

1164-14-216

Timo de Wolff* (t.de-wolff@tu-braunschweig.de), Braunschweig, Germany, and **Adam Kurpisz** and **Mareike Dressler**. *Certificates of Nonnegativity and Their Applications in Theoretical Computer Science*.

Certifying nonnegativity of real, multivariate polynomials is a key problem in real algebraic geometry since the 19th century. In the 21st century, the problem (re-)gained significant momentum due to its relevance in polynomial optimization and its applications. The classical standard certificates of nonnegativity are sums of squares (SOS). But other, independent certificates of nonnegativity exist: e.g., sums of nonnegative circuit polynomials (SONC), which I have developed joint with Iliman in 2014.

In the first part of this talk, I give an overview about certificates and hierarchies of nonnegativity. In the second part, I discuss highlights of recent work joint with Dressler and Kurpisz about theoretical bounds for hierarchies (of nonnegativity) applied to polynomial optimization problems on the Boolean Hypercube. This class includes in particular standard problems in theoretical computer science such as MAXCUT or KNAPSACK, which motivated our work. (Received January 19, 2021)