abstract

ARITHMETIC COMBINATORICS
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

For a probability distribution X over a finite set, let D(X) denote the L_2-distance of X from the uniform distribution. Let X, Y be probability distributions over the finite group G and let Z be their G-convolution. Inspired by recent work of Gowers, we prove that

(*) D(Z) \le \sqrt{n/m} D(X) D(Y),

where n=|G| and m is the minimum degree of nontrivial real representations of G.

We deduce several corollaries on product growth of subsets of G, including improved and generalized versions of Gowers' result on the solvability of the equation xy = z in given subsets of G. One of the corollaries to (*) gives a best possible answer to a question by Venkatesh and Green on the product growth of subsets of SL_2(q). Applications to Helfgott-type diameter and mixing arguments follow as well.

A number of applications to the area of "bounded generation" in group theory have been found. One such application:

Every finite quasisimple group of Lie type of characteristic
p can be written as the product five of its Sylow p-subgroups.

This improves and simplifies a previous result which served as an ingredient in the proof of Serre's conjecture on the topology of profinite groups (Nikolov-Segal) and the recent result that all finite quasisimple groups of Lie type have expander generators (Kassabov - Lubotzky - Nikolov).

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Joint work with Nikolay Nikolov and Laszlo Pyber