

# Algebraic rules for quadratic regularization of Newton's method

E. W. Karas\*    S. A. Santos<sup>†</sup>    B. F. Svaiter<sup>‡</sup>

## Abstract

A class of quasi-Newton methods to minimize a twice differentiable function with Lipschitz continuous Hessian is proposed. These methods are based on the quadratic regularization of Newton's method, with algebraic explicit rules for computing the regularizing parameter. The convergence properties of this class of methods are analyzed. If the sequence generated by the method converges then its limit point is stationary. Local quadratic convergence is also established in a neighborhood of a stationary point with positive definite Hessian. Encouraging preliminary numerical experiments are presented.

**Keywords:** Smooth unconstrained minimization; Newton's method; regularization; global convergence; local convergence; computational results.

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\*Department of Mathematics, Federal University of Paraná, CP 19081, 81531-980, Curitiba, PR, Brazil. E-mail: [ewkaras@ufpr.br](mailto:ewkaras@ufpr.br). This author was partially supported by CNPq grants 307714/2011-0, 472313/2011-8.

<sup>†</sup>Department of Applied Mathematics, University of Campinas, Campinas, SP, Brazil. E-mail: [sandra@ime.unicamp.br](mailto:sandra@ime.unicamp.br). This author was partially supported by CNPq grant 304032/2010-7, FAPESP grants 2013/05475-7, 2013/07375-0 and PRONEX Optimization.

<sup>‡</sup>IMPA, Estrada Dona Castorina 110, 22460-320, Rio de Janeiro, Brazil. E-mail: [benar@impa.br](mailto:benar@impa.br). This author was partially supported by CNPq grants 302962/2011-5, 474944/2010-7, FAPERJ grant E-26/102.940/2011 and PRONEX Optimization.