14.126 Game theory
Problem Set 3

The due date for this assignment is Thursday April 15. Please quote your sources.

1. Consider a repeated linear Cournot duopoly with one long-run player who maximizes the discounted sum of stage profits (with discount factor δ) and a series of of short-run players as the second firm. The inverse-demand function is $P = 1 - Q$ and the marginal costs are zero. For each $q \in \{0, 0.01, 0.02, \ldots, 0.99, 1\}$, there is a type of the long-run player who cannot produces any amount other than q,each with probability $\varepsilon/101$ for some $\varepsilon \in (0, 1/2)$. Find the set of possible Nash equilibrium payoffs for the long run player as $\delta \to 1$.

2. Exercise 2 in 14.126 Lecture Notes on Rationalizability.

3. Exercise 4 in 14.126 Lecture Notes on Rationalizability. Assume that the solution concepts are defined on the space of hierarchies corresponding to finite type spaces.

4. Consider a type space (Θ, T^*, p) where Θ and $T^* = T_1^* \times \cdots \times T_n^*$ are countable. (For each t_i, $p_{t_i} \in \Delta\left(\Theta \times T_{-i}^*\right)$.) For any $T = T_1 \times \cdots \times T_n \subseteq T^*$, T is said to be a subspace of T^* if $p_{t_i}(\Theta \times T_{-i}) = 1$ for each $t_i \in T_i$ and each i. Let X be the set of all subspaces of T^*, including the empty set. Show that $(X, \supseteq)$ is a complete lattice. What are join and meet?

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