

ALGEBRA AND NUMBER THEORY
SEMINAR

Nonnegative Polynomials and Sums of Squares

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Abstract: A multivariate real polynomial p is nonnegative if $p(x)$ is at least 0 for all $x \in \mathbb{R}^n$. I will review the history and motivation behind the problem of representing nonnegative polynomials as sums of squares. Such representations are of interest for both theoretical and practical computational reasons. However, much about the relationship between nonnegative polynomials and sums of squares remains unknown. I will present some recent results which establish links between nonnegative polynomials, sums of squares and classical algebraic geometry. In the smallest cases where there exist nonnegative polynomials that are not sums of squares I will describe a complete classification of the differences between these sets.

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MATHEMATICS AND COMPUTER SCIENCE
EMORY UNIVERSITY