

Large-step interior-point algorithm for linear optimization based on a new wide neighbourhood

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Abstract

The interior-point algorithms for linear optimization can be classified depending on the length of the step. In this way, we can speak about large-step and short-step methods, that work in different neighbourhoods of the central path. The large-step algorithms work in a wide neighbourhood, while the short-step ones determine the new iterates that are in a smaller neighbourhood. In spite of the fact that the large-step algorithms are more efficient in practice, the theoretical complexity of the short-step ones is generally better.

Recently, Ai and Zhang have presented a large-step interior-point algorithm for linear complementarity problems which works in a wide neighbourhood of the central path, but it has the same complexity as the best short-step methods. In this talk we introduce a new wide neighbourhood of the central path. We prove that the obtained large-step primal-dual interior-point algorithm for linear optimization has the same complexity as the best short-step algorithms. Furthermore, we also discuss the possibility of analysing the case of a predictor-corrector method which uses the introduced new neighbourhood of the central path.