CSDM Seminars

Computer Science/Discrete Mathematics Seminar II

Submitted by admin on Wed, 05/08/2013 - 10:01
Series: Computer Science/Discrete Mathematics
No Seminar Talk
Date & Time: Tue, 05/07/2013 - 10:30 - 12:30
Location: S-101

terms:

- CSDM Seminars

Computer Science/Discrete Mathematics Seminar I

Submitted by admin on Tue, 05/07/2013 - 10:01
Nondeterministic Direct Product Reductions and the Success Probability of SAT Solvers
Series: Computer Science/Discrete Mathematics
Andrew Drucker
Member, School of Mathematics
Date & Time: Mon, 05/13/2013 - 10:30 - 12:30
Location: S-101
Video Link:
http://video.ias.edu/csdm/1213/0513-Andrew%20Drucker

In this talk I will describe nondeterministic reductions which yield new direct product theorems (DPTs) for Boolean circuits. In our theorems one assumes that a function F is "mildly hard" against *nondeterministic* circuits of some size s(n) , and concludes that the t-fold direct product F^t is "extremely hard" against probabilistic circuits of only polynomially smaller size s'(n) . The main advantage of these results compared with previous DPTs is the strength of the size bound in our conclusion.

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Computer Science/Discrete Mathematics Seminar I

Submitted by admin on Tue, 05/07/2013 - 10:01
Association Schemes, Non-Commutative Polynomials and Lasserre Lower Bounds for Planted Clique
Series: Computer Science/Discrete Mathematics
Raghu Meka
DIMACS (Rutgers); Member, School of Mathematics
Date & Time: Mon, 05/13/2013 - 13:30 - 15:30
Location: S-101
Video Link:
http://video.ias.edu/csdm/1213/0513-RaghuMeka

Finding cliques in random graphs and the closely related "planted" clique variant, where a clique of size k is planted in a random G(n,1/2) graph, have been the focus of substantial study in algorithm design. Despite much effort, the best known polynomial-time algorithms only solve the problem for k ~ sqrt(n). Here we show that beating sqrt(n) would require substantially new algorithmic ideas, by proving a lower bound for the problem in the Lasserre hierarchy, the most powerful class of semi-de finite programming algorithms we know of.

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Computer Science/Discrete Mathematics Seminar I

Submitted by admin on Thu, 05/02/2013 - 10:01
Tight Bounds for Set Disjointness in the Message-Passing Model
Series: Computer Science/Discrete Mathematics
Rotem Oshman
University of Toronto
Date & Time: Mon, 05/06/2013 - 11:15 - 12:15
Location: S-101
Video Link:
http://video.ias.edu/csdm/1213/0506-RotemOshman

In many distributed systems, the cost of computation is dominated by the cost of communication between the machines participating in the computation. Communication complexity is therefore a very useful tool in understanding distributed computation, and communication complexity lower bounds have been used extensively to obtain lower bounds on various distributed problems. However, almost all applications of communication complexity lower bounds in distributed computing use two-party lower bounds, despite the fact that distributed computation usually involves many players.

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Computer Science/Discrete Mathematics Seminar II

Submitted by admin on Wed, 04/24/2013 - 10:01
Series: Computer Science/Discrete Mathematics
No Seminar Talk
Date & Time: Tue, 05/14/2013 - 10:30 - 12:30

terms:

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Computer Science/Discrete Mathematics Seminar II

Submitted by admin on Tue, 04/23/2013 - 10:01
Combinatorial Walrasian Equilibrium
Series: Computer Science/Discrete Mathematics
Michal Feldman
Hebrew University of Jerusalem
Date & Time: Tue, 04/30/2013 - 10:30 - 12:30
Location: S-101
Video Link:
http://video.ias.edu/csdm/1213/0430-MichalFeldman

We study algorithms for combinatorial market design problems, where a collection of objects are priced and sold to potential buyers subject to equilibrium constraints. We introduce the notion of a combinatorial Walrasian equilibium (CWE) as a natural relaxation of Walrasian equilibrium, an appealing and robust notion of market pricing equilibrium. The only difference between a CWE and a (non-combinatorial) WE is the ability for the seller to pre-bundle the items prior to sale. This innocuous and natural bundling operation opens up a plethora of algorithmic challenges and opportunities.

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Computer Science/Discrete Mathematics Seminar I

Submitted by admin on Wed, 04/17/2013 - 11:01
Diffuse Decompositions of Polynomials
Series: Computer Science/Discrete Mathematics
Daniel Kane
Stanford University
Date & Time: Mon, 04/22/2013 - 11:15 - 12:15
Location: S-101
Video Link:
http://video.ias.edu/csdm/1213/0422-DanielKane

We study some problems relating to polynomials evaluated either at random Gaussian or random Bernoulli inputs. We present some new work on a structure theorem for degree-d polynomials with Gaussian inputs. In particular, if p is a given degree-d polynomial, then p can be written in terms of some bounded number of other polynomials q_1,...,q_m so that the joint probability density function of q_1(G),...,q_m(G) is close to being bounded. This says essentially that any abnormalities in the distribution of p(G) can be explained by the way in which p decomposes into the q_i .

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Computer Science/Discrete Mathematics Seminar II

Submitted by admin on Wed, 04/17/2013 - 10:01
Uncertainty Principle
Series: Computer Science/Discrete Mathematics
Klim Efremenko
Tel-Aviv University; Member, School of Mathematics
Date & Time: Tue, 04/23/2013 - 10:30 - 12:30
Location: S-101
Video Link:
http://video.ias.edu/csdm/1213/0423-KlimEfremenko

Informally, uncertainty principle says that function and its Fourier transform can not be both concentrated. Uncertainty principle has a lot of applications in areas like compressed sensing, error correcting codes, number theory and many others. In this talk we will try to survey different formulations of uncertainty principle. In this talk we will be mostly focused on the discreet analog of uncertainty principle.

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Computer Science/Discrete Mathematics Seminar II

Submitted by admin on Wed, 04/10/2013 - 14:01
Series: Computer Science/Discrete Mathematics
No Seminar Talk
Date & Time: Tue, 04/16/2013 - 10:30 - 12:30
Location: S-101

terms:

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Computer Science/Discrete Mathematics Seminar I

Submitted by admin on Thu, 04/04/2013 - 14:01
Analytical Approach to Parallel Repetition
Series: Computer Science/Discrete Mathematics
Irit Dinur
Weizmann Institute; Radcliffe institute
Date & Time: Mon, 04/15/2013 - 11:15 - 12:15
Location: S-101
Video Link:
http://video.ias.edu/csdm/1213/0415-IritDinur

We propose an “analytical” framework for studying parallel repetitions of one-round two-prover games. We define a new relaxation of the value of a game, val+, and prove that it is both multiplicative and a good approximation for the true value of the game. These two properties imply Raz's parallel repetition theorem as val(G^k) ~ val+(G^k) = val+(G)^k ~ val(G)^k Using this approach, we will describe a reasonably simple proof for the NP-hardness for label-cover(1,delta), the starting point of many inapproximability results.

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