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DECISION ANALYSIS – SHORT EXERCISES VII – SOLUTION CONCEPTS IN STRATEGIC GAMES

I. Consider the below normal-form strategic game involving two payers, A and B, and solve the following sub-tasks:

a) identify dominated/dominating strategies, if any, for players A and B

the dominating strategy for player A is (B, L) \ ~~is not existing~~

b) find all pure Nash equilibria; the pure Nash equilibrium is (T , L)

A \ B	L	R
T	2 \ 2	0 \ 1
B	3 \ 0	1 \ 1

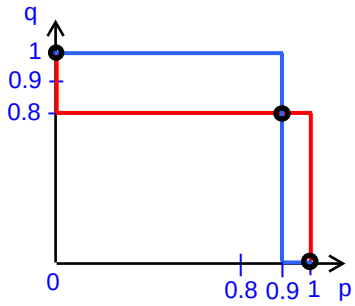
II. Consider the below normal-form strategic game involving two payers, A and B, and solve the following sub-tasks:

a) find all Nash equilibria (including the mixed ones) by drawing a diagram with the best responses for players A and B

hint: for player A, consider $u_A(T,q) \geq u_A(B,q)$, i.e., $0q - 10(1-q) \geq -1q - 6(1-q)$

for player B, consider $u_A(L,p) \geq u_A(R,p)$, i.e., $0p + 0(1-p) \geq 10p - 90(1-p)$

Pure NE: (s1, s2) = ((0,1), (1,0))
Pure NE: (s1, s2) = ((1,0), (0,1))
Mixed NE: (s1, s2) = ((0.9,0.1), (0.8,0.2))



$$p \in best_A(q) = \begin{cases} 1 & \text{if } q < 4/5 \\ [0,1] & \text{if } q = 4/5 \\ 0 & \text{if } q > 4/5 \end{cases} \qquad q \in best_B(p) = \begin{cases} 1 & \text{if } p < 9/10 \\ [0,1] & \text{if } p = 9/10 \\ 0 & \text{if } p > 9/10 \end{cases}$$

b) compute an expected utility for player B for the following mixed strategy profile s=((0.5, 0.5), (0.1, 0.9))

$u_B(s) = 0*0.5*0.1 + 10*0.5*0.9 + 0*0.5*0.1 + (-90)*0.5*0.9 = 4.5 - 40.5 = -36$

A \ B	L (q)	R (1-q)
T (p)	0 \ 0	-10 \ 10
B (1-p)	-1 \ 0	-6 \ -90