

CSDM Seminars

[Computer Science/Discrete Mathematics Seminar II](#)

Submitted by admin on Tue, 01/22/2013 - 12:01

The Ribe Program

Series: Computer Science/Discrete Mathematics

Manor Mendel

The Open University of Israel; Member, School of Mathematics

Date & Time: Tue, 01/29/2013 - 10:30 - 12:30

Location: S-101

Video Link:

<http://video.ias.edu/1213/csdm/0129-ManorMendel>

A linear property of Banach spaces is called "local" if it depends on finite number of vectors and is invariant under renorming (i.e., distorting the norm by a finite factor). A famous theorem of Ribe states that local properties are invariant under (non linear) uniform-homeomorphisms, suggesting that local properties should have purely metric characterizations. The Ribe program attempts to uncover explicit metric characterizations of local properties, and study them in the context of metric spaces. More broadly it attempts to apply ideas from Banach to general metric spaces.

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Submitted by admin on Tue, 01/22/2013 - 12:01

New Independent Source Extractors with Exponential Improvement

Series: Computer Science/Discrete Mathematics

Xin Li

University of Washington

Date & Time: Mon, 01/28/2013 - 11:15 - 12:15

Location: S-101

Video Link:

<http://video.ias.edu/1213/csdm/0128-XinLi>

We study the problem of constructing extractors for independent weak random sources. The probabilistic method shows that such an extractor exists for two sources on n bits with

min-entropy $k \geq 2 \log n$. On the other hand, explicit constructions are far from optimal. Previously the best known extractor for (n, k) sources requires $O(\log n / \log k)$ independent sources [Rao06, Barak-Rao-Shaltiel-Wigderson06]. In this talk I will give a new extractor that uses only $O(\log(\log n / \log k)) + O(1)$ independent sources. This improves the previous best result exponentially.

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Submitted by admin on Wed, 01/16/2013 - 10:01

Sparsity Lower Bounds for Dimensionality Reducing Maps

Series: Computer Science/Discrete Mathematics

Jelani Nelson

Member, School of Mathematics

Date & Time: Tue, 01/22/2013 - 10:30 - 12:30

Location: S-101

Video Link:

<http://video.ias.edu/1213/csdm/0122-JelaniNelson>

Abstract: We give near-tight lower bounds for the sparsity required in several dimensionality reducing linear maps. In particular, we show: (1) The sparsity achieved by [Kane-Nelson, SODA 2012] in the sparse Johnson-Lindenstrauss lemma is optimal up to a $\log(1/\epsilon)$ factor. (2) RIP₂ matrices preserving k -space vectors in \mathbb{R}^n with the optimal number of rows must be dense as long as $k < n / \text{polylog}(n)$.

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[Computer Science/Discrete Mathematics Seminar I](#)

Submitted by admin on Wed, 01/09/2013 - 19:01

Mathematical Theories of Interaction with Oracles: Active Property Testing and New Models for Learning Boolean Functions

Series: Computer Science/Discrete Mathematics

Liu Yang

School of Computer Science, Carnegie Mellon University

Date & Time: Mon, 02/11/2013 - 11:15 - 12:15

Location: S-101

Video Link:

<http://video.ias.edu/csdm/1213/0211-LiuYang>

With the notion of interaction with oracles as a unifying theme of much of my dissertation work, I discuss novel models and results for property testing and computational learning, with the use of Fourier analytic and probabilistic methods. One motivation for property testing is that testing can provide a fast preprocessing step before learning. However, algorithms based on membership queries (i.e., the ability to query functions on arbitrary points) tend to query highly ambiguous or unnatural points that can be impossible for a human oracle to label.

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Submitted by admin on Wed, 01/09/2013 - 19:01

OSNAP: Faster Numerical Linear Algebra Algorithms Via Sparser Subspace Embeddings

Series: Computer Science/Discrete Mathematics

Jelani Nelson

Member, School of Mathematics

Date & Time: Tue, 01/15/2013 - 10:30 - 12:30

Location: S-101

Video Link:

<http://video.ias.edu/1213/csdm/JelaniNelson-0115>

<http://math.ias.edu/files/seminars/Nelson.pdf>

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Submitted by admin on Wed, 01/09/2013 - 19:01

On Bilinear Complexity

Series: Computer Science/Discrete Mathematics

Pavel Hrubes

University of Washington

CSDM Seminars

Date & Time: Mon, 01/14/2013 - 11:15 - 12:15

Location: S-101

Video Link:

<http://video.ias.edu/1213/csdm/PavelHrubes-0114>

For a set of polynomials F , we define their bilinear complexity as the smallest k so that F lies in an ideal generated by k bilinear polynomials. The main open problem is to estimate the bilinear complexity of the single polynomial $\sum_{i,j} x_i^2 y_j^2$. This question is related to the classical sum-of-squares problem as well as to problems in arithmetic circuit complexity. We will focus on related sets of polynomials and prove some lower and upper bounds on their bilinear complexity.

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Submitted by admin on Wed, 01/09/2013 - 19:01

Clique Number of Random Geometric Graphs in High Dimension

Series: Computer Science/Discrete Mathematics

Sebastien Bubeck

Princeton University

Date & Time: Mon, 01/21/2013 - 11:15 - 12:15

Location: S-101

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Submitted by admin on Wed, 01/09/2013 - 19:01

Computational Complexity in Mechanism Design

Series: Computer Science/Discrete Mathematics

Jing Chen

Massachusetts Institute of Technology; Member, School of Mathematics

Date & Time: Tue, 11/27/2012 - 10:30 - 12:30

Location: S-101

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[Computer Science/Discrete Mathematics Seminar I](#)

Submitted by admin on Wed, 01/09/2013 - 19:01

Series: Computer Science/Discrete Mathematics

No Seminar

Date & Time: Mon, 12/17/2012 - 11:15 - 12:15

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Submitted by admin on Wed, 01/09/2013 - 19:01

The SOS (aka Lasserre/Positivstellensatz/Sum-of-Squares) System

Series: Computer Science/Discrete Mathematics

(1) Raghu Meka and (2) Avi Wigderson

(1) DIMACS; (2) IAS

Date & Time: Tue, 12/18/2012 - 10:30 - 12:30

Location: S-101

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