Algebra Seminar

Secondary Terms in the Davenport-Heilbronn Theorems

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Abstract: In a 1971 paper, Davenport and Heilbronn proved asymptotics for the number of cubic fields of bounded discriminant, and a related result for 3-torsion in class groups of quadratic fields. However, numerical experiments revealed that their formulas were a poor match for the data.

In the cubic field case, Roberts conjectured that this poor match is explained by a secondary term of order $X^{5/6}$, and we will prove his conjecture as well as the analogous statement for class groups. We also obtain a surprising non-equidistribution in arithmetic progressions, which appears only in the secondary term.

Our work is independent of another proof of Roberts' conjecture by Bhargava, Shankar, and Tsimerman, and uses the theory of Shintani zeta functions. This is joint work with Takashi Taniguchi.

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