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Cone Lifts of Convex Bodies

A central open question at the intersection of convexity and optimization is to characterize those convex semialgebraic sets that arise as the projection of a slice of a positive semidefinite cone by an affine space. In this talk I will address the following question: Given a convex body C and a closed convex cone K , when is C the projection of K intersected with an affine space? The characterization relies on a new notion of cone-factorization of a nonnegative matrix extending the well-known notion of nonnegative factorization of a nonnegative matrix.