Math 209 - Number Theory

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Rational Point Count Distributions for del Pezzo Surfaces over Finite Fields

Abstract:
A del Pezzo surface of degree $d$ over a finite field of size $q$ has at most $q^2 + (10 - d)q + 1$ $F_q$-rational points. A surface attaining this maximum is called split, and if all of these rational points lie on the exceptional curves of the surface, then it is called full. Can we count and classify these extremal surfaces? We focus on del Pezzo surfaces of degree 3, cubic surfaces, and of degree 2, double covers of the projective plane branched over a quartic curve. We will see connections to the geometry of bitangents of plane quartics, counting formulas for points in general position, and error-correcting codes.

Special Note:
There will be a pre-talk from 1:15 to 1:45 for graduate students and postdocs.

Host: Kiran Kedlaya

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2:00 PM
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