1 Examples

1. Exercise 4.27, from [1].

2. Exercise 4.34b), from [1].

3. [2]. Consider the following optimization problem

$$\begin{array}{l}
\max_x c'x \\
st \quad Ax \leq b \\
\quad y'x \leq f \quad \forall y \in P
\end{array} \tag{1}$$

where $P$ is the set

$$P = \{ y \in \mathbb{R}^n \mid My \leq g \}.$$ 

Here, $M$ is an $l \times n$ matrix and $g$ is an $l$-dimensional vector, and assume that $P \neq \emptyset$. Note that in addition to the usual $m$ constraints $Ax \leq b$, there are constraints of the form “$y'x \leq f$”, one for each vector $y \in P$. Unless $P$ is a singleton, (1) will potentially have an infinite number of constraints.

Transform the above formulation into a linear programming problem with a finite number of variables and constraints.

References
