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Summary: In this work we study Newton’s method for solving nonlinear equations with operators defined between two Banach spaces. Together with the classical Kantorovich theory, we consider a center-Lipschitz condition for the Fréchet derivative of the involved operator. This fact allow us to obtain a majorizing sequence for the sequence defined in Banach spaces and to give conditions for the convergence. In this way, we obtain a generalization of Kantorovich’s theorem that improves the values of the universal constant that appears in it as well as the radius where the solution is located and where it is unique. Finally we illustrate the main theoretical result by means of some examples.

MSC:
65H05 Numerical computation of solutions to single equations

Keywords:
Newton’s method; Newton-Kantorovich theorem; semilocal convergence; majorizing sequences

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References:


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