بنام خدا

Problem set 4

1. Answer True or False.

- A convex programming problem always has a unique global minimum point.
- If the Hessian of the Lagrange function at x*, −2L(x*), is positive definite, the optimum design problem is convex.
- For a constrained problem, the sufficient condition at x* is satisfied if there are no feasible directions in a neighborhood of x* along which the cost function reduces.

2. Solve the following LP problems by the Simplex method.

$$z = 2x_1 + 5x_2 - 4.5x_3 + 1.5x_4$$
$$5x_1 + 3x_2 + 1.5x_3 \le 8$$
$$1.8x_1 - 6x_2 + 4x_3 + x_4 \ge 3$$
$$-3.6x_1 + 8.2x_2 + 7.5x_3 + 5x_4 = 15$$
$$x_i \ge 0;\ i = 1 \text{ to } 4$$

3. Solve the “saw mill” problem formulated in Section 2.4. Investigate the effect on the optimum solution of the following changes:

1. The transportation cost for the logs increases to $0.16 per kilometer per log.
2. The capacity of Mill A decreases to 200 logs/day.
3. The capacity of Mill B decreases to 270 logs/day.

(Optional) 4. Obtain solutions for the three formulations of the “cabinet design” problem given in Section 2.6. Compare the three formulations. Investigate the effect on the optimum solution of the following changes:

1. Bolting capacity is decreased to 5500/day.
2. The cost of riveting the Cl component increases to $0.70.
3. The company must manufacture only 95 devices per day.

Hint: *It will be the best if you try to prepare a MATLAB code to solve all of problems.*

"Research is to see what everybody else has seen, and to think what nobody else has thought."
Albert Szent-Gyoergi