FA 1 Part II
2/24/2025

20 Points Possible

Attempt 1

In Progress
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Details

Consider the following LP:

$$\text{Maximize } z = 16x_1 + 15x_2$$

subject to

$$\begin{aligned} 40x_1 + 31x_2 &\le 124 \\ -x_1 + x_2 &\le 1 \\ x_1 &\le 3 \\ x_1, x_2 &\ge 0 \end{aligned}$$

(a) Solve the problem by the simplex method, where the entering variable is the nonbasic variable with the *most* negative z-row coefficient.

(b) Resolve the problem by the simplex algorithm, always selecting the entering variable as the nonbasic variable with the *least* negative z-row coefficient.

(c) Compare the number of iterations in (a) and (b). Does the selection of the entering variable as the nonbasic variable with the *most* negative z-row coefficient lead to a smaller number of iterations? What conclusion can be made regarding the optimality condition?

(d) Suppose that the sense of optimization is changed to minimization by multiplying z by -1. How does this change affect the simplex iterations?

Solve the dual of the following problem, and then find its optimal solution from the solution of the dual. Does the solution of the dual offer computational advantages over solving the primal directly?

$$\text{Minimize } z = 50x_1 + 60x_2 + 30x_3$$

subject to

$$\begin{aligned}
5x_1 + 5x_2 + 3x_3 &\geq 50 \\
x_1 + x_2 - x_3 &\geq 20 \\
7x_1 + 6x_2 - 9x_3 &\geq 30 \\
5x_1 + 5x_2 + 5x_3 &\geq 35 \\
2x_1 + 4x_2 - 15x_3 &\geq 10 \\
12x_1 + 10x_2 &\geq 90 \\
x_2 - 10x_3 &\geq 20 \\
x_1, x_2, x_3 &\geq 0
\end{aligned}$$

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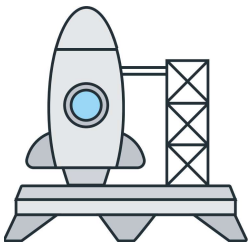

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