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Timo de Wolff* (dewolff@math.tamu.edu) and **Sadik Iliman**. *Amoebas, Nonnegative Polynomials and Sums of Squares Supported on Circuits*.

We completely characterize sections of the cones of nonnegative polynomials and sums of squares with *polynomials supported on circuits* – a genuine class of sparse polynomials. In particular, nonnegativity is characterized by an invariant, which can be immediately derived from the initial polynomial via using a new norm based relaxation strategy. Based on these results, we obtain a completely new class of nonnegativity certificates independent from sums of squares certificates.

Furthermore, nonnegativity of such polynomials f coincides with solidness of the *amoeba* of f , i.e., the Log-absolute-value image of the algebraic variety $V(f) \subset (\mathbb{C}^*)^n$ of f .

These results establish a first direct connection between amoeba theory and nonnegativity of polynomials. They generalize earlier works both in amoeba theory and real algebraic geometry by Fidalgo, Kovacec, Reznick, Theobald and de Wolff. (Received September 14, 2014)