Name:_____

Quiz #4 – EconS 301 (November 1st, 2022)

Question #1 (100 Points)

Consider the following 2*x*2 game

		Player 2	
		L	***R***
Player 1	***L***	6,6	2,7
	R	7,2	0,0

a) Identify the pure strategy Nash equilibria of this game.

b) Consider the probability β placed by player 1 on ***L*** and λ is player 2's probability of playing ***L***, where β,λ∈[0,1]. Formulate the expected payoff of each player. Is there a mixed strategy Nash Equilibrium in this game?

c) Draw the best-response correspondences. Where do they intersect?

Solution

a) NE={(L,R), (R,L)}

b) Assume β is the probability that player 1 selects L and λ is the probability that player 2 selects L. Hence:

$$EU_1(L)=6\lambda+2(1-\lambda)=2+4\lambda$$
$$EU_1(R)=7\lambda+0(1-\lambda)=7\lambda$$

Hence, player 1 chooses L if $EU_1(L)>EU_1(R)$. That is, if **$2+4\lambda>7\lambda$** or **$\lambda<2/3$**.

In addition,

$$EU_2(L)=6\beta+2(1-\beta)=2+4\beta$$
$$EU_2(R)=7\beta+0(1-p)=7\beta$$

Hence, player 2 chooses L if $EU_2(L)>EU_2(R)$. That is, if **$2+4\beta>7\beta$** or **$\beta<2/3$**.

Therefore players' best response function are :

$R^1(q)=$

- L if **$\lambda<2/3$**
- Randomizes between L & R (**$\beta\in(0,1)$**) if **$\lambda=2/3$**
- R (L=0) if **$\lambda>2/3$**

$R^2(p)=$

- L if **$\beta<2/3$**
- Randomizes between L & R (**$\lambda\in(0,1)$**) if **$\beta=2/3$**
- R if **$\beta>2/3$**

The MSNE is player 1 randomizes between L and R if **$\lambda=2/3$** and player 2 randomizes between L and R if **$\beta=2/3$.**

c)