



A Novel Adaptive Method Based on New Minorant-Majorant Functions Without Line Search for Semidefinite Optimization

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Abstract: A novel robust adaptive method, to solve a semidefinite programming (SDP) problem, is proposed in this study. We are interested in computation of the direction by Newton's method and of the displacement step using minorant-majorant functions instead of line search methods in order to reduce the computation cost. Our new approach is even more beneficial than classical line search methods. We created a MATLAB implementation and ran numerical tests on various sizable instances to validate it. The numerical data gained demonstrate the correctness and effectiveness of our strategy, and are presented in the last section of this paper.

Keywords: *semidefinite optimization, interior point methods, perturbations minorant-majorant functions, general perturbation schemes, line search.*

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1 Introduction

In the last twenty years, Semidefinite Programming (SDP) has evolved as the most exciting and active research area in optimization. Combinatorial optimization, control theory, and conventional convex constrained optimization are only a few of the many disciplines in which SDP has applications. SDP problems arise in several areas of applications such as economic, social, public planning and nonlinear dynamics and systems (see [2, 18]). Most of these applications can often be solved pretty efficiently both in theory and in reality since SDP is solvable through interior-point methods.

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