Assignment 7

Due on May 14, 2020, before 11:59 PM

1. Given the diagram shown in the following figure, assume that every node in the network has adapted the algorithm. In 2 rounds, a new behavior has emerged in the network and the value of $v_a$ and $v_b$ in the total utility of the behavior has increased. After 4 rounds, the utility of the behavior has decreased and it has become less stable. In 6 rounds, there is a change in the behavior. The feedback is not in the network, thus the two behaviors, which would have been adapted to, have not been adapted to.

2. Let $u(v_a, v_b) = u_1(v_a, v_b) + u_2(v_a, v_b)$. Suppose that $u_1(v_a, v_b) = u(v_a, v_b)$ and $v = v_b = 0.5$. Then, the utility function is $u(v_a, v_b) = 2u_1(v_a, v_b) + 2u_2(v_a, v_b)$. Draw the network in the following behavior. Behaviors $u_1$ and $u_2$ have been adapted. Draw the network in the following behavior. Behaviors $u_1$ and $u_2$ have not been adapted. Draw the network in the following behavior. Behaviors $u_1$ and $u_2$ have been adapted.

3. The content of a node is in a group. Suppose that $v_a$ and $v_b$ are the neighbors of the node $v_a$ and $v_b$. Each node has the behavior $u(v_a, v_b) = u_1(v_a, v_b) + u_2(v_a, v_b)$. The network topology is shown in the following figure. Behaviors $u_1$ and $u_2$ have been adapted. Is this a stable behavior? Yes, the behavior is stable.

4. Given a network in the following figure, draw the network in the following behavior. Behaviors $u_1$ and $u_2$ have been adapted. Is this a stable behavior? Yes, the behavior is stable.

5. Given a network in the following figure, draw the network in the following behavior. Behaviors $u_1$ and $u_2$ have been adapted. Is this a stable behavior? Yes, the behavior is stable.

6. Consider two pairs of behaviors $u_1$ and $u_2$. Each pair has a threshold of $a$ for the remaining network to be adapted between $u_1$ and $u_2$. When the threshold is set to $a$, the behaviors $u_1$ and $u_2$ are not adapted. When the threshold is set to $b$, the behaviors $u_1$ and $u_2$ are adapted. In the remaining network, the threshold value is $1.5$. Draw the network in the following behavior. Behaviors $u_1$ and $u_2$ have been adapted. Is this a stable behavior? Yes, the behavior is stable.