14.12 Game Theory – Midterm I (Make up)

Instructions. This is an open book exam; you can use any written material. You have one hour and 20 minutes. Each question is 25 points. Good luck!

1. Compute all the Nash equilibria in the following game.

$1\backslash 2$	\mathbf{L}	Μ	\mathbf{R}
Т	3,2	4,0	0,0
Μ	2,0	3,3	0,0
В	0,0	0,0	3,3

2. Find all pure-strategy Nash equilibria in the following game. Which of these equilibria are consistent with common knowledge of sequential rationality?



- 3. Compute all pure-strategy Nash equilibria in the following game. Player 1 chooses some $x \in [0, 1]$. Observing x, player 2, either Approves (in which case 1 gets x utiles, 2 gets 1 - x utiles), or Rejects, in which case both get 0 utiles. Which of these equilibria are consistent with the common knowledge of sequential rationality of player 1, which of them are consistent with the common knowledge of sequential rationality of 2.
- 4. In this question you are asked to compute the rationalizable strategies in linear Bertrandduopoly with "imperfect substitutes." We have two firms $N = \{1, 2\}$, each with zero marginal cost. Simultaneously, each firm *i* sets a price $p_i \in P = [0, 10]$. The demand for the good firm *i* sells, as a function of p_1 and p_2) is

$$Q_i(p_1, p_2) = 1 + p_j - p_i.$$

Each firm i maximizes its own profit

$$\pi_i(p_1, p_2) = p_i Q(p_1, p_2).$$

- (a) Given any price p_j set by the other firm, what is the best price p_i^{BR} for firm *i*? Plot a graph of best response curves. (5 points)
- (b) Compute the pure strategy Nash equilibrium. (5 points)
- (c) Compute all the rationalizable strategies. (15 points)