

Steven Robertson

lundi 3 juin 2024 16:20 (30 minutes)

A Combinatorial Approach to the $p(t)$ -adic Littlewood Conjecture

Let p be a prime and let $p(t)$ be an irreducible polynomial with coefficients in a field K . In 2004, de Mathan and Teulié stated the p -adic Littlewood conjecture (p -LC) in analogy to the classical Littlewood conjecture. This talk focuses on the analogue of p -LC over the field of formal Laurent series with coefficients in K , known as the $p(t)$ -adic Littlewood conjecture ($p(t)$ -LC). Specifically, two metric results are provided on $p(t)$ -LC with an additional growth function f . The first - a Khintchine-type theorem for $p(t)$ -adic multiplicative approximation - enables one to determine the measure of the set of counterexamples to $p(t)$ -LC for any choice of f . The second complements this by showing that the Hausdorff dimension of the same set is maximal when $p(t) = t$ in the critical case where $f = \log 2$.

These statements are proved by developing a dictionary between Diophantine approximation in function fields and the so-called number wall of a sequence - an infinite array containing the determinant of every finite Toeplitz matrix generated by that sequence. This unique methodology provides a complementary approach to the classical strategies used to attack a problem in Diophantine approximation: namely, Ergodic Theory and Number Theory.