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Solving Linear Fuzzy Fredholm Integral Equations System by Triangular Functions

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Abstract

In this paper we intend to offer a numerical method to solve linear fuzzy fredholm integral equations system of the second kind. This method converts the given fuzzy system into a linear system of algebraic equations by using triangular orthogonal functions. The proposed method is illustrated by an example and also results are compared with the exact solution by using computer simulations.

Keywords: Fuzzy number, Fuzzy Fredholm integral equations system, Triangular functions
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1 Introduction

There are many numerical methods which have been focused on the solution of fuzzy integral equations. Recently, introduced a new set of triangular orthogonal functions have been applied for solving integral equation by Babolian et al. [1]. Mr Mirzaee et al. [2] have used the triangular functions for solving fuzzy Fredholm integral equation of second kind (FFIE-2). The aim of this paper is to apply the triangular functions for the linear fuzzy Fredholm integral equations system of the second kind (FFIES-2).

2 Preliminaries

Definition 2.1. ([1]) Two m-sets of triangular functions (TFs) are defined over the interval [0,T] as:

$$T1_i(t) = \begin{cases} 1 - \frac{t-ih}{h}, & ih \le t < (i+1)h, \\ 0, & o.w \end{cases}, \quad T2_i(t) = \begin{cases} \frac{t-ih}{h}, & ih \le t < (i+1)h, \\ 0, & o.w \end{cases},$$

where $i = 0, 1, \cdots, m-1, h = \frac{T}{m}$, with a positive integer value for m.

In this paper, it is assumed that $T = 1$. Consider the first m terms of $T1_i$ and $T2_i$,we can write them concisely as m-vectors:

$$T1(t) = [T1_0(t), T1_1(t), \cdots, T1_{m-1}(t)]^T, \quad T2(t) = [T2_0(t), T2_1(t), \cdots, T2_{m-1}(t)]^T.$$

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