

Problem Set 5

Exercise 1. Two people select a policy that affects them both by alternately vetoing policies until only one remains. First person 1 vetoes a policy. If more than one policy remains, person 2 then vetoes a policy. If more than one policy still remains, person 1 then vetoes another policy. The process continues until only one policy has not been vetoed. Suppose there are three possible policies, X , Y , and Z , person 1 prefers X to Y to Z , and person 2 prefers Z to Y to X .

- a. Model this situation as an extensive form game.
- b. Find all the Nash equilibria of this game
- c. Find all subgame perfect equilibria of this game.

Exercise 2. An object that two people each value at v (a positive integer) is sold in an auction. In the auction, the people alternately have the opportunity to bid; a bid must be a positive integer greater than the previous bid. On her turn, a player may pass rather than bid, in which case the game ends and the other player receives the object; both players pay their last bids (if any). Each person's wealth is w , which exceeds v ; neither player may bid more than her wealth.

- a. Model this situation as an extensive form game.
- b. Find all subgame perfect equilibria of this game, for arbitrary values of v and w .

Exercise 3. A child's action a (a number) affects both her own private income $c(a)$ and her parent's income $p(a)$; for all values of a we have $c(a) < p(a)$. The child is selfish: she cares only about the amount of money she has. Her loving parent cares both about how much money she has and how much her child has. Specifically, her preferences are represented by a payoff equal to the smaller of the amount of money she has and the amount of money her child has. The parent may transfer money to the child. First the child takes an action, then the parent decides how much money to transfer.

- a. Model this situation as an extensive form game.
- b. Find all subgame perfect equilibria of this game, in terms of the functions c and p .