Exercise 5

ECON / MATH C103 - Mathematical Economics
Philipp Strack

due Tue Feb 28, 4:59pm

Helpful Material:
- Last week's lecture notes.

Exercise 1: Each of two agents $i \in \{1,2\}$ owns an object. The value of an agent's object is his private information, i.e. known to him but not the other agent or the designer. We assume that the values of both objects are independently uniformly distributed on $[0,1]$. Both agents assign the same value to the objects.

For example if the object of agent 1 has a value of 0.5 and the object of agent 2 has a value of 0.3 and agent 1 gets agent $2's$ object $1's$ utility is given by 0.3 and $2's$ utility by 0.5.

Each agent is asked independently and simultaneously whether he wants to exchange his object for the other agent's object. If both agents agree to trade then the objects are exchanged; otherwise each agent keeps his own object. Each agents objective is to maximize his expected payoff, there are no transfers.

(a) Describe the above situation formally as a mechanism design problem, by specifying utilities, types, and the mechanism. (3pts)

(Hint: An agent's utility here needs to depend on the other agent's type.)

(b) Describe the set of Pareto efficient allocations, as well as the set of allocations that maximize the sum of the agents' utilities. (2pt)

(c) Derive formally the dominant strategy equilibria of the mechanism. (4pts)

(d) Derive formally the Bayes Nash equilibria of the mechanism. (8pts)