

Combinatorics and Probability Seminar

Faster algorithms for counting independent sets in regular bipartite graphs

Aditya Potukuchi (UIC)

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 on the techniques used, which combine 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 Jenssen and Will Perkins.

Monday, October 18 at 2:00 PM in 636 SEO
--