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On the implementation of an interior-point filter line-search algorithm for large-scale non-linear programming. (English) [Zbl 1134.90542](#)

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Summary: We present a primal-dual interior-point algorithm with a filter line-search method for nonlinear programming. Local and global convergence properties of this method were analyzed in previous work. Here we provide a comprehensive description of the algorithm, including the feasibility restoration phase for the filter method, second-order corrections, and inertia correction of the KKT matrix. Heuristics are also considered that allow faster performance. This method has been implemented in the IPOPT code, which we demonstrate in a detailed numerical study based on 954 problems from the CUTEr test set. An evaluation is made of several line-search options, and a comparison is provided with two state-of-the-art interior-point codes for nonlinear programming.

MSC:

90C51 Interior-point methods

90C06 Large-scale problems in mathematical programming

90C30 Nonlinear programming

Cited in **2** Reviews
Cited in **589** Documents

Keywords:

Nonlinear programming; Nonconvex constrained optimization; Filter method; Line search; Interior-point method; Barrier method

Software:

CUTEr; HSL; ipfilter; Ipopt; KNITRO; LANCELOT; SifDec; SNOPT

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