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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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