

Why do some equations have only finitely many solutions?

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Certain polynomials $f(x_1, \dots, x_n)$ in n variables and with integer coefficients have the remarkable property that, for every number ring A , the equation $f(a_1, \dots, a_n) = 0$ has only finitely many solutions with a_1, \dots, a_n elements of A . The Lang-Vojta conjecture in fact predicts that polynomials with this property are precisely those whose zero set defines a hyperbolic variety. In particular, Lang-Vojta's conjecture relates certain "arithmetic" properties of a polynomial with certain "complex analytic" properties. In this talk I will explain this deep conjecture through many simple examples, and present several results predicted by this conjecture.