Game Theory (ECO307)

November 24, 2018

Instructions: Answer all questions.
Duration: 3 hours
Total Marks: 100

A. (20 marks). Find all the pure-strategy Bayesian Nash equilibria in the following static Bayesian game:

1. Nature determines whether the payoffs are as in Game 1 or as in Game 2, each game being equally likely.
2. Player 1 learns whether nature has drawn Game 1 or Game 2, but player 2 does not.
3. Player 1 chooses either Tor B; player 2 simultaneously chooses either L or R.
4. Payoffs are given by the game drawn by nature.

		Player 2			*Player* 2	
		L	R		L	R
Player 1	T	1, 1	0, 0	T	0, 0	0, 0
	B	0, 0	0, 0	B	0, 0	2, 2

B. (20 marks). Consider a Cournot duopoly operating in a market with inverse demand $P(Q) = a - Q$, where $Q = q_1 + q_2$ is the aggregate quantity on the market: Both firms have total costs $c_i(q_i) = cq_i$, but demand is uncertain: it is high ($a = a_H$) with probability θ and low ($a = a_L$) with probability $1 - \theta$. Furthermore, information is asymmetric: firm 1 knows whether demand is high or low,. but firm 2 does not. All of this is common knowledge. The two firms simultaneously choose quantities. What are the strategy spaces for the two firms? Make assumptions concerning a_H, a_L, θ and c such that all equilibrium quantities are positive. What is the Bayesian Nash equilibrium of this game?

C. (20 marks). Is there a pure strategy pooling perfect Bayesian equilibrium where both types play R? If yes, describe the equilibrium. Is there a pure strategy separating perfect Bayesian equilibrium where type t_1 plays R and type t_2 plays L? If yes, describe the outcome.

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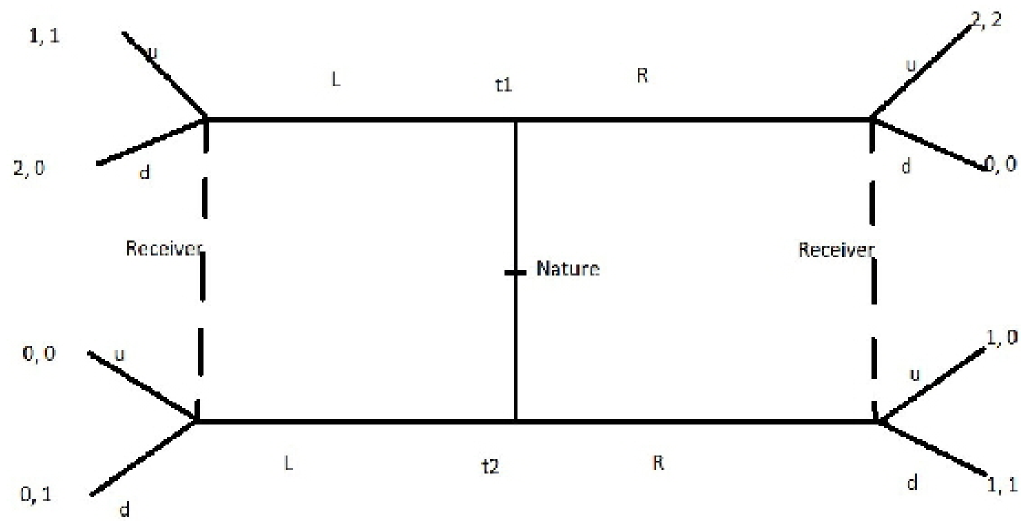

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D (20 marks). Consider a first-price, sealed-bid auction in which the bidders' valuations are independently and uniformly distributed on $[0, 1]$. Show that if there are n bidders, then the strategy of bidding $(n - l)/n$ times one's valuation is a symmetric Bayesian Nash equilibrium of this auction.

E (20 marks). In the $n-$player normal-form game $G = \{s_1, ..., s_n;\ u_1, ..., u_n\}$ if iterated elimination of strictly dominated strategies eliminates all but the strategies $(s_1^*, s_2^*, ..., s_n^*)$, then these strategies are the unique Nash equilibrium of the game.