THE UNIVERSITY OF CHICAGO

Computational and Applied Mathematics & Statistics Student Seminar

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Random optimization, physics, and hardness

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Rosenwald 011
1115 E 58th St

ABSTRACT

Optimization problems on random instances frequently appear in statistics, and many of them appear to be hard to solve with efficient algorithms. In the past decades, physicists have also studied such random optimization problems to understand the behavior of spin glasses, and their methods have been adapted to statistics and theoretical computer science literature to give evidence on the hardness of many statistical problems. In this talk, I will introduce two of these methods, the overlap gap property (OGP) and the Franz--Parisi potential (FPP), and discuss what they imply about the hardness of problems. Then I will apply these to a specific problem: finding a shortest path on sparse random graphs. Then I will discuss the failure of the OGP heuristic on this problem and some possible explanations for this phenomenon. This is based on joint work with Frederic Koehler.