Assignment 6_Q1

Consider a game between A and B players in a finite population of size **N=1000**.

Evolve the system according to the Moran process.

At any given time, pick a two players at random and make them compete with one another.

Calculate the payoff to each.

Update the population every generation by picking an individual for reproduction with a probability proportional to its fitness and an individual for death randomly.

Evolve the population till one of the strategies gets fixed.

USE: a=3,b=0,c=5,d=1; and # rounds m=4

1. If strategy A corresponds to Cooperation and B corresponds to Defection, obtain a plot of the time evolution of frequencies of Cooperators and Defectors in a repeated PD game starting from an initial state where the no of cooperators and defectors are 500 each.

2. If A=TFT and B=ALLD, obtain a plot of the time evolution of the frequencies of TFT and ALLD starting from an ***initial*** state in which (i) #TFT= 250 & #ALLD=750 (ii) #TFT=150 & #ALLD=850

Calculate the unstable equilibrium frequency of TFT and verify if the simulation results obtained in (ii) are consistent with the theoretical predictions.

Submission Deadline: March 7, 2019

Assignment 6_Q2

Questions to explore using NetLogo (PD N-Person Iterated model)

Download NetLogo!

Click on File➔Models Library➔Social Science➔Unverified➔Prisoner's Dilemma➔PD N-Person Iterated

to open that model in NetLogo. This model was extensively used in class to demonstrate various aspects of the PD game. You can learn about the model by clicking on the **Info** tab. Click on the **Code** tab. This gives you the code on which the model is based. The code is written in NetLogo language, but you don't need to be an expert in that language in order to make small modifications. Go to the segment which describes the "unknown" strategy which is by default set to TFT.

Modify the "unknown" strategy in the code to make it represent GTFT. You can get some clues regarding the modification necessary by looking at the segment describing the Random strategy

1. Make GTFT compete with ALLD only. How does the average payoff to each change when

(i) x0_GTFT=1/3 & x0_ALLD=2/3 ?

(ii) x0_ALLD=1/3 & x0_GTFT=2/3 ?

2. Make GTFT compete with ALLD and TFT. How does the average payoff to each strategy change when

(i) x0_TFT<< x0_GTFT and x0_TFT<< x0_ALLD and x0_GTFT ~ x0_ALLD ?

(ii) x0_TFT~ x0_GTFT ~ x0_ALLD ?

(iii) x0_TFT ~ x0_ALLD << x0_GTFT ?

Provide the image files showing the variation of the average payoffs in all cases.

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