ECOL8000: IPD simulation excercise

October 11, 2018

1). Think about how the functions below, `randomD_tit_4_tat` and `randomC_tit_4_tat`, can each be used to play the basic tit 4 tat strategy.

```
randomD_tit_4_tat=function(opposition_last_play=1,threshold=1){

if(runif(1)<=threshold) return(opposition_last_play)
else return(0)

}
```

```
randomC_tit_4_tat=function(opposition_last_play=1,threshold=1){

if(runif(1)<=threshold) return(opposition_last_play)
else return(1)

}
```

2). Use `play_ipd_thresholds` to play `randomD_tit_4_tat` vs. `randomD_tit_4_tat` for the following range of scenarios (while adjusting the number of interations, if necessary).

a) `threshold_str1=1, threshold_str2=1`
b) `threshold_str1=0, threshold_str2=0`
c) `threshold_str1=0.5, threshold_str2=0.5`
d) at least two other threshold combinations of your choosing

What is the long term score differential in each case (use `plot_game_score_differential` to vidualize the long term behavior)? How do you explain the long term behavior you observe (hint: you probably want to look at the actual plays of the two players over time)? Explain the rationale for your choice of threshold combinations.

3). Play `randomD_tit_4_tat` vs. `randomC_tit_4_tat` for a range of scenarios, i.e. combinations of thresholds. For games played for a relatively large number of iterations, describe the long term behavior of the score differential. Describe what is happening in each pattern regime.

4). Together, what do your results suggest about successful strategies? Do your conclusions agree with or differ from those in Axelrod and Hamilton's paper?

5). For fun, devise your own strategy and determine how well it does against the random tit 4 tat strategies.