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Advanced Algorithms
WS 2019/20
Homework 10
11.12.2019

Exercise 1:

Show that the dual linear program of a primal linear program in canonical form is a linear program in canonical form as well.

Exercise 2:

A system of linear inequalities $Ax \leq b$ is called *inconsistent* if there is a y with $y^T A = 0$, $y^T b < 0$ and $y \geq 0$. Show that the system $Ax \leq b$ has no solution iff the system is inconsistent.

Exercise 3:

Consider the criterion in Theorem 3.5 of the lecture. Is this criterion necessary? Prove its necessity or give a counterexample.

Exercise 4:

Let be given a primal-dual pair of linear programs. Prove the following assertion: If the primal linear program has a degenerate optimal solution then the dual linear program has more than one optimal solutions.