SOME PROBABILISTIC RESULTS USING DYNAMICS

1. Abstract

We will discuss two problems that are probabilistic in nature and are solved using dynamics.

The first one considers annihilation and coalescence on finite binary trees. Given an infection configuration in the leaves, and given a set of spreading rules, the infection spreads along the nodes of the tree. What is the limiting distribution at the root node, as the height of the tree grows? We will present results for some instances of this problem. The proofs use quadratic equations. Joint work with I. Benjamini.

The second is a Pólya's urn with graph based interactions. Given a finite connected graph, place a bin at each vertex, and call two bins a pair if they share an edge. At discrete times, a ball is added to each pair of bins as follows: one of the bins gets the ball with probability proportional to its current number of balls raised by some fixed power $\alpha > 0$. What is the limiting behavior of the proportion of balls in the bins? We will present results for $\alpha \leq 1$. The proofs use stochastic approximation algorithms. Joint work with M. Benaïm, I. Benjamini, and J. Chen.