HW 9.11

Sunday, October 4, 2020 4:18 PM

This exercise asks you to consider what happens when players choose their actions by a simple rule of thumb instead of by reasoning. Suppose that two players play a specific finite simultaneous-move game many times. The first time the game is played, each player selects a pure strategy at random. If player $i$ has $m_i$ strategies, then she plays each strategy $s_i$ with probability $1/m_i$. At all subsequent times at which the game is played, however, each player $i$ plays a best response to the pure strategy actually chosen by the other player the *previous* time the game was played. If player $i$ has $k$ strategies that are best responses, then she randomizes among them, playing each strategy with probability $1/k$.

**(a)** Suppose that the game being played is a prisoners' dilemma. Explain what will happen over time.

They confess forever because it's always the best response.

**(b)** Next suppose that the game being played is the battle of the sexes. In the long run, as the game is played over and over, does play always settle down to a Nash equilibrium? Explain.

| | A | B |
|---|---|---|
| A | 2,1 | 0,0 |
| B | 0,0 | 1,2 |

If (0,0) is chosen first, then (0,0) is the BR so they look for each other forever. If (2,1) or (1,2) is chosen first, it settles.

**(c)** What if, by chance, the players happen to play a strict Nash equilibrium the first time they play the game? What will be played in the future? Explain how the assumption of a strict Nash equilibrium, rather than a nonstrict Nash equilibrium, makes a difference here.

If it's strict, they'll never deviat because strict Nash is always better

**(d)** Suppose that, for the game being played, a particular strategy $s_i$ is not rationalizable. Is it possible that this strategy would be played in the long run? Explain carefully.

No. only best responses are played