THE WEIZMANN INSTITUTE OF SCIENCE
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE
Geometric Functional Analysis and Probability Seminar

Room 155 ,Ziskind Building
on Thursday, Nov 14, 2019at 13:30

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Random Cayley graphs

Abstract:

We consider the random Cayley graph of a finite group G formed by picking k random generators uniformly at random:

1. We prove universality of cutoff (for the random walk) and a concentration of measure phenomenon in the Abelian setup (namely, that all but $o(|G|)$ elements lie at distance $[R-o(R),R-o(R)]$ from the origin, where R is the minimal ball in Z^k of size at least $|G|$), provided $k \gg 1$ is large in terms of the size of the smallest generating set of G. As conjectured by Aldous and Diaconis, the cutoff time is independent of the algebraic structure (it is given by the time at which the entropy of a random walk on Z^k is $\log|G|$).
2. We prove analogous results for the Heisenberg $H_{p,d}$ groups of $d \times d$ uni-upper triangular matrices with entries defined mod p, for p prime and d fixed or diverging slowly.
3. Lastly, we resolve a conjecture of D. Wilson that if G is a group of size at most 2^d then for all k its mixing time in this model is as rapid as that of Z_2^d and likewise, that the slowest mixing p-group of a given size is Z_p^d.

(Joint work with Sam Thomas.)

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