Agenda

- 3, 6, 7 of the additional exercises

Logistics

- Midterm 2 Tues April 12
  - same terms as midterm 1

- No precept next week
- Last precept on integer optimization after

3) Let $A = A^T$

Consider $\min_x c^T x$

s.t. $Ax \geq c$

$x \geq 0$

Show that if x^* satisfies $Ax^* = c$, $x^* \geq 0$ then x^* is optimal

6) P is column-stochastic if

- $P \geq 0$
- $P^T \mathbb{1} = \mathbb{1}$ (i.e. $\sum_{i=1}^{n} P_{ij} = 1 \quad j = 1, \dots, n$)

6.1) Show that if P is column-stochastic then $(P^T x)_i \leq x_{max}$

6.2) Assume P is column-stochastic. Show using LP duality that $\exists\, y \in \mathbb{R}^n$ s.t. $Py = y,\ y \geq 0,\ \mathbb{1}^T y = 1$

7) Consider $\min_x \; -2x_1 - x_2$

$$\text{s.t. } x_1 - x_2 \le 2$$
$$x_1 + x_2 \le 6$$
$$x_1, x_2 \ge 0$$

7.1) Convert the problem into std form, construct a basic feasible solution where $(x_1, x_2) = (0,0)$

7.2) Carry out 1 iteration of simplex

$A_1 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$