

MATH/SIUC COLLOQUIUM



9-30-21 3:00PM

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Title:

Faster algorithms for counting
independent sets in regular bipartite
graphs.

*Via Zoom

Time: 3:00pm

Abstract

I will present an algorithm that takes as input a d -regular bipartite graph G , runs in time $\exp(O(n/d \log^3 d))$, and outputs w.h.p., a $(1 + o(1))$ -approximation to the number of independent sets in G . As a by-product of the intermediate steps to this algorithm, We also obtain, for fixed d , an FPTAS to approximate the number of independent sets in d -regular bipartite "expanding" graphs. More than the result itself, I will focus more on the techniques used, which combines combinatorial methods (graph containers) with statistical physics methods (abstract polymer models and cluster expansion), and mention other recent applications. I will start from the basics, and no prior knowledge of any of the topics is assumed.

Joint work with Matthew Jensen and Will Perkins

*Zoom link will be emailed prior to meeting.