ERROR ESTIMATE IN THE SINC COLLOCATION METHOD FOR VOLTERRA-FREDHOLM INTEGRAL EQUATIONS BASED ON DE TRANSFORMATION*

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Dedicated to Prof. K. Maleknejad on the occasion of his 62th birthday

Abstract. We present a method and experimental results for approximate solution of nonlinear Volterra-Fredholm integral equations by double exponential (DE) transformation based on the sinc collocation method. It is well known that by applying DE transformation the rate of convergence $O(\exp(-cN/\log N))$ is attained, where N is a parameter representing the number of terms of the sinc expansion. The purpose of this paper is to develop the work carried out in 2005 by Muhammad et al. [J. Comput. Appl. Math., 177 (2005), pp. 269–286], for the numerical solution of two dimensional nonlinear Volterra-Fredholm integral equations. We design a numerical scheme for these equations based on the sinc collocation method incorporated with the DE transformation. A new error estimation by truncation is also obtained which is shown to have an exponential order of convergence as in Muhammad et al. (op. cit.). Finally, the reliability and efficiency of the proposed scheme are demonstrated by some numerical experiments.

Key words. integral equation, sinc collocation method, double exponential transformation, Volterra-Fredholm integral equation, error estimation.

AMS subject classifications. 65D32, 45G10.

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