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PERTURBED NEWTON-LIKE METHODS AND NONDIFFERENTIABLE OPERATOR EQUATIONS ON BANACH SPACES WITH A CONVERGENCE STRUCTURE

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Abstract. In this study, we use perturbed Newton-like methods to find solutions of nonlinear, nondifferentiable operator equations on Banach spaces with a convergence structure. This technique involves the introduction of a generalized norm as an operator from a linear space into a partially ordered Banach space. In this way the metric properties of the examined problem can be analyzed more precisely. Moreover, this approach allows us to derive from the same theorem, on the one hand, semi-local results of Kantorovich-type, and on the other hand, global results based on monotonicity considerations. Furthermore, we show that special cases of our results reduce to the corresponding ones already in the literature. Finally, our results are used to solve integral equations that cannot be solved with existing methods.

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