Introduction to Game Theory

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Exercise Sheet 7

Due: Friday, July 3, 2020

Exercise 7.1 (Repeated Games, 1 + 1 + 3 + 3 points)

Consider the following instance of the infinitely repeated prisoner's dilemma. The payoff matrix of the stage game is given below.

		Player 2 C	Player 2 D
Player 1	C	$3, 3$	$0, 10$
	D	$10, 0$	$1, 1$

(a) Let t be the *tit-for-tat* strategy as defined in the lecture. Specify the unique run $O(t, t)$ that results from playing t against t.

(b) Compute the discounted payoff $v_1(O(t, t))$ of player 1 for the strategy profile (t, t) for general $0 < \delta < 1$ and for $\delta = \frac{1}{2}$ in particular.

(c) Under the discounting preference criterium, for which discount factor $0 < \delta < 1$ is (Grim, Grim) a Nash equilibrium? Justify your answer. (*Hint:* The Grim strategy starts with playing C. After any play of D it plays D forever.)

(d) Consider the following three payoff profiles under the limit-of-means preference criterium: 1. $(2, 2)$, 2. $(10, 10)$, and 3. $(3, 0)$. For each payoff profile, either construct two automata that form a Nash equilibrium or argue that no Nash equilibrium with the given payoffs exists.