

1. Problem 5.1 in Ignizio and Cavalier, parts (a) and (c) only.

(a) Label all extreme points and give their exact coordinates.

(c) At each iteration, indicate the reduced costs as well as the entering and leaving variables. Also give the basic feasible solution $\mathbf{x} = (x_1, \dots, x_5)$, the objective function value, and the corresponding geometric extreme point in part (a). You should carry out your calculations using the B^{-1} matrix, updated at each iteration.

2. Problem 5.3 in Ignizio and Cavalier.

(a) Rather than solving the problem stepwise from the beginning, just verify in a *direct* manner that $\mathbf{x} = (10, 0, 16, 6, 0, 0, 0)$ is an optimal solution. Do *not* compute inverses of matrices. Instead, solve systems of linear equations.

(b) Is the optimal solution unique? Why or why not?

3. Problem 5.11 in Ignizio and Cavalier, parts (a), (b), and (c).

Note: the bounds on x_2 should be $-5 \leq x_2 \leq 4$.

(a) Label all extreme points and give their exact coordinates.

(b) Instead of specifying the “working-basis matrix,” just identify the basic variables.

(c) Carry out each iteration by solving systems of linear equations, rather than computing inverses or using the simplex tableau. Use the normal rule (greatest violation of reduced cost conditions) to decide on which variable enters at each step.

(d) List the sequence of extreme points in part (a) that are visited in carrying out the iterations of step (c).