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A LOCAL CONVERGENCE ANALYSIS AND APPLICATIONS OF NEWTON'S METHOD UNDER WEAK ASSUMPTIONS

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Abstract. We provide a local convergence theorem for Newton's method in a Banach space setting. We use Lipschitz, center Lipschitz conditions and small majorizing sequences. It turns out that this way our convergence radius (ball) is larger and the error bounds finer than before. This observation is very important in computational mathematics, and finds several applications such as the construction of efficient mesh independence refinement strategies.

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Key Words and Phrases. Banach space, Newton's method, majorizing functions, Lipschitz, center-Lipschitz conditions, radius (ball) of convergence.

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