

1. **LP duals of matrix games.** In lecture we derived these two linear programs that opposing players of a two-person, zero-sum matrix game would need to solve for their optimal strategies:

$$\begin{array}{llll} \underset{x, \lambda}{\text{maximize}} & \lambda & \text{and} & \underset{y, \nu}{\text{minimize}} \quad \nu \\ \text{subject to} & \lambda e \leq Ax & & \text{subject to} \quad \nu e \geq A^T y \\ & e^T x = 1, \ x \geq 0 & & e^T y = 1, \ y \geq 0 \end{array}$$

Show that these two problems are dual to each other.

2. **Rock, Paper, Scissors.**

- (a) Derive the payoff matrix for the game Rock, Paper, Scissors.
- (b) Numerically solve, using JuMP, each player's corresponding linear program. Verify that the solutions coincide with the obvious optimal strategy.