finite monogenic semigroups, null semigroups, almost null semigroups, right zero semigroups, left zero semigroups and all three-element semigroups.

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Contact information

Volodymyr Gavrylkiv
Department of Mathematics and Computer Science, Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine
Email address: vgavrylkiv@gmail.com
URL: gavrylkiv.pu.if.ua

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Invariant random subgroups of rank 1 Lie groups and hyperbolic groups and their growth rates

Ilya Gekhtman, Arie Levit

Invariant random subgroups (IRS) are conjugacy invariant probability measures on the space of subgroups of a given group G. They arise naturally as point stabilizers of probability measure preserving actions. The space of invariant random subgroups of SL_2R can be regarded as a natural compactification of the moduli space of Riemann surfaces, related to the Deligne-Mumford compactification. Invariant random subgroups can be regarded as a generalization both of normal subgroups and of lattices in topological groups. As such, it is interesting to extend results from the theories of normal subgroups and of lattices to the IRS setting.

Jointly with Arie Levit, we prove such a result: the critical exponent (exponential growth rate) of an infinite IRS in an isometry group of a Gromov hyperbolic space (such as a rank 1 Lie group, or a hyperbolic group) is almost surely greater than half the Hausdorff dimension of the boundary.

This generalizes an analogous result of Matsuzaki-Yabuki-Jaerisch for normal subgroups.

As a corollary, we obtain that if Γ is a typical subgroup and X a rank 1 symmetric space then $\lambda_0(X/\Gamma) < \lambda_0(X)$ where λ_0 is the bottom of the spectrum of the Laplacian. The proof uses ergodic theorems for actions of hyperbolic groups.

I will also talk about results about growth rates of normal subgroups of hyperbolic groups that inspired this work. Based mostly on the paper "Critical exponents of invariant random subgroups in negative curvature." (llya Gekhtman and Arie Levit, GAFA 2019)

Contact information

Ilya Gekhtman
Department of Mathematics, Toronto, Canada
Email address: ilyagekh@gmail.com

Arie Levit
Department of Mathematics, Toronto, Canada
Email address: ilyagekh@gmail.com

Abelian varieties and p-divisible groups of Minkowski's conjecture concerning critical lattices of the region, its characteristic $p > 0$ analogues and expansions

Nikolaj Glazunov

We investigate algebraic aspects of the Minkowski's conjecture [**4, 2**] concerning admissible and critical lattices of the region $|x|^p + |y|^p < 1,\ p > 1$, its extensions, and reductions to finite fields. These aspects include lattices (modules), abelian varieties (elliptic curves), p-divisible and formal groups and corresponding moduli spaces. For notations and definitions from geometry of numbers see [**4, 1, 2, 3**]. Recall some of them. Let $\mathcal{R} \subset \mathbb{R}^n$ be a set and Λ be a lattice with the basis $\{a_1, \ldots, a_n\}$ in $\mathbb{R}^n$. A lattice Λ is *admissible* for the body $\mathcal{R}$ ($\mathcal{R}-$*admissible*) if $\mathcal{D} \bigcap \Lambda = \emptyset$ or 0. Let $d(\Lambda)$ be the determinant of Λ. The infimum $\Delta(\mathcal{R})$ of determinants of all lattices admissible for $\mathcal{R}$ is called *the critical determinant* of $\mathcal{R}$; if there is no $\mathcal{R}-$admissible lattices then puts $\Delta(\mathcal{R}) = \infty$. A lattice Λ is *critical* if $d(\Lambda) = \Delta(\mathcal{R})$. Let $D_p = \{(x, y),\ p > 1\} \subset \mathbb{R}^2$ be the 2-dimension region:

$$|x|^p + |y|^p < 1. \tag{1}$$

At first present the Minkowski-Cohn moduli space framework of our considerations of admissible and critical lattices. Let

$$\Delta(p, \sigma) = (\tau + \sigma)(1 + \tau^p)^{-\frac{1}{p}}(1 + \sigma^p)^{-\frac{1}{p}}, \tag{2}$$

be the function defined in the domain

$$\mathcal{M}:\ \infty > p > 1,\ 1 \le \sigma \le \sigma_p = (2^p - 1)^{\frac{1}{p}},$$

of the $\{p, \sigma\}$ plane, where σ is some real parameter; here $\tau = \tau(p, \sigma)$ is the function uniquely determined by the conditions

$$A^p + B^p = 1,\ 0 \le \tau \le \tau_p,$$

where

$$A = A(p, \sigma) = (1 + \tau^p)^{-\frac{1}{p}} - (1 + \sigma^p)^{-\frac{1}{p}},$$

$$B = B(p, \sigma) = \sigma(1 + \sigma^p)^{-\frac{1}{p}} + \tau(1 + \tau^p)^{-\frac{1}{p}},$$

τ_p is defined by the equation

$$2(1 - \tau_p)^p = 1 + \tau_p^p,\ 0 \le \tau_p \le 1.$$

Remark 1. The function $\Delta(p, \sigma)$ in region $\mathcal{M}$ determines the moduli space of admissiblel lattices of the rigion D_p each of which contains three pairs of points on the boundary of D_p.