The SONC Cone: Primal and Dual Perspectives

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Solving polynomial optimization problems requires to certify nonnegativity of multivariate, real polynomials. A classical way to do this are sums of squares (SOS). An alternative way are sums of nonnegative circuit polynomials (SONC), which I introduced joint with Iliman in 2014 building on work by Reznick. For a fixed support, SONCs form a convex cone, which has the same dimension as the corresponding nonnegativity cone. Moreover, motivated from a dualization process, one can obtain a particular (strict but full-dimensional) subcone of the SONC cone - the DSONC cone - leading to certificates which have, despite being weaker than SONC, the benefit to be obtainable via linear programming. In this talk I will speak about the SONC cone and its DSONC subcone. It is based on ArXiv 2204.03918.

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