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Victoria Powers*, Dept. of Mathematics and Computer Science, Emory University, Atlanta, GA 30322. *Certificates of positivity for polynomials nonnegative on compact semialgebraic sets in the plane.*

Suppose S is a basic closed semialgebraic set in \mathbb{R}^n , i.e., a set defined by finitely many nonstrict polynomial inequalities, and a polynomial f with real coefficients is positive, or non-negative, on S . By a **certificate of positivity for f on S** we mean an algebraic expression for f , usually involving sums of squares of real polynomials, from which one can deduce the positivity condition immediately. The theory and practice of such certificates has a long and rich history, going back to work of Hilbert in the late 19th century. Recently, there has been much interest in the subject due to many applications in both pure and applied mathematics. In this talk, we will discuss certificates of positivity for compact basic closed semialgebraic sets in \mathbb{R}^2 , particularly compact polyhedra. (Received January 06, 2016)