

## ASSIGNMENT 16

### SIMPLEX METHOD

-----S. Phull

1. Maximize  $p = 20x_1 + 24x_2$  subject to the constraints

$$x_1 + 2x_2 \leq 20$$

$$2x_1 + x_2 \leq 16$$

$$x_1, x_2 \geq 0$$

2. Maximize  $p = 4x_1 - 6x_2 + 5x_3$  subject to the constraints

$$-x_1 + x_2 \leq 1$$

$$x_2 + 2x_3 \leq 4$$

$$2x_1 + x_3 \leq 6$$

$$2x_2 + x_3 \leq 1$$

$$x_1, x_2, x_3 \geq 0.$$

3. Maximize  $p = 2x_1 - x_2 + x_3$  subject to the constraints

$$-x_1 + 5x_2 - 2x_3 \leq 10$$

$$2x_1 + x_2 - x_3 \leq 5$$

$$x_1 - x_2 + 2x_3 \leq 4$$

$$x_1, x_2, x_3 \geq 0.$$

4. Maximize  $p = 2x_1 + x_2 + 3x_3$  subject to the constraints

$$2x_1 - x_2 + x_3 \leq 6$$

$$x_1 + 3x_3 \leq 9$$

$$2x_1 + 2x_2 + x_3 \leq 12$$

$$x_1, x_2, x_3 \geq 0.$$

5. Maximize  $p = 8x_1 + 9x_2 + 4x_3$  subject to the constraints

$$x_1 + x_2 + 2x_3 \leq 2$$

$$2x_1 + 3x_2 + 4x_3 \leq 3$$

$$7x_1 + 6x_2 + 2x_3 \leq 8$$

$$x_1, x_2, x_3 \geq 0$$

6. Maximize  $p = 2x_1 + x_2 + 6x_3 + x_4$  subject to the constraints

$$x_1 + 3x_2 + x_3 + x_4 \leq 4$$

$$x_1 + x_3 + 2x_4 \leq 5$$

$$x_2 + x_3 \leq 2$$

$$x_1, x_2, x_3, x_4 \geq 0.$$

7. Maximize  $p = x_1 + 2x_2 + 3x_3 + x_4$  subject to the constraints

$$2x_1 - x_3 \leq 4$$

$$x_2 + x_3 + x_4 \leq 8$$

$$-x_1 + 2x_2 - x_4 \leq 2$$

$$x_1, x_2, x_3, x_4 \geq 0.$$

8. Maximize  $p = x_1 + 2x_2 + x_3 + 5x_4$  subject to the constraints

$$x_1 + x_3 + x_4 \leq 50$$

$$3x_1 + x_2 + 2x_3 + x_4 \leq 100$$

$$x_1, x_2, x_3, x_4 \geq 0.$$

9. Maximize  $p = x_1 + 2x_2 + 4x_3 + 5x_4$  subject to the constraints

$$x_1 + x_2 + x_4 \leq 44$$

$$2x_1 + x_2 + 2x_3 + 5x_4 \leq 200$$

$$x_1 + x_3 \leq 50$$

$$x_1, x_2, x_3, x_4 \geq 0.$$

10. Maximize  $p = x_1 + 2x_2 + 3x_3 + x_4$  subject to the constraints

$$2x_1 + x_2 + x_3 \leq 18$$

$$3x_1 + x_2 + 2x_3 + 3x_4 \leq 36$$

$$x_1 + x_3 \leq 12$$

$$x_1, x_2, x_3, x_4 \geq 0.$$

## ASSIGNMENT 17

### DUAL PROBLEMS

-----S. Phull

1. Minimize  $C = x_1 + x_2 + 2x_3$  subject to the constraints

$$\begin{aligned} x_1 + 2x_2 + x_3 &\geq 16 \\ 2x_1 + x_2 + x_3 &\geq 10 \\ x_1 + x_3 &\geq 2 \end{aligned} \quad x_1, x_2, x_3 \geq 0$$

2. Minimize  $C = 3x_1 + 5x_2 + 2x_3$  subject to the constraints

$$\begin{aligned} x_1 + x_2 + 3x_3 &\geq 4 \\ x_1 + x_2 &\geq 2 \\ x_1 + x_2 + x_3 &\geq 6 \end{aligned} \quad x_1, x_2, x_3 \geq 0$$

3. Minimize  $C = 2x_1 + x_2 + 3x_3$  subject to the constraints

$$\begin{aligned} x_1 + x_2 + x_3 &\geq 100 \\ 2x_1 + x_2 &\geq 50 \end{aligned} \quad x_1, x_2, x_3 \geq 0$$

4. Minimize  $C = x_1 + x_2 + 4x_3$  subject to the constraints

$$\begin{aligned} -x_1 - x_2 + x_3 &\geq 2 \\ -x_1 + x_2 + 2x_3 &\geq 1 \end{aligned} \quad x_1, x_2, x_3 \geq 0$$

5. Minimize  $C = 2x_1 + 3x_2 + x_3 + x_4$  subject to the constraints

$$\begin{aligned} x_1 + 4x_2 - x_3 + 2x_4 &\geq 10 \\ 2x_1 + 2x_2 + 2x_3 - x_4 &\geq 30 \\ x_1 + x_2 + x_3 - 3x_4 &\geq 8 \end{aligned} \quad x_1, x_2, x_3, x_4 \geq 0.$$

6. Minimize  $C = 4x_1 + 6x_2 + 5x_3 + 3x_4$  Subject to the constraints

$$\begin{aligned} x_1 + x_2 + x_4 &\geq 3 \\ x_1 + 2x_2 + 2x_3 &\geq 4 \end{aligned}$$

$$x_1, x_2, x_3, x_4 \geq 0.$$