

Step-1

Consider the following problem:

Minimize cost: $x_1 + x_2 - x_3$

Subject to:

$$2x_1 - 4x_2 + x_3 + x_4 = 4$$

$$3x_1 + 5x_2 + x_3 + x_5 = 2$$

Determine which x_1 will enter the basis and which x_1 will leave. Compute new pair of basic variables and cost at new corner.

Step-2

Start from the corner, $x_4 = 4$ and $x_5 = 2$ are basic variables. At that corner x_1, x_2, x_3 will be zero. Entering variable will be x_3 as it has negative cost coefficient. As x_3 will enter x_4 or x_5 must leave.

In first equation when $x_3 + x_4 = 4$, x_4 can get maximum value 4 and in second equation when $x_3 + x_5 = 2$, x_5 can get value 2. So choose minimum value, this means that x_5 will be the leaving variable.

Step-3

So, the new corner is:

$$x = (0, 0, 2, 4, 0)$$

New cost at the corner:

$$\begin{aligned} x_1 + x_2 - x_3 &= 0 + 0 - 2 \\ &= -2 \end{aligned}$$

New basic variables will be x_3, x_4 .

Step-4

Therefore, following is observed:

Entering variable is x_3 , leaving variable is x_5 , cost is -2, and new basic variables are x_3, x_4 .