1019-15-120 **Kourosh Modarresi*** (kourosh.modarresi@stanford.edu), SCCM Program, Stanford University, Gates Building, 2B, Stanford, CA 94305-9025, and **Gene H. Golub** (golub@stanford.edu), Department of Computer Science, Gates Building 2B, Room 280, Stanford, CA 94305-9025. *An Efficient Adaptive Algorithm for the Solution of Fredholm Integral Equations of the First Type.*

The Mathematical model of many physical systems is in the form of a Fredholm integral equations of the first type of;

$$\int_0^1 K(s,t)x(t)dt = d(s) \quad , \qquad 0 \leq s \leq 1$$

The solution to this system is possible through computational methods which require the discretization of the original integral equation. The result of the discretization is a linear system of equations of;

Kx+e=d

In this work, we consider the overdetermined cases. Despite the Hadamard's belief, many real physical problems are ill-posed. Ill-posed physical problems include those with 1st Fredholm equation as their mathematical model. These type of problems are ill-posed due to the fact that their integral operator, $K(s,t)$, is a compact operator. The solution of these type of problems involves regularization techniques. The standard regularization methods solve the problem globally. We discuss a flexible local solution scheme which results in higher accuracy and better approximation of the original solution. (Received August 11, 2006)