



Recitations 20

[Definitions used today]

- SPE, Backward Induction, Behavioral Strategies, Linear Game, Perfect Recall

Question 1 [45 III.1 Spring 2007] majors

Consider extensive form games that are finite (that is, that have a finite set of nodes).

- Define an extensive form linear game.
- Prove that for any linear game, any player in the game, and any behavioral strategy of the player there is a mixed strategy of the same player that induces the same probability distribution on final nodes for any pure strategy of the other players.
- Give an example to show that in a linear game for a mixed strategy of the player there may be no behavioral strategy that induces the same distribution on final nodes for some pure strategy of the other players.

Question 2 [84 III.1 Spring 2009 majors]

An extensive form game (EFG) is said to be linear if every information set is crossed at most once by every history.

- Give an example of an EFG which is not linear.
- Give an example of EFG that is linear but not of perfect recall.
- Compare linear games and games with perfect recall. Is one of the two a subset of the other? Prove your answer.

Question 3

Find all SPE and NE of following game

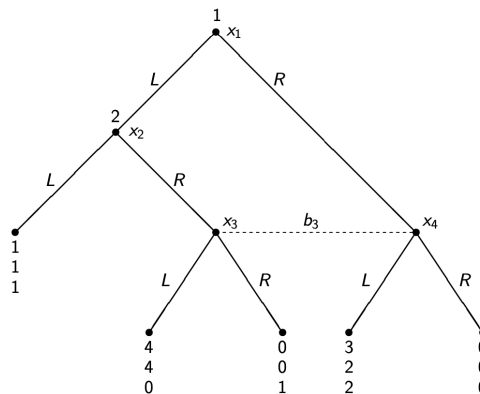


Figure 1

Question 4 [Final 2019]

- Prove that for any finite EFG of perfect information, there is a last move node, that is a move node x such that $IS(x) \subseteq Z$.
- Prove, or disprove by showing a counter-example to the statement: In any finite EFG of perfect recall, there is a last information set I^i for some player i , that is, an information set such that for any node $x \in I^i$, $IS(x) \subseteq Z$.