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Simplified infeasible interior-point algorithm for linear optimization based on a simple function

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Abstract

Based on a similar kernel function, we present an infeasible version of the interior-point algorithm for linear optimization introduced by Wang et al. (2016). The property of exponential convexity is still important to simplify the analysis of the algorithm. The iteration bound coincides with the currently best iteration bound for infeasible interior-point algorithms.

Keywords: Linear optimization, Infeasible interior-point algorithm, Kernel function, Exponential convexity

1. Introduction

The interior-point methods (IPMs) becomes one of the most effective methods for solving linear optimization (LO) problems after Karmarkar [1] first proposed it in his path-breaking paper, which enables the methods to be a hot area of research. There are two kinds of IPMs: feasible interior-point methods (FIPMs) and infeasible interior-point methods (IIPMs). FIPMs start with a strictly feasible point and maintain feasibility during the solution process. However, it is not easy to find an initial feasible interior point. One method to overcome this difficulty is to use the homogeneous embedding model introduced first by Ye et al. [2] for LO, see more in [3, 4]. IIPMs have the advantage that they can start with an arbitrary point and feasibility can be reached if optimality is approached. Lustig [5] and Tanabe [6] were the

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