

1.

Minimize $z(x) = x_1 + x_2 + x_3 + 2x_4 + 2x_5 + 2x_6 + 4x_7$
 Subject to $x_1 + x_2 + 2x_4 + x_5 + x_7 = 16$
 $x_2 + x_3 + x_4 + 2x_5 + 5x_7 = 19$
 $x_1 + x_3 + x_4 + x_5 + 2x_6 + 2x_7 = 13$
 $x_j \geq 0$ for all j

Exercises

3.24 For the LP given at the top $x = (1, 2, 3, 4, 5, 0, 0)^T$ is known to be an optimum feasible solution. Obtain an optimum BFS from it.

2.

3.51 For the following system, is $(4, 9, 0, 3, 0, 0)^T$ an extreme point? Why? If not, is it on an edge? If it is, is the edge bounded or unbounded?

$$\begin{aligned} x_1 + x_2 - 3x_4 + 3x_5 + x_6 &= 4 \\ x_1 + 2x_2 - 5x_4 + 5x_5 + 3x_6 &= 7 \\ -x_2 + x_3 + 2x_4 - 5x_5 + x_6 &= -3 \\ x_j &\geq 0 \text{ for all } j \end{aligned}$$

If it is on an edge, Write the formula for that edge.

3.

$$\begin{aligned} x_1 - x_2 + x_3 - x_4 + x_5 + x_6 &= -3 \\ x_2 - 2x_3 + 3x_4 + x_5 + 2x_6 &\geq 20 \\ x_1 - x_3 + 2x_4 + 2x_5 + 3x_6 &\leq 17 \\ 2x_1 + 2x_4 - x_5 &\leq 26 \\ 3x_1 + 2x_2 - x_3 + 6x_4 + x_5 + 3x_6 &\geq 50 \\ x_1 + x_4 &= 12 \\ x_j &\geq 0 \text{ for all } j \end{aligned}$$

Check whether

$\bar{x} = (5, 3, 2, 7, 0, 0)$ is a BFS.