Stanford Department of Mathematics Colloquium

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4:15 p.m.
Bldg. 380, Room 380-W.

Khot's Unique Games Conjecture

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Abstract

Abstract: In 2002, Subhash Khot formulated the 'Unique Games Conjecture,' a conjecture about the complexity of certain optimization problems.
The conjecture, whose status remain uncertain, has inspired a remarkable body of work, clarifying the computational complexity of several optimization problems and the effectiveness of 'semidefinite programming' convex relaxations.
The computational complexity questions addressed in this research program have proved to be related to old and new questions in analysis, probability, and geometry. Examples of such questions are:
- The central limit theorem explains what happens when we sum several independent random variables. What happens if, instead of summing them, we compute a low-degree polynomial function of them?
- In Gaussian space, what is the body of a given volume whose boundary is the smallest?
- What is the monotone balanced boolean function whose value is least likely to change when evaluated on two random correlated inputs?
- What is the smallest distortion achievable when embedding a finite metric space of negative type into L1?
- What conditions on the Fourier spectrum of a boolean function imply that it depends on few variables?
In this talk, which assumes no knowledge of computational complexity, I will explain the statement of the conjecture and the context in which the above questions relate to questions about the computational complexity of combinatorial optimization problems.