

Measuring the solution set of a system of polynomial equations

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Abstract

Polynomials appear in a wide variety of contexts in Mathematics, Engineering and Computer Science. Polynomials in those situations are not random but come up with a certain structure that is important to exploit. A relevant result in this direction is the classical Bernstein-Kushirenko theorem, giving a bound for the number of solutions in the algebraic torus of a system of polynomial equations in terms of their Newton polytopes. In this talk, I will present advances towards an arithmetic analogue of this result, bounding the bit length of such a solution set. This will give us the pretext for an excursion into the arithmetic intersection theory of toric varieties, a fascinating subject at the crossroad of algebraic geometry, number theory and combinatorics.