

Locating Roots of Sparse Exponential Sums via Discrete Geometry

An exponential sum is a polynomial with real exponents, and a sparse exponential sum is the one with few terms. There are classical results due to Cauchy and later results due to Ostrowski and Voorhove that give estimates on the number of roots of a univariate polynomial in a disk, an angular sector or a rectangle. In this talk, we discuss a discrete geometric approach that refines classical results in univariate case and also generalizes to the multivariate exponential sums. We provide a polyhedral approximation to the roots of the sparse exponential sum, and provide precise distance bounds based on the number of terms. Our approach benefits from the tropical geometric point of view but no background in the field is assumed from the audience. This is joint work with Grigoris Paouris and J. Maurice Rojas.