

The SONC Cone: Primal and Dual Perspectives

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Countless applied problems in various sciences can be expressed as polynomial optimization problems. Solving these nonlinear problems essentially requires to certify nonnegativity of multivariate, real polynomials, a classical problem from real algebraic geometry.

A classical way to certify nonnegativity are sums of squares (SOS). An alternative way are sums of nonnegative circuit polynomials (SONC), which I introduced joint with Ilman in 2014. The latter forms a convex cone with algebraic boundary.

Moreover, motivated from a dualization process, one can obtain a particular (strict but full-dimensional) subcone of the SONC cone leading to certificates which have, despite being weaker than SONC, the great benefit to be obtainable via linear programming.

In this talk I will speak about the SONC cone and its subcone. It is based on joint work with Jens Forgaard and upcoming work with Janin Heuer.

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