Electronic Journal: Southwest Journal of Pure and Applied Mathematics
Internet: http://rattler.cameron.edu/swjpam.html
ISSN 1083-0464
Issue No. 02, 1997, pp. 24–28.
Submitted: October 5, 1997. Published: July 31, 1998.

COMPARING THE RADII OF SOME BALLS APPEARING IN CONNECTION TO THREE LOCAL CONVERGENCE THEOREMS FOR NEWTON'S METHOD

Ioannis K. Argyros I.

Abstract. We provide three local convergence theorems for Newton's method in Banach space. These theorems use information on the first, second, and first-second Fréchet derivatives of the operator involved, respectively. In all cases, we show that for any starting point inside a ball centered at the solution of the nonlinear equation, Newton's method converges to that solution. Our goal is to obtain the smallest and the largest convergence region for method (2). Our results apply to solve autonomous differential equations. A numerical example is also provided.

1991 A.M.S. (MOS) Subject Classification Codes. 65J15, 65B05, 47H17, 49D15.

Key Words and Phrases. Newton's method, Banach space, local convergence theorem.

Department of Mathematics, Cameron University, Lawton, OK 73505 USA
E-mail Address: ioannisa@cameron.edu
©1998 Cameron University

Typeset by $\mathcal{AMS}$-TEX