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AN ALGORITHMIC APPROACH FOR COUPLED SYSTEM OF FUZZY DIFFERENTIAL EQUATIONS

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Abstract. In the present article, The dynamical systems containing fuzzy valued functions and interaction are named fuzzy differential equations (FDEs). We consider a class of variational iterative technique algorithmic approach for investigating a coupled system of linear fuzzy differential equations is tested with initial value as a triangular fuzzy number. The iterative technique is then applied to score the approximate solutions. The comparable solution of the problem was obtained with little amount of iterations. Two examples have been solved to illustrate the accuracy and implementation of the technique. Comparisons with the accurate solutions verify that this iterative technique is very effective and convenient.

Keywords. fuzzy number, fuzzy differential equations, variational method, fuzzy valued functions, coupled system of fuzzy differential equations.

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1 Introduction

A fuzzy dynamical system of equations of the general form can be considered as:

$$\begin{cases} u'_{l,u}(t;s) = f(t, u(t;s), v(t;s)) \\ v'_{l,u}(t;s) = g(t, u(t;s), v(t;s)), \end{cases}$$

where every u, v is a function of t, if every f, g is a linear function of u, v. Then the system is said to be linear first order fuzzy dynzmical system.Here $s \in [0,1]$, with initial conditions $u_{l,u}(0) = u_0, v_{l,u}(0) = v_0$.

The systems of linear dynamical equations arise in a wide variety of applications.The dynamical system of equations is among the most important mathematical tools used in producing models in the physical, biological sciences, and engineering. The theory of fuzzy sets and applications has advanced in a variety of ways in many disciplines. Applications of this theory can be found, for example, in artificial intelligence, computer science,