

Computer Science/Discrete Mathematics Seminar II

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The Chasm at Depth 3

Series: Computer Science/Discrete Mathematics

Shubhangi Saraf

Rutgers, The State University of New Jersey

Date & Time: Tue, 02/19/2013 - 10:30 - 12:30

Location: S-101

Video Link:

<http://video.ias.edu/csdm/1213/0219-ShubhangiSaraf>

I will describe the very recent breakthrough result by Gupta, Kamath, Kayal and Saptharishi which shows that every polynomial P in n variables, of degree d which is polynomial in n , and which can be computed by a polynomial sized arithmetic circuit over the complex numbers, can be also computed by a *depth 3* arithmetic circuit of size sub exponential in d ; specifically size $2^{\{\sqrt{d} \text{ polylog } n\}}$ (the actual paper gives a more precise bound depending on the degree of the polynomial and size of the arithmetic circuit). In particular there exists a depth 3 arithmetic circuit computing the d by d determinant of size $2^{\{\sqrt{d} \log d\}}$. Such results were previously shown for reduction to depth 4 arithmetic circuits, and it is totally remarkable (and prior to this totally unsuspected) that it is also true for reduction to depth 3 circuits.

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Wed, 12/19/2012 - 18:18

Tue, 02/12/2013 - 18:24

terms:

- [CSDM Seminars](#)