Seminar on Combinatorial Computing
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Room 6495, Graduate Center
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Group algebras, expanders and codes

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Abstract

Let G be a finite group and let p be a prime such that $(p, |G|) = 1$. We study conditions under which the group algebra $F_p[G]$ has a few G-orbits whose union generate it as an expander (equivalently, all the discrete Fourier coefficients of this generating set are bounded away uniformly from one). We prove a (nearly sharp) bound on the distribution of dimensions of irreducible representations of G which implies the existence of such expanding orbits. One application is a probabilistic construction of good codes which depends on a linear number of random bits. We further give a bound on the number of representations of dimension d in terms of the Kazhdan Constant of a generating set S of G. Together these results lead to a new iterative construction of expanding Cayley graphs of nearly constant degree.

Joint work with Avi Wigderson.

For further information contact Janos Pach at pach@cims.nyu.edu, or visit our website: http://www.math.nyu.edu/ pach/combinatorics_seminar.html