ECON 521, Discussion Section 10

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1. Suppose that you are attempting to buy a house and you are bargaining with the current owner over the sale price. The house is of value 1 to you and 0 to the current owner and this is common knowledge. Assume that bargaining takes place with alternating offers and that each stage of bargaining (an offer and a response) take a full day to complete. If agreement is not reached after ten days of bargaining, then the opportunity for the sale disappears (you will have no house and the current owner has to keep the house forever). Suppose that you and the current owner discount the future according to the discount factor δ per day. The real estate agent has allowed you to decide whether you will make the first offer – note that if you make the first offer, since there are ten days, your opponent will make the last offer. Assume that if an agent is indifferent between accepting an offer and not, he accepts. There exists a δ^* such that for all $\delta < \delta^*$, it is better for you (as the buyer) to go (first or second - you work it out) and for all $\delta > \delta^*$ it is better for you to go (first or second - opposite of the last one). Find δ^*.

   Hint: First, work out what offer will be made in the last round. Then use a backward induction argument. To do backward induction here, suppose the seller offers x in round t and the buyer is indifferent between accepting and not. Then, the trick is to find the y in round $t-1$ that makes the seller indifferent between accepting and holding out to offer x in round t. Then, do the same trick on the other side: suppose the buyer offers y in round t and the seller is indifferent between accepting and not. Find the x in round $t-1$ that makes the buyer indifferent between accepting and holding out to offer y in round t. Once you have these, you can iterate backwards from the last offer to calculate the SPE offers at each round.

2. (Selten's Horse) Find the NE, the SPE, and the sequential equilibria of Selten's Horse.