v) = (0, 0, 4, 15)$$

$$\Leftrightarrow \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} u \\ v \end{pmatrix} = \begin{pmatrix} 4 \\ 15 \end{pmatrix} \Rightarrow \begin{cases} \text{non-base } x, y \\ \text{base } u, v \end{cases}$$

$$z = 4x + 3y$$

$$\begin{aligned} x + y + u &= 4 \Rightarrow x = 4 - u \leq 4 \\ 5x + 3y + v &= 15 \Rightarrow x = \frac{15 - v}{5} = 3 - \frac{v}{5} \leq 3 \end{aligned} \Rightarrow x \leq 3$$

$$\begin{aligned} \theta\text{-ratio of } u &: \frac{4}{1} = 4 \\ v &: \frac{15}{5} = 3 \end{aligned}$$

Pivoting
row

$y \uparrow$



$$1 \cdot x + \frac{3}{5}y + 0 \cdot u + \frac{1}{5}v = 3$$

objective row $\rightarrow$



$$\frac{5}{2}x - \frac{1}{5})$$

 $\leftarrow u$

x

$$u\text{-row} \times \frac{3}{5} + obj.\text{-row}$$

$$\bar{z} = \frac{27}{2} = 4 \cdot \frac{3}{2} + 3 \cdot \frac{5}{2}$$

$$\frac{8-3}{10} \quad 12 + \frac{3}{2}$$

0 - 3