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R. Cibulka

NTIS - Dept. of Mathematics, Faculty of Applied Sciences, University of West Bohemia,
Univerzitní 22, 306 14 Pilsen, Czech Republic
cibi@kma.zcu.cz

A. L. Dontchev

Mathematical Reviews, 416 Fourth Street, Ann Arbor, MI 48107-8604, U.S.A.
ald@ams.org

J. Preininger

Institute of Statistics and Mathematical Methods in Economics, University of Technology,
Wiedner Hauptstrasse 8, 1040 Vienna, Austria
jakob.preininger@tuwien.ac.at

T. Roubal

NTIS - Dept. of Mathematics, Faculty of Applied Sciences, University of West Bohemia,
Univerzitní 22, 306 14 Pilsen, Czech Republic
roubalt@students.zcu.cz

V. Veliov

Institute of Statistics and Mathematical Methods in Economics, University of Technology,
Wiedner Hauptstrasse 8, 1040 Vienna, Austria
veliov@tuwien.ac.at

Kantorovich-Type Theorems for Generalized Equations

We study convergence of the Newton method for solving generalized equations of the form $f(x) + F(x) \ni 0$, where f is a continuous but not necessarily smooth function and F is a set-valued mapping with closed graph, both acting in Banach spaces. We present a Kantorovich-type theorem concerning r -linear convergence for a general algorithmic strategy covering both nonsmooth and smooth cases. Under various conditions we obtain higher-order convergence. Examples and computational experiments illustrate the theoretical results.

Keywords: Newton's method, generalized equation, variational inequality, metric regularity, Kantorovich theorem, linear/superlinear/quadratic convergence.

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