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Math170: Mathematical Methods for Optimization Term Project

Consider the following linear program (LP)

$$\begin{aligned} \min_x \ & c^T x \\ \textbf{s.t.} \ & Ax = b \\ & l \le x \le u \end{aligned}$$

Derive the dual and optimality conditions for this LP. Write a program to solve this linear program using the Simplex Algorithm. You should derive a revised Simplex Tableau that is taylored to the special form of the linear program at hand. Your program should do the following:

1. State whether the equality constraints are consistent, and if so whether any unnecessary constraints are removed.

2. State primal feasibility. If feasible, provide a basic feasible solution. If infeasible, provide the optimal solutions for Phase I linear program.

3. If linear program is feasible, provide the optimal solutions for both the primal and dual if they exist. Also verify whether the optimal solutions do satisfy all the constraints.

This is an assignment worth 20 points in the final numerical score. Due Dec. 1, 2010.