VIRTUAL EAST-WEST SCV SEMINAR

June 15, 2021

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Algebraic methods for the study of hermitian sums of squares

We study real bihomogeneous polynomials $r(z, \bar{z})$ on the diagonal of $\mathbb{C}^n \times \mathbb{C}^n$ for which $r(z, \bar{z}) \, ||z||^2 = ||h(z)||^2$ for some holomorphic polynomial mapping h. Such polynomials are interesting objects of study in their own right, but are also the locus of the Ebenfelt Sum of Squares (SOS) Conjecture, which has implications for the study of proper holomorphic mappings between balls in complex Euclidean spaces of different dimensions. In this talk we discuss algebraic reformulations of these problems, give an overview of our results concerning possible signatures and ranks for this class of polynomials, and discuss our progress on the SOS Conjecture. This program is joint work with Dusty Grundmeier, and, more recently, Hal Schenck.