

Computer Science/Discrete Mathematics Seminar II

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An Arithmetic Analogue of Fox's Improved Triangle Removal Lemma

Series: Computer Science/Discrete Mathematics

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Date & Time: Tue, 04/02/2013 - 10:30 - 12:30

Location: S-101

Video Link:

<http://video.ias.edu/csdm/1213/0402-SushantSachdeva>

We give an arithmetic version of the recent proof of the improved triangle removal lemma by Fox [Fox11], for the group F_2^n . A triangle in F_2^n is a tuple (x,y,z) such that $x+y+z = 0$. The triangle removal lemma for F_2^n states that for every $\epsilon > 0$, there is a $\delta > 0$, such that if a subset A of F_2^n requires the removal of at least $\epsilon 2^n$ elements to make it triangle-free, then it must contain at least $\delta 2^{2n}$ triangles. We give a direct proof which gives an improved lower bound for δ (as a function of ϵ), analogous to the one obtained by Fox for triangle removal in graphs. This result was previously known via a reduction from the improved removal lemma for directed cycles [Fox11,Král-Serra-Vena 09]. However, we believe our proof in this simplified setting is more transparent, and defines fourier-analytic notions that may be of independent interest.

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terms:

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