

Microeconomic Analyses of Old Indian Texts

Backward induction

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Part B. Game theory

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Noncooperative games
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Backward induction**
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Chapter VII: Backward induction

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Game tree and backward induction

Definition

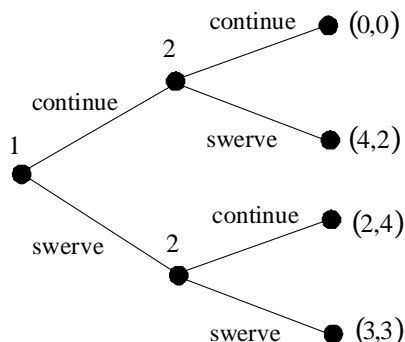
- so far: strategic or simultaneous-form games
- now: game tree
 - player 1 moves first
 - player 2 learns player 1's move and then moves himself

Game of chicken:

It is advantageous to move first?

Game tree and backward induction

Game of chicken I



Player 2 knows what player 1 has done.

Player 1 can predict the reaction of player 2

Problem

What is your prediction?

Game tree and backward induction

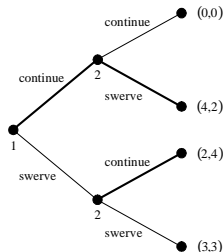
Game of chicken II

Problem

Find the backward-induction solution for the game of chicken!

Solution

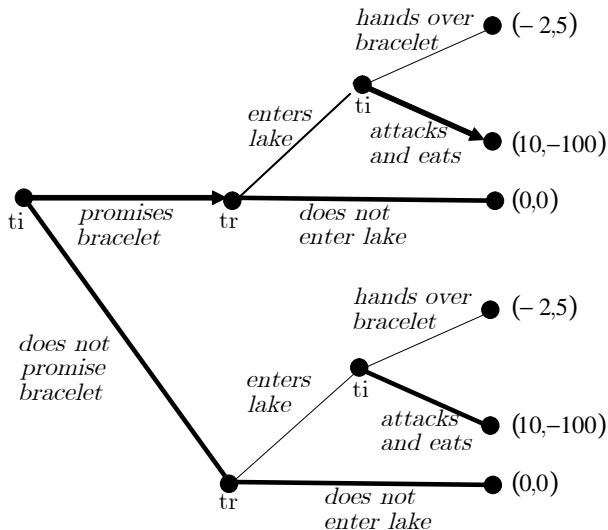
Driver 1 has a first-mover advantage in the game of chicken. He chooses "continue" so that driver 2 is forced to swerve.



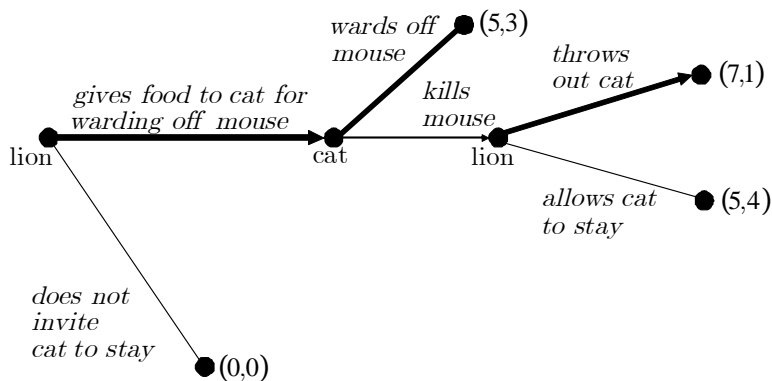
Problem

How about "matching pennies" or the "battle of the sexes"?

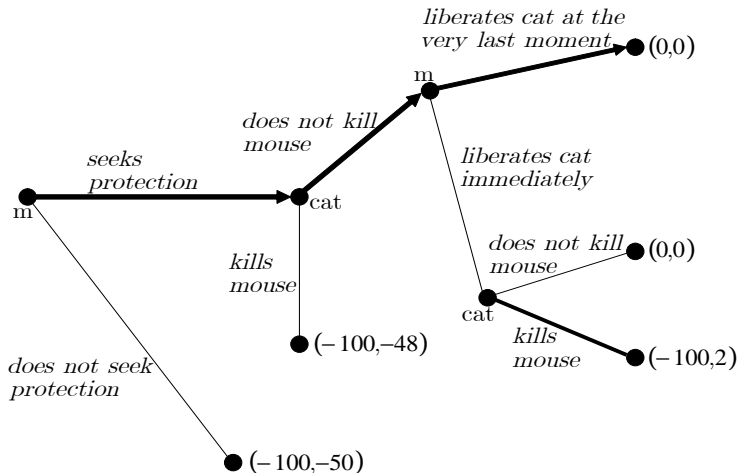
Indian Fables: The tiger and the traveller



Indian Fables: The lion, the mouse, and the cat



Indian Fables: The cat and the mouse



Additional exercise

In the centipede game, the players choose b (to finish) or w (to go on) in turn:

- What would you do if you were player 1?
- Solve this game by backward induction!
- Do you want to reconsider your answer to the first question?

