Polynomials constant on a hyperplane and CR maps of spheres

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Abstract
Joint work with Han Peters. Let $p$ be a polynomial in several variables with nonnegative coefficients that is equal to 1 whenever the variables sum to 1. We prove a sharp degree bound for such polynomials with a fixed number of nonnegative distinct monomials. This bound was conjectured by John P. D’Angelo and proved in two dimensions by D’Angelo, Kos and Riehl. The speaker together with Han Peters has proved the bound for dimensions 3 and greater. In dimensions 4 and higher we in fact have a complete classification of the sharp polynomials. As a corollary we obtain a sharp degree bound on monomial CR maps of spheres. The first part of the talk will be rather elementary and should be understandable even for undergraduate students.