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Complexity Analyses of Discretized Successive Convex Relaxation Methods

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Abstract We investigate the computational complexity of discretized successive convex relaxation methods in the way of upper bounding the number of major iterations required, in the worst case. Kojima and Takeda [2] earlier analyzed the computational complexity of semi-infinite successive convex relaxation methods (these methods require the solution of infinitely many linear programming or semidefinite programming problems with infinitely many constraints to be solved during each major iteration). Our analyses extend Kojima-Takeda analysis to the discretized successive convex relaxation methods which require the solution of finitely many ordinary linear programming or semidefinite programming problems in each major iteration. Our complexity bounds are within a small constant (four) multiple of theirs.

Keywords non-convex quadratic optimization, computational complexity, convex relaxation, semidefinite programming, linear programming, lift-and project methods

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