Stable Polynomials and van der Waerden’s Conjecture

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Abstract

Stable polynomials are multivariate polynomials which can be viewed as a generalization of real-rooted univariate polynomials. Recently they found beautiful and surprising applications in combinatorics and theoretical computer science. I will explain how they can be used to prove van der Waerden’s conjecture about doubly stochastic matrices: for any $n \times n$ doubly stochastic matrix, the permanent is at least $n!/n^n$ (which is achieved by the matrix where every entry is $1/n$).