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SEMILOCAL CONVERGENCE FOR NEWTON'S METHOD ON A BANACH SPACE WITH A CONVERGENCE STRUCTURE AND TWICE FRÉCHET DIFFERENTIABLE OPERATORS

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Abstract. We provide a semilocal convergence theorem for Newton's method on a Banach space with a convergence structure. The operators involved are twice Fréchet differentiable. Our result contains earlier ones as special cases, if the Banach space is equipped with a real norm. Moreover it compares favorably with earlier results involving only once Fréchet-differentiable operators, since our sufficient convergence conditions are shown that they can be weaker.

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Key Words and Phrases. Newton's method, Banach space with a convergence structure, majorizing sequence, Fréchet-differentiable operator, Newton–Kantorovich hypothesis.

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