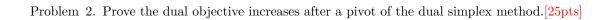
Numerical Optimization, 2023 Fall Homework 3

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Due 23:59 (CST), Nov. 16, 2023

Problem 1. Prove the dual of the dual of a linear programming (standard form) is itself. [25pts]

So above all, the dual of the dual of a linear programming (standard form) is itself.



Problem 3. Let $L(x, \lambda)$ be the Lagrangian of a linear programming problem, and (x^*, λ^*) be the optimal primal-dual solution. Prove that

$$L(\boldsymbol{x}, \boldsymbol{\lambda}^*) \ge L(\boldsymbol{x}^*, \boldsymbol{\lambda}^*) \ge L(\boldsymbol{x}^*, \boldsymbol{\lambda}),$$

for any primal feasible \boldsymbol{x} and dual feasible $\boldsymbol{\lambda}.[25 \mathrm{pts}]$

