Abstract:

Mixed-integer semidefinite optimization problems involve minimizing or maximizing a linear objective function subject to the constraints in which a given matrix formed from the decision variables is positive semidefinite, and some of the variables are integer-valued. Due to the nonlinearity of the positive semidefinite constraint and the discreteness of the integer constraints, this problem includes various practical optimization problems. In this talk, we introduce some of our recent studies for mixed integer semidefinite optimization and its applications to portfolio optimization. First, to solve large-sized mixed-integer semidefinite optimization problems, we propose a branch-and-cut method as a general-purpose method. Next, we focus on the cardinality-constrained distributionally-robust portfolio optimization problem formulated as a mixed integer semidefinite optimization problem and propose a specialized algorithm to solve this model with the cutting-plane method.