

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Approximate Solutions in Planted 3-SAT BENJAMIN HSU, Princeton University, CHRISTOPHER LAUMANN, Harvard University, RODERICH MOESSNER, Max Planck Institute for Complex Systems, SHIVAJI SONDHI, Princeton University — In many computational settings, there exists many instances where finding a solution requires a computing time that grows exponentially in the number of variables. Concrete examples occur in combinatorial optimization problems and cryptography in computer science or glassy systems in physics. However, while exact solutions are often known to require exponential time, a related and important question is the running time required to find approximate solutions. Treating this problem as a problem in statistical physics at finite temperature, we examine the computational running time in finding approximate solutions in 3-satisfiability for randomly generated 3-SAT instances which are guaranteed to have a solution. Analytic predictions are corroborated by numerical evidence using stochastic local search algorithms. A first order transition is found in the running time of these algorithms.

Benjamin Hsu
Princeton University

Date submitted: 09 Nov 2012

Electronic form version 1.4