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A Logarithmic Barrier approach for Linear Programming

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Abstract

This paper presents a logarithmic barrier method for solving a linear programming problem. We are interested in computation of the direction by the Newton's method and in computation of the displacement step using majorant functions instead line search methods in order to reduce the computation cost. This purpose is confirmed by numerical experiments, showing the efficiency of our approach, which are presented in the last section of this paper.

Keywords: Linear Programming, Interior Point Methods, Logarithmic Barrier methods.

2010 MSC: 90C22, 90C51.

1. Introduction

Interior point methods are developed in the sixties by Dikin and Fiacco-McCormick [8], to solve nonlinear mathematical programs with large dimension. Some alternatives are conceived for the linear programming history to find the coherence between the theory and the practice, among powerful algorithms with polynomial complexity.

We distinguish three fundamental classes of interior point methods, namely: affine methods, potential reduction methods and central trajectory methods [16]. Interior point methods were the object of several research works, the ones done by Den Hertog [7], Nesterov and Nemirovski [14], Roos, Terlaky and Vial

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