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Convergence of a regularized Euclidean residual algorithm for nonlinear least-squares.

(English) [Zbl 1218.90182](#)

SIAM J. Numer. Anal. 48, No. 1, 1-29 (2010).

Authors' abstract: "The convergence properties of the new regularized Euclidean residual method for solving general nonlinear least-squares and nonlinear equation problems are investigated. This method, derived from a proposal by *Yu. Nesterov* [*Optim. Methods Softw.* 22, No. 3, 469–483 (2007; [Zbl 1136.65051](#))], uses a model of the objective function consisting of the unsquared Euclidean linearized residual regularized by a quadratic term. At variance with previous analysis, its convergence properties are here considered without assuming uniformly nonsingular globally Lipschitz continuous Jacobians nor an exact subproblem solution. It is proved that the method is globally convergent to first-order critical points and, under stronger assumptions, to roots of the underlying system of nonlinear equations. The rate of convergence is also shown to be quadratic under stronger assumptions."

Reviewer: [Do Van Luu \(Hanoi\)](#)

MSC:

[90C30](#) Nonlinear programming

[65K05](#) Numerical mathematical programming methods

[90C26](#) Nonconvex programming, global optimization

[90C06](#) Large-scale problems in mathematical programming

Cited in **19** Documents

Keywords:

regularized Euclidean residual algorithm; nonlinear least-squares; the Gauss-Newton algorithm; global convergence; first-order critical points

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