The Cardinal spline methods for the numerical solution of nonlinear integral equations

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Abstract

In this study, an effective technique is presented for solving nonlinear Volterra integral equations. The method is based upon application of cardinal spline functions on small compact supports . The integral equation is reduced to a system of algebra equations. Since the matrix for the system is triangular, It is relatively straight forward to solve for the unknowns and an approximation of the original solution with high accuracy is accomplished. Several cardinal splines are employed in the paper to enhance the accuracy. The sufficient condition for the existence of the inverse matrix is examined and the convergence rate is examined. We compare our method with other methods proposed in recent papers and demonstrated the advantage of our method with several examples.