Mathematics, Statistics, and Computer Science **@ UIC**

Combinatorics and Discrete Probability Seminar

Dynamical Thresholds for the Fixed-Magnetization Ising Model

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Abstract: Spin models on graphs are a source of many interesting questions in statistical physics, algorithms, and combinatorics. The Ising model is a classical example—first introduced as a model of magnetization, it can combinatorially be described as a weighted probability distribution on 2-vertex-colorings of a graph. We'll consider a fixed-magnetization version of the Ising model—akin to fixing the number of, say, blue vertices in every coloring—and a natural Markov chain sampling algorithm called the Kawasaki dynamics. We show some surprising results regarding the existence and location of a fast/slow mixing threshold for these dynamics. Our proofs require a combination of Markov chain tools, such as path coupling and spectral independence, with combinatorial tools, such as random graph analysis and second moment methods. Joint work with Aiya Kuchukova, Marcus Pappik, and Will Perkins.

Monday, October 28 at 3:00 PM in 1227 SEO