Number Theory Seminar

How often does a cubic hypersurface have a point?

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Abstract: A cubic hypersurface in $\mathbb{P}^n$ defined over $\mathbb{Q}$ is given by the vanishing locus of an integral cubic form in $n + 1$ variables. For $n \geq 4$, it is conjectured that these varieties satisfy the Hasse principle. Recent work of Browning, Le Boudec, and Sawin shows that this conjecture holds on average, in the sense that the density of soluble cubic forms is equal to that of the everywhere locally soluble ones. But what do these densities actually look like? We give exact formulae in terms of the probability that a cubic hypersurface has p-adic points for each prime p. These local densities are rational functions, uniform in p, recovering a result of Bhargava, Cremona, and Fisher in the $n = 2$ case. This is joint work with Lea Beneish.

Tuesday, October 15 at 2:00 PM in 636 SEO