

A Convex Reformulation of Rank-constrained Optimization Problems

ABSTRACT – Low rank approximations are desirable in many settings. We show that the problem of minimizing a linear or convex quadratic objective function of a matrix subject to linear constraints and an upper bound on the rank is equivalent to a convex conic optimization problem. The reformulation first represents the problem as a semidefinite program with conic complementarity constraints and then lifts the problem to give an equivalent convex conic optimization problem. The rank-sparsity decomposition problem falls within our framework.



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SPEAKER BIO – John Mitchell is a Professor of Mathematical Sciences and of Industrial and Systems Engineering at Rensselaer Polytechnic Institute. He earned a PhD in operations research from Cornell University. He has multiple publications on interior point column generation, semidefinite programming, mathematical programs with complementarity constraints, integer programming, and applications of optimization. His research is concerned with the interplay between different areas of optimization, for example using continuous optimization techniques to solve discrete optimization problems, or employing integer programming techniques to solve problems with complementarity constraints, or exploiting strong convex relaxations of nonconvex optimization problems. His applied optimization projects include the development of recovery plans for interdependent infrastructure systems after a disaster, scheduling sports leagues, path planning in robotics, and financial optimization.

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3:30PM – 4:50PM

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