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FIXED POINT THEOREM ON COMPLETE £-FUZZY METRIC SPACE

ABSTRACT: *The main purpose of this paper is to give an extension of the fixed point theorem from fuzzy Banach space which is considered in [7] to £-fuzzy Banach space. Moreover, we show that any £-fuzzy contractive map with k as its contractive constant has a unique fixed point.*

Keywords: *t-norm, t-uniformly continuous, £-fuzzy metric space, £-fuzzy contractive, Fixed point theorem.*

1. INTRODUCTION AND PRELIMINARIES

The concepts which is given through this section will be used in the sequel. One can find more about these definitions and statements in [1], [2] ,[3],[4], [5], [6].

Definition 1.1: Suppose that £ = $(L, \leq_L)$ is a complete lattice and U a is non-empty set called universe. An £-fuzzy set L on U is defined as a mapping $A: U \to L$. For each u in U, $A(u)$ represents the degree(in L) to which U satisfies A.

Lemma 1.1: Consider the set L^* and operation $\leq_{L^*}$ defined by:

$$L^* = \{(x_1, x_2) \in [0,1]^2 \ \ and \ \ x_1 + x_2 \leq 1\},$$

$(x_1, x_2) \leq_{L^*} (y_1, y_2) \Leftrightarrow x_1 \leq y_1$ and $x_2 \geq y_2$, for every $(x_1, x_2), (y_1, y_2) \in L^*$. then $(L^*, \leq_{L^*})$ is a complete lattice.

Definition 1.2: An intuitionistic fuzzy set $A_{\xi,\eta}$ on a universe U is an object $A_{\xi,\eta} = \{(\xi_A(u), \eta_A(u) : u \in U\}$; where for all $u \in U$, $\xi_A(u) \in [0,1]$ and $\eta_A(u) \in [0,1]$ are called the membership degree and the non-membership degree, respectively, of u in $A_{\xi,\eta}$ and furthermore satisfy $\xi_A(u) + \eta_A(u) \leq 1$.

Classically, a triangular norm T on $([0,1], \leq)$ is defined as an increasing, commutative, and associative mapping $T: [0,1]^2 \to [0,1]$ satisfying.