

Random Diophantine Equations and the Prime Hasse Principle

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Abstract

If a homogeneous Diophantine equation has a nontrivial solution in the integers, then it also has a nontrivial solution in the reals and in the integers modulo p^n for every prime p and $n > 0$. The Hasse Principle is said to hold for an equation if the converse also holds.

In their 2014 paper, Brüdern and Dietmann proved that for diagonal homogeneous equations of degree k in at least $3k + 2$ variables, the Hasse Principle almost always holds, in the sense that if one chooses the coefficients uniformly in a box of size A , then the probability that the Hasse Principle holds tends to 1 as A tends to infinity.

In this seminar, we will outline the main ideas of their proof (which uses the Circle Method), and then talk about the analogous result for solubility of equations in the primes (solutions consisting of prime numbers). It turns out that one of the main challenges of doing this is coming up with an analogue to the Hasse Principle, which I am calling a "Prime Hasse Principle".

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Location: B3.02

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