香港中文大學
The Chinese University of Hong Kong

Institute of Theoretical Computer Science and Communications

ITCSC Colloquium

Two "Simple" Problems That Imply Strong Circuit Lower Bounds

By
Prof. Ran Raz
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February 22, 2010 (Monday)

2:00 pm – 3:00 pm

Rm. 1027, 10/F., Ho Sin Hang Engineering Building, CUHK

Abstract:
I will present two families of mathematical problems that are very simple to describe, that seem very natural-to-study from geometric, algebraic or combinatorial points of view, and are seemingly unrelated to theoretical computer science, and whose solution would give exceptionally strong results in theoretical computer science; namely, super-polynomial lower bounds for the size of general arithmetic circuits and formulas.

More specifically, I will discuss 'elusive functions and lower bounds for arithmetic circuits' - an approach to prove exponential lower bounds for circuit size; and 'tensor-rank and lower bounds for arithmetic formulas' - an approach to prove super-polynomial lower bounds for formula size.

Biography:
Ran Raz is a Professor of Mathematics and Computer Science at the Weizmann Institute of Science. He received his B.Sc in mathematics and physics and his PhD in mathematics from the Hebrew University, and after a short postdoc at Princeton University joint the Weizmann Institute. His main research area is complexity theory, with emphasis on proving lower bounds for computational models. More specifically, he is interested in Boolean and arithmetic circuit complexity, communication complexity, propositional proof theory, probabilistically checkable proofs, quantum computation and communication, and randomness and derandomization. He was a member at the Institute for Advanced Study (2000-2001, and fall 2002) and a visiting researcher at Microsoft Research Redmond (Jan-June 2006) and Microsoft Research New England (July-December 2009).

*** ALL ARE WELCOME ***

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