APPLIED MATHEMATICS COLLOQUIUM

Direct Product Theorems for Communication and Query Complexity

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Abstract:
A direct product theorem states that solving n instances of a problem requires Omega(n) times the resources for a single instance, even to achieve success probability 2^{-Omega(n)}. Although seemingly obvious, such statements are elusive and, in several computational models, flat out wrong. Direct product theorems are studied for their own appeal as well as complexity-theoretic applications.

We prove that direct product theorems hold very broadly in the settings of quantum communication and quantum query complexity. The former model studies the minimum communication required to compute a function whose arguments are distributed among several parties; the latter model studies the minimum number of bits one needs to adaptively query in a Boolean string to compute a given Boolean function. The talk will require no familiarity with quantum computing.

Monday November 29th 2010
4:30 PM
Building 2, Room 105
Refreshments are available in Building 2, Room 290
(Math Common Room) between 3:30 – 4:30 PM