

Title: Locally Positive Semidefinite Matrices

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Abstract: The cone of positive semidefinite matrices plays a prominent role in optimization, and many hard computational problems have well-performing semidefinite relaxations. In practice, enforcing the constraint that a large matrix is positive semidefinite can be expensive. We introduce the cone of k -locally positive semidefinite matrices, which consists of matrices all of whose k by k principal submatrices are positive semidefinite. We consider the distance between the cones of positive and locally positive semidefinite matrices, and possible eigenvalues of locally positive semidefinite matrices. Hyperbolic polynomials play a role in some of the proofs. Joint work with Santanu Dey, Marco Molinaro, Kevin Shu and Shengding Sun.