Seminarium geometrów

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Conjugation-invariant norms on $SL_2(R)$ for rings of integers with infinitely many units

Abstract: Conjugation-invariant norms were initially introduced by Burago, Ivanov and Polterovich to understand commutator lengths of diffeomorphism groups, quasi-morphisms and hamiltonian group actions. However, interest quickly arose in studying conjugation-invariant norms of groups more abstractly and one of the first class of examples studied were the groups $SL_{n\geqslant 3}(R)$ for R a ring of integers in number fields: Burago et. al. showed that such conjugation-invariant norms always have finite diameter and the precise behavior of these diameters were described by Kedra, Libman and Martin in their concept of strong boundedness. In the non-discrete case it was recently shown by Polterovich, Shalom and Shem-Tov that conjugation-invariant norms on $SL_{n\geqslant 3}(R)$ have profinite completions, a property they call the dichotomy property. Beyond $SL_{n\geqslant 3}$ itself, I used very similar arguments to show that these results generalize to all other arithmetic Chevalley groups of higher rank. However, it is well-known that the behavior of $SL_2(R)$ for R a ring of integers with infinitely many units closely resembles those of Chevalley groups and so it stands to reason that strong boundedness and the dichotomy property should generalize to $SL_2(R)$ as well. However the proof of both strong boundedness and the dichotomy property for Chevalley groups rely on K-theoretic results not all of whom hold for $SL_2(R)$. In this talk I will give a brief account on conjugation-invariant norms on Chevalley groups and then describe proofs for strong boundedness and the dichotomy property for $SL_2(R)$. Last, I will describe some open problems.

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