An interior-point algorithm for large-scale nonlinear optimization with inexact step computations

ID 504638
Author(s) Curtis, Frank E.; Schenk, Olaf; Waechter, Andreas
Author(s) at UniBasel Schenk, Olaf ;
Year 2010
Title An interior-point algorithm for large-scale nonlinear optimization with inexact step computations
Journal SIAM journal on scientific computing
Volume 32
Number 6
Pages / **Article-Number** 3447-3475
Keywords large-scale optimization, constrained optimization, interior-point methods, nonconvex optimization, trust regions, inexact linear system solvers, Krylov subspace methods
We present a line-search algorithm for large-scale continuous optimization. The algorithm is matrix-free in that it does not require the factorization of derivative matrices. Instead, it uses iterative linear system solvers. Inexact step computations are supported in order to save computational expense during each iteration. The algorithm is an interior-point approach derived from an inexact Newton method for equality constrained optimization proposed by Curtis, Nocedal, and W chter [SIAM J. Optim., 20 (2009), pp. 1224–1249], with additional functionality for handling inequality constraints. The algorithm is shown to be globally convergent under loose assumptions. Numerical results are presented for nonlinear optimization test set collections and a pair of PDE-constrained model problems.

Publisher SIAM
ISSN/ISBN 1064-8275
edoc-URL http://edoc.unibas.ch/dok/A5842690
Full Text on edoc No;
Digital Object Identifier DOI 10.1137/090747634
ISI-Number WOS:000285551800012
Document type (ISI) Article