

The Lyapunov rank of a proper cone

by

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Abstract:

In various strategies for solving primal-dual conic linear problems or cone complementarity problems, one tries to write the optimality/complementarity conditions in the form of a square system by replacing the complementarity constraints by linearly independent bilinear relations (which come from the so-called Lyapunov-like transformations). In order to identify proper cones where this can be achieved, we define the *Lyapunov rank* of a proper cone as the maximal number of linearly independent Lyapunov-like transformations on the cone, or equivalently, as the dimension of the Lie algebra of the automorphism group of that cone. In this talk, we present some rank results for various cones of interest (polyhedral cones, symmetric cones, and completely positive cones). In particular, we describe a recent rank result on permutation invariant proper polyhedral cones.