

Repeated Games

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Introduction

- Some relevant questions:
 - What happens when players interact again and again in a strategic setting?
 - Can cooperation be sustained between two players interacting strategically in a prisoners' dilemma like situation?
 - What is the role of reputation and punishment in strategic interactions?
 - Sometime we exhibit 'tit-for-tat' response. Is it a good strategy?
- In a repeated game, a game (say G) is played multiple times
 - Stage Game: A single play of the game (G)
 - Each occurrence of G is called an iteration or a round.
- An Example: Repetition of Prisoners' Dilemma

Repeated Game

- Two kinds of repeated games: Finitely repeated and infinitely repeated games.
- Finitely Repeated: Games with finite and known number of repetition.
- Infinitely Repeated: Games that continue for ever or Games that end at a random, unknown time
- Assumption: Players observe and remember the outcome of all previous stage games
- For every different observation of the outcomes of stage games, players could have a different response.

Repeated Prisoners' Dilemma

- Example: Repeated Prisoners' Dilemma

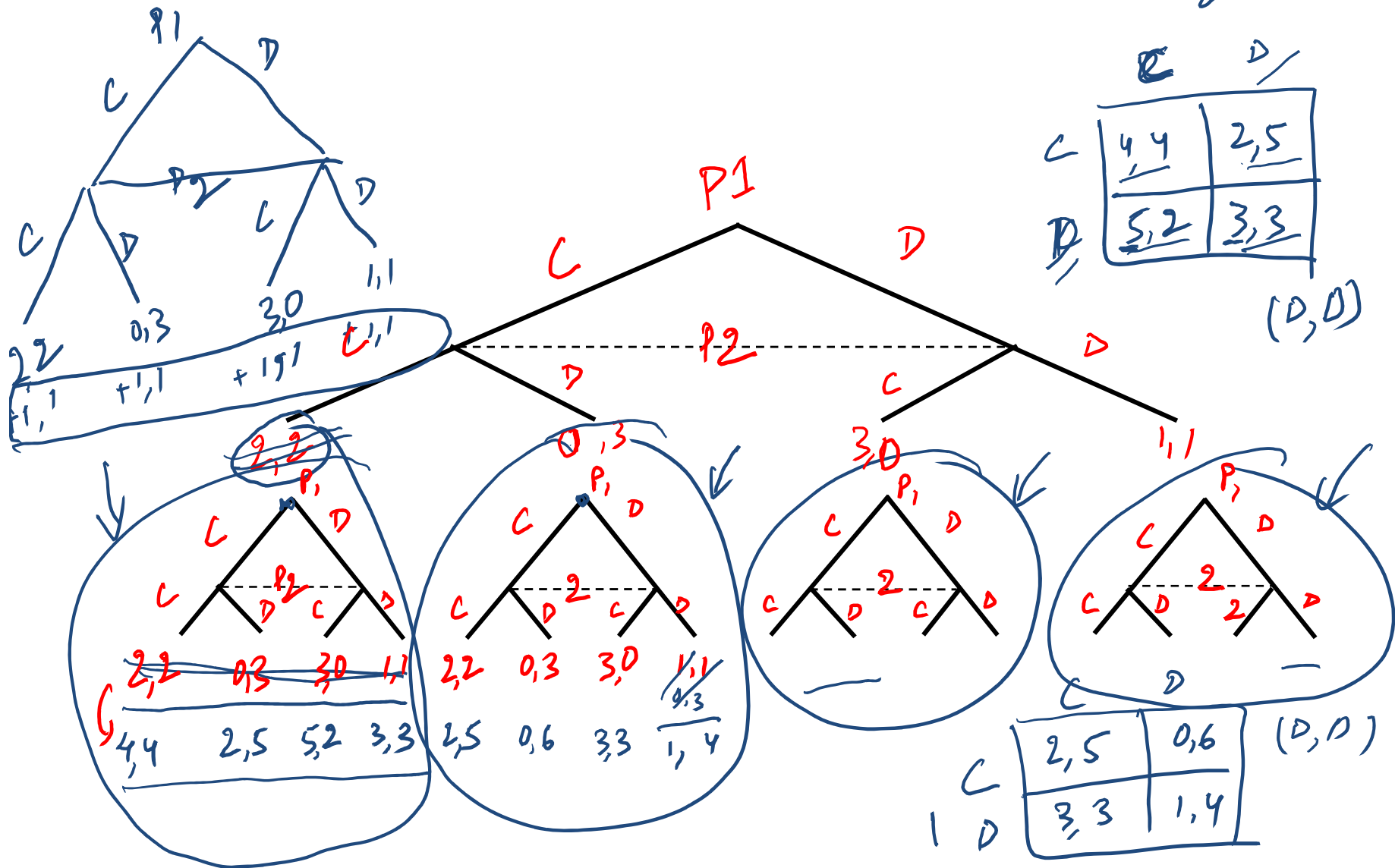
P1\P2	Cooperate	Defect
Cooperate	2,2	0,3
Defect	3,0	1,1

- Confess.
- Only one pure strategy NE at (Defect, Defect).
- If game is repeated T times: [T is a finite number]
 - How should we write the payoffs?
 - Are there any strategies possible that would sustain (C,C) as the equilibrium strategy in at least some of the iteration of the game?

Twice Repeated Prisoners' Dilemma

- Two players play Prisoners' dilemma twice.
- Before the second stage game, each knows the outcome of the first stage game.
- Assumption: Payoff is the sum of earnings on the two stages.
- How to solve it?
 - Extensive form representation.

Extensive Form Representation



Finitely Repeated Prisoners Dilemma

- What is the equilibrium outcome
[Subgame perfect] if

Prisoners' dilemma is repeated 1000 times?

stage

stage 2