Section 7: Bargaining games

Econ C110 / PoliSci C135

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In this section, we will deal with bargaining games. These are applications of SPNE in extensive form games, so we've already covered all the necessary concepts.

1 Extensive form games and SPNE

Recall the following facts:

- A player's strategy specifies an action *at every node* in which he is called to play. In a bargaining game with continuous offers, the strategy has to specify a response to every possible offer!
- SPNE are equilibria in which strategies are NE in every subgame.
- For finite horizon games, we can use backwards induction to find SPNE.
- For infinite games, we have to apply the definition of SPNE.
  - In infinite bargaining games, think about the subgames...there are usually only 4 truly distinct subgames.

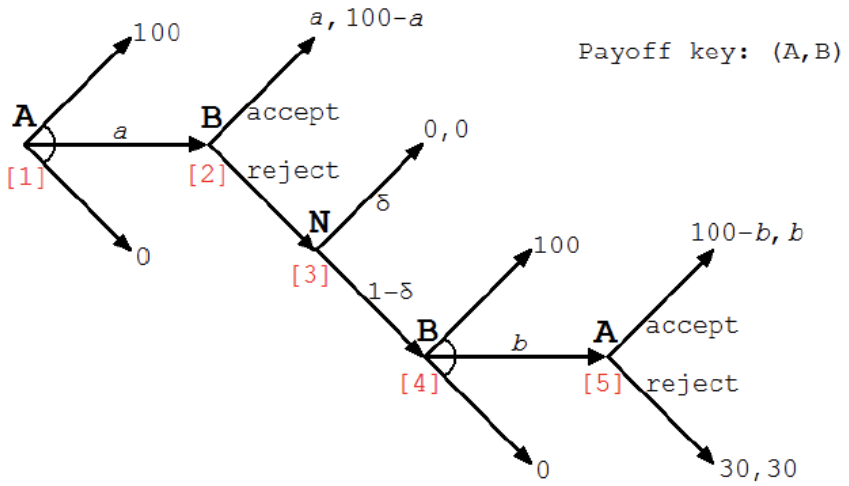
One-shot deviation principle. In infinitely repeated games (with some discount factor), a strategy profile is SPNE if and only if there are no profitable "one-shot deviations" for each subgame for every player. A one shot deviation is a change in the player's strategy in a single round, reverting to the original strategy afterwards.

2 Exercises

Exercise 1. Consider the following game.

- A and B are splitting a cake worth 100 utility.
- A proposes first; then B can accept or reject. If he rejects, there is δ chance that the cake is destroyed. (This is modeled by player **N**ature).

- If the cake survives, then B proposes; and A can accept or reject. If A rejects, then a lawyer splits the cake for them and takes 40% as a fee.



- Consider the subgame starting with B's proposal. What are potential offers b that can be NE? Find the SPNE of this subgame.
- Suppose $\delta = 0.1$ and the players have expected utility over the payoffs. Find the SPNE.

Exercise 2. (One-sided offers). Two players are splitting something worth 1 utility. Every round, player 1 makes an offer $(x, 1-x)$. Then player 2 either accepts or rejects the offer; if he rejects, then player 1 makes another offer, etc. After every round (player 1 offers, and player 2 responds) the payoff is discounted by $0 < \delta < 1$. (This models impatience; for example, if player 2 accepts an offer of $(0.5, 0.5)$ in the second round, the payoffs are $(0.5\delta, 0.5\delta)$). Find the SPNE.