A DISCRETE REGULARIZATION FOR FREDHOLM INTEGRAL EQUATIONS OF THE FIRST KIND

M.T. NAIR

ABSTRACT. Consider the problem of solving the integral equation of the first kind

$$\int_{\Omega} k(s,t)x(t)dt = y(t), \quad s \in \Omega, \tag{$*$}$$

where $\Omega := [a,b]$, $k(\cdot,\cdot) \in L^2(\Omega \times \Omega)$ and $y \in L^2(\Omega)$. It is well known that, the above problem is ill-posed, in the sence that, even if $(*)$ has a unique solution, the solution x does not depend continuously data y. So, in order to obtain stable approximations for the solution or least square solution of $(*)$, some regularization method has to be employed.

In this talk, we shall discuss one such regualrization method when the kernel $k(\cdot,\cdot)$ and the data y are continuous, and when y is known only at some points $\tau_1, \ldots, \tau_n$ in Ω. For obtaining an error estimate and to establish the convergence, we shall assume that the points $\tau_1, \ldots, \tau_n$ in Ω are the nodes for a convergent quadrature rule.

DEPARTMENT OF MATHEMATICS, I.I.T. MADRAS, CHENNAI-600 036, INDIA

E-mail address: mtnair@iitm.ac.in