

Eco 311/511: Game Theory

Mid-Semester Exam

October 8, 2024

Instructions: Answer all questions. Maximum marks=25. Time= 1 hour

1. Two live music venues, A and B, are located nearby each other must decide whether or not to hire additional musicians that will attract more clients than usual if the other venue does not do so as well. Suppose p_A and p_B are the prices of hiring for A and B respectively, and $200 < p_A, p_B < 400$. Sufficient number of musicians are available for both firms to hire.

Player B

		Hire	Not hire
Player A	Hire	$(1200 - p_A, 1200 - p_B)$	$(1400 - p_A, 800)$
	Not hire	$(700, 2000 - p_B)$	$(1000, 1000)$

- (a) Find pure strategy Nash equilibria for the above game. (3)
 - (b) Suppose both venues consider competing for infinitely many time periods. For which values of discount rate $\delta \geq 0$ is it possible to find a SPNE in which both venues decide not to hire any musicians when $p_L = p_N = 300$? Write down a strategy that allows this equilibrium. (6)
2. Suppose two firms, 1 and 2 choose their quantity of output of a homogeneous product sequentially. Firm 1 chooses its output q_1 first, and cannot change that quantity after it has made its choice. Next, firm 2 observes q_1 , and then chooses its quantity q_2 . What quantities will the firms choose, if the cost of production (for each firm) is 0, and if the market demand is given by $Q = 12 - p$ where $Q = q_1 + q_2$ and p denotes the market price. (5)
3. Suppose a game of matching pennies with two players is played twice. Represent the game in extensive form. Does the game have an SPNE? Provide a brief explanation for your answer. (4+2)
4. Consider the interval $I = [0, 1]$. Suppose n persons individually choose a point in I . Each person wants to choose a point that maximizes the sum of the distance from the points chosen by the other two. Write down best response for each player when $n = 2$ and find the pure strategy Nash equilibria (if any) when $n = 3$. (5)