

Search Problems and Algorithms

Tutorial 9, 7 April

Problems

1. Solve the linear relaxation of the following integer program using the geometric view where the optimal value is found in a “corner point” of the polytope defined by the inequations.

$$\begin{aligned} \min & -x_1 - x_2 \quad \text{s.t.} \\ & 2x_1 + 5x_2 \leq 16 \\ & 6x_1 + 5x_2 \leq 30 \\ & x_1 \geq 0 \\ & x_2 \geq 0 \\ & x_1, x_2 \text{ integers} \end{aligned}$$

2. Solve the problem above by the branch and bound algorithm using linear relaxation. Select always x_1 as the branching variable when both x_1 and x_2 are fractional.
3. Give the following linear program in the standard form in a Simplex tableau in the diagonalized form corresponding to a basic feasible solution.

$$\begin{aligned} \min & -5x_1 - 4x_2 \quad \text{s.t.} \\ & 6x_1 + 4x_2 \leq 24 \\ & x_1 + 2x_2 \leq 6 \\ & x_1 - x_2 \geq -1 \\ & x_2 \leq 2 \\ & x_1 \geq 0 \\ & x_2 \geq 0 \end{aligned}$$

4. Solve the problem above using the Simplex algorithm.