

COLLOQUIUM

Optimization with sparse matrix cone constraints

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Abstract: Optimization problems with sparse matrix cone constraints arise naturally in a wide range of applications, and such problems can often be solved efficiently by carefully utilizing the underlying structure. Two kinds of sparse matrix cones are of particular interest: the cone of symmetric positive semidefinite matrices with a given sparsity pattern and its dual cone, the cone of sparse, positive semidefinite-completable matrices. These cones are very general and include, as special cases, the nonnegative orthant, the quadratic cone, and the cone of positive semidefinite matrices. Using techniques from sparse numerical linear algebra, the structure of the sparse matrix cones can be exploited to construct faster optimization algorithms. This talk will focus on the usefulness of sparse matrix cone formulations, which will be demonstrated through numerical examples drawn from a variety of problems such as optimal power flow and robust estimation.

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