Meeting: 1006, Lubbock, Texas, SS 6A, Special Session on Real Algebraic Geometry

1006-14-221 **J. Maurice Rojas*** (rojas@math.tamu.edu), TAMU 3368, Texas A&M University, College Station, TX 77843-3368. *Bounds and Algorithms for Real Polynomials Supported on Circuits.*

Consider an n-variate real polynomial f of degree d with $m \leq n+2$ monomial terms. We show that the zero set of f in the positive orthant has no more than n compact connected components, and no more than $2n$ non-compact connected components. The best previous bound for the total number of connected components was $2^{O(n^2)}$, via a more general result of Khovanski. We then show how to decide, in many cases, the existence of a real root of f, using a number of bit operations polynomial in n and the logarithm of d. The best previous bit complexity bounds were polynomial in d^n. (Received February 15, 2005)