

Certificates of polynomial nonnegativity via hyperbolic optimization

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A key connection between real algebraic geometry and optimization is that we can check whether a multivariate polynomial is a sum of squares by solving a semidefinite optimization problem. This talk will focus on an alternative approach to certifying the nonnegativity of homogeneous multivariate polynomials that is based on the theory of hyperbolic polynomials, and can be made effective by solving hyperbolic optimization problems. I will introduce this approach, discuss known relationships between these hyperbolic certificates of nonnegativity and sums of squares, and explain how they connect to efforts to understand the relative expressive power of semidefinite and hyperbolic optimization.