Mathematics, Statistics, and Computer Science   **@ UIC**

Number Theory Seminar

Uniformity of rational points and tropical geometry

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Abstract: Let X be a curve of genus g over a number field F of degree $d = [F : \mathbb{Q}]$. The conjectural existence of a uniform bound $N(g, d)$ on the number $\#X(F)$ of F-rational points of X is an outstanding open problem in arithmetic geometry, to follow from the Bomberi–Lang conjecture. We prove a special case of this conjecture – we give an explicit uniform bound when X has Mordell–Weil rank $r \leq g - 3$. This generalizes recent work of Stoll on uniform bounds for hyperelliptic curves. Using the same techniques, we give an explicit, unconditional uniform bound on the number of F-rational torsion points of J lying on the image of X under an Abel–Jacobi map. We also give an explicit uniform bound on the number of geometric torsion points of J lying on X when the reduction type of X is highly degenerate.

Our methods combine Chabauty–Coleman's p-adic integration, non-Archimedean harmonic analysis on Berkovich curves, and the theory of linear systems and divisors on metric graphs.

This is joint work with Joe Rabinoff and Eric Katz.

Tuesday, April 28 at 11:00 AM in SEO 427