A specialized SDP solver for sums-of-squares problems in discrete geometry

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Abstract

Many bounds in discrete geometry can be formulated as a semidefinite program with polynomial inequality constraints, which typically are enforced using sums-of-squares characterizations and coefficient matching. In this talk I will explain how sampling preserves the low-rank structure typically present in these programs and how this can be used in a semidefinite programming solver for faster computations. The final part of the talk will include some basic examples to show how our Julia implementation of the solver can be used in practice. Joint work with David de Laat.