Notebook

August 10, 2017

1 Contemporary research topics

In this section of the course, we will look at a number of areas of recent (and ongoing!) mathematical research.

In particular 4 pieces of work will be reviewed:

- Measuring the price of anarchy in critical care unit interactions
- Iterated Prisoner's Dilemma contains strategies that dominate any evolutionary opponent
- Studying the emergence of invasiveness in tumours using game theory
- Evolution Reinforces Cooperation with the Emergence of Self-Recognition Mechanisms: an empirical study of the Moran process for the iterated Prisoner's dilemma

These four papers offer insights in to modern game theoretic research across the topics studied in this course. As a class we will discuss the papers in turn (so you will need to have read them).

This will be examinable. Questions might include:

- What is the main area of game theory used in this paper?
- What are/is the main result of this paper?
- Give an overview of a/some specific proof/calculation/method used in this paper?
- Critique this paper: how could it be improved.
- How does this paper sit in comparison to the rest of the literature on the subject.

1.1 Measuring the price of anarchy in critical care unit interactions

This is a paper that looks at a 2 player game modelling hospital interactions.

1.2 Iterated Prisoner's Dilemma contains strategies that dominate any evolutionary opponent

This is a paper that considers a particular type of strategy in the Iterated Prisoner's Dilemma

1.3 Studying the emergence of invasiveness in tumours using game theory

This is a paper that looks at cancer tumours using evolutionary game theory.

1.4 Evolution Reinforces Cooperation with the Emergence of Self-Recognition Mechanisms: an empirical study of the Moran process for the iterated Prisoner's dilemma

This is a paper that gives an in depth numerical study of Moran processes.