Student Research Talks (StReeTs)

George Mason University

A Short Proof of The Harris-Kesten Theorem

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Abstract

Percolation theory initiated as a mathematical model of random physical processes, such as the flow through a disordered porous medium. The particular model of focus in this talk involves a square planar lattice whose edges are said to be open, independently, with probability p, and are said to be closed otherwise. The main interest of percolation theory is to find the probability p at which an infinite path of open edges (almost surely) exists. For p = 0, it does not exist, and for p = 1, it does exist. So, there exists a critical probability between 0 and 1, that is, the "minimal probability" for an infinite path of open edges to (almost surely) exist. It was first shown that the critical probability is greater than or equal to 1/2, and 20 years later, it was shown that it is precisely 1/2. This talk will first present an intuitive argument as to why the critical probability is 1/2, and then present the rigor of the Harris-Kesten Theorem.

Date: Friday, March 22*nd*
Time: 2:30pm–3:20pm
Place: Exploratory Hall 4106

Pizza will be served at the presentation.

For further information or for special accommodations (including dietary restrictions), please contact Michael Merkle or Gabe Lumpkin via email at `mmerkle@gmu.edu or glumpkin@gmu.edu` by Thursday.