

Sparse Nonnegative Polynomials, Sums of Squares and Lattice Points in Polytopes

In this talk we will completely describe sections of the cone of nonnegative polynomials and sums of squares with a certain class of sparse polynomials that are supported on a circuit. These descriptions depend heavily on the combinatorial structure and lattice point configuration of the corresponding Newton polytopes of the polynomials. Using tools from toric geometry, we will encounter large subsets at which nonnegative polynomials are equal to sums of squares. Furthermore, we provide counterexamples and conjectures to some open problems concerning a generalization to larger support sets.