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QUASI-NEWTON PRECONDITIONERS FOR THE INEXACT NEWTON METHOD*

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Abstract. In this paper preconditioners for solving the linear systems of the Newton method in each nonlinear iteration are studied. In particular, we define a sequence of preconditioners built by means of Broyden-type rank-one updates. Optimality conditions are derived which guarantee that the preconditioned matrices are not far from the identity in a matrix norm. Some notes on the implementation of the corresponding inexact Newton method are given and some numerical results on two model problems illustrate the application of the proposed preconditioners.

Key words. Quasi-Newton method, Krylov iterations, updating preconditioners, inexact Newton method

AMS subject classifications. 65F10, 65H10, 15A12

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