APPLIED MATHEMATICS COLLOQUIUM

NOISE TOLERANCE OF EXPANDERS AND SUBLINEAR EXPANDER RECONSTRUCTION

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ABSTRACT:

We consider the problem of online sublinear expander reconstruction and its relation to random walks in "noisy" expanders. Given access to an adjacency list representation of a bounded-degree graph G, we want to convert this graph into a bounded-degree expander G' changing G as little as possible. The graph G' will be output by a distributed filter: this is a sublinear time procedure that given a query vertex, outputs all its neighbors in G', and can do so even in a distributed manner, ensuring consistency in all the answers.

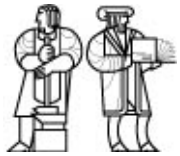
One of the main tools in our analysis is a result on the behavior of random walks in the graph that are almost expanders: graphs that are formed by arbitrarily connecting a small unknown graph (the noise) to a large expander. We show that a random walk from almost any vertex in the expander part will have fast mixing properties, in the general setting of irreducible finite Markov chains. We also design sublinear time procedures to distinguish vertices of the expander part from those in the noise part, and use this procedure in the reconstruction algorithm.

This is joint work with Yuval Peres and C. Seshadhri.

MONDAY, OCTOBER 20, 2008
4:30 PM
Building 4, Room 231

Reception at 4:00 PM in Building 2, Room 349
(Applied Math Common Room))

Applied Math Colloquium: http://www-math.mit.edu/amc/fall08
Math Department: http://www-math.mit.edu



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