Talk: Jordan symmetry reduction for conic optimization over the doubly nonnegative cone: theory and software

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Abstract: A common computational approach for polynomial optimization problems (POPs) is to use (hierarchies of) semidefinite programming (SDP) relaxations. When the variables in the POP are required to be nonnegative, these SDP problems typically involve nonnegative matrices, i.e. they are conic optimization problems over the doubly nonnegative cone. The Jordan reduction, a symmetry reduction method for conic optimization, was recently introduced for symmetric cones by Parrilo and Permenter [Mathematical Programming 181(1), 2020]. We extend this method to the doubly nonnegative cone, and investigate its application to known relaxations of the quadratic assignment and maximum stable set problems. We also introduce new Julia software where the symmetry reduction is implemented. This is joint work with Daniel Brosch.