

Problem Set 5

Due Wednesday, April 14, 2011

From Dutta

Chapter 15: Exercises 11, 12, 15, 17, 20 – 23 (Note: For question 22, use a discount rate of 0.9)

Additional Exercises

- Find conditions on the discount factor under which cooperation can be supported in the infinitely repeated games with the following stage games. Assume that both players have the same discount factor. Use the grim-trigger strategy profile.

| | | PLAYER 2 | |
|----------|---|----------|-----|
| | | C | D |
| PLAYER 1 | C | 2,2 | 0,4 |
| | D | 4,0 | 1,1 |

(a)

| | | PLAYER 2 | |
|----------|---|----------|-----|
| | | C | D |
| PLAYER 1 | C | 3,4 | 0,7 |
| | D | 5,0 | 1,2 |

(b)

| | | PLAYER 2 | |
|----------|---|----------|-----|
| | | C | D |
| PLAYER 1 | C | 3,2 | 0,1 |
| | D | 7,0 | 2,1 |

(c)

- Persons 1 and 2 are forming a firm. The value of their relationship depends on the effort that each expends. Suppose that person i 's utility from the relationship is $x_i^2 + x_j - x_i x_j$, where x_i is person i 's effort and x_j is the effort of the other person ($i = 1, 2$). Assume $x_1, x_2 \geq 0$.
 - Compute the partners' best-response functions and find the Nash equilibrium of this game. Is the Nash equilibrium efficient?
 - Now suppose that the partners interact over time, which we model with the infinitely repeated version of the game. Let δ denote the discount factor of the players. Under what conditions can the partners sustain some positive effort level $k = x_1 = x_2$ over time? (Postulate strategies and then derive a condition under which the strategies form an equilibrium in the repeated game.)