1142-90-186 **Timo de Wolff*** (`dewolff@math.tu-berlin.de`), Institut für Mathematik der TU Berlin, Sekr. MA 6-2, Str. des 17. Juni 136, Berlin, Germany, and **Henning Seidler**. *Polynomial Optimization via SONC Certificates.*

Deciding nonnegativity of real polynomials is a fundamental problem in real algebraic geometry and polynomial optimization. Since the 19th century, sums of squares (SOS) are a standard certificates for nonnegativity, which can be detected via semidefinite programming (SDP) in practice.

In 2014, Sadik Iliman and I introduced a new nonnegativity certificate based on *sums of nonnegative circuit polynomials (SONC)*. These certificates are *independent* of sums of squares. In the same year, we applied SONCs to global nonnegativity problems using geometric programming (GP) for the first time.

In this talk, I will present recent work with my graduate student Henning Seidler: In early 2018, we released a first version of our software POEM for polynomial optimization especially using SONC certificates. Recently, we finished a first experimental, large-scale comparison of SONC and SOS certificates for unconstrained optimization. Though both the SDPs corresponding to SOS and the GPs corresponding to SONC are convex optimization problems, which are solved numerically via interior point methods, their performance differs dramatically in practice. (Received September 03, 2018)