



Reproducing kernel method for solving a class of Fredholm integral equations

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Abstract

This paper presented a numerical method for solving Fredholm integral equations by reproducing kernel method (RKM). On the basis of reproducing kernel Hilbert spaces theory, an iterative algorithm for solving some integral equations is presented. We present two examples which have better results than others.

Keywords: Reproducing kernel, Fredholm integral, Approximate solution.

Mathematics Subject Classification [2010]: 45B05, 74H15, 41A10.

1 Introduction

The opinion integral equations play an important role in both mathematics and other applicable areas. This kind equations have been investigated in many application domains. Here, we study Fredholm integral equations [1].

$$y(x) = g(x) + \int_a^b k(x, t)y(t)dt, \quad (1)$$

where the function $g(x)$ and $k(x, t)$ are given, and the unknown function $y(t)$ is to be determined. A new method of solving solution for Fredholm integral equations is proposed in a reproducing kernel Hilbert space in this paper. It is called reproducing kernel method. Reproducing kernel theory has important applications in numerical analysis, differential equations, integral equations, probability and statistics, learning theory and so on. Reproducing kernel methods for solving a variety of integral equations were introduced by Jin [2], Du [3], Chen [4], Shen [5].

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