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M. Seetharama Gowda* (gowda@math.umbc.edu), Department of Mathematics and Statistics, UMBC, Baltimore, MD 21250. *The Lyapunov rank of a proper cone.*

In various strategies for solving primal-dual cone-LP 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. In order to identify proper cones where this can be achieved, we define the Lyapunov rank (also called the bilinearity rank) of a proper cone in R^n as the maximal number of linearly independent Lyapunov-like transformations (bilinearity relations) 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 polyhedral cones, symmetric cones, completely positive cones, and Bishop-Phelps cones. We show, for example, that proper irreducible polyhedral cones (such as the l_1 -cone, for $n \geq 3$) have rank one and symmetric cones admit square complementarity systems. (Received January 28, 2014)