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Abstract

We analyse the semilocal convergence of Newton's method under a center Lipschitz condition for the second derivative of the operator involved different from that used by other authors until now. In particular, we propose to center the Lipschitz condition for the second derivative in a different point from that where Newton's method starts. This allows us to obtain different starting points for Newton's method and modify the domain of starting points.

Keywords: Newton's method, semilocal convergence, majorizing sequence, error estimates, order of convergence, region of accessibility, integral equation.
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1 Introduction

By using mathematical modelling, many problems from computational sciences and other disciplines can be brought in the form of the equation $F(x) = 0$, where F is a nonlinear