ORF524 - Problem Set 1

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Problem 1

Let's consider the following optimization problem

$$\begin{array}{ll} \min\limits_{x} & 0 \\ \text{subject to} & Ax \leq b \end{array}$$

and its dual

$$\begin{array}{ll} \max\limits_{y \geq 0} & -y^T b \\ \text{subject to} & y^T A = b \end{array}$$

By the duality theorem, both problems have the same optimal solution.

If 1. is feasible, then 0 is its optimal solution. If 2. is feasible, then the optimal value is negative. We conclude that the two systems cannot be feasible at the same time.

Problem 2