JOURNAL OF INTEGRAL EQUATIONS
AND APPLICATIONS
Volume 2, Number 1, Winter 1989

DISCRETE NUMERICAL SOLVABILITY OF HAMMERSTEIN INTEGRAL EQUATIONS OF MIXED TYPE

M. GANESH AND M.C. JOSHI

ABSTRACT. In a recent paper using a variation of the Kumar and Sloan new collocation-type method, we studied the numerical solvability of Hammerstein integral equation of mixed type

$$x(s) + \sum_{i=1}^{m} \int_a^b k_i(s,t) f_i(t, x(t))\, dt = y(s), \quad s \in [a,b]. \tag{I}$$

In this paper a discretized version of the above method is considered. The discrete version is obtained when the integrals are evaluated using quadrature formula. Using interpolatory quadrature rules and piecewise-polynomial function spaces, the convergence of the discrete approximate solutions to the actual solution of (I) is proved. The order of convergence is obtained when the quadrature rule is of certain degree of precision.

1. Introduction. In [**3**], we studied the numerical solvability of Hammerstein integral equation of mixed type

$$x(s) + \sum_{i=1}^{m} \int_a^b k_i(s,t) f_i(t, x(t))\, dt = y(s), \quad s \in [a,b] \tag{1.1}$$

where $-\infty < a < b < \infty, y, k_i$ and f_i are known functions and x is a solution to be determined.

A discretized version of the numerical solvability discussed in [**3**] is considered in this paper. The discretized version is obtained when all the definite integrals required to be evaluated for computing the numerical solution of (1.1) using the method of [**3**], are approximated by numerical quadrature.

The convergence of the discrete approximate solutions to the actual solution of (1.1) is discussed and its rate of convergence is obtained in certain piecewise-polynomial function spaces. When the quadrature