APPROXIMATE QUADRATIC FUNCTIONAL EQUATION IN FELBIN'S TYPE NORMED LINEAR SPACES

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Abstract

In this paper, we prove the generalized Hyers–Ulam–Rassias stability of quadratic functional equation in Felbin's type normed linear spaces by using the direct and fixed point methods. The concept of Hyers-Ulam-Rassias stability originated from Th. M. Rassias' stability theorem that appeared in his paper: On the stability of the linear mapping in Banach spaces, Proc. Amer. Math. Soc. **72** (1978), 297–300.

1. Introduction and preliminaries

In [15] Grantner et al., takes the fuzzy real number as a decreasing mapping from the real line to the unit interval or lattice in general. Lowen [28] applies the fuzzy real numbers as non-decreasing, left continuous mapping from the real line to the unit interval so that its supremum over $\mathbb{R}$ is 1. Also fuzzy arithmetic operations on L-fuzzy real line were studied by Rodabaugh [54], where he showed that the binary addition is the only extension of addition to $\mathbb{R}(L)$. Hoehle [17] especially emphasized the role of fuzzy real numbers as modeling a fuzzy threshold softening the notion of Dedekind cut. In this paper a fuzzy real number is taken as a fuzzy normal and convex mapping from the real line to the unit interval.

The concept of the fuzzy metric space has been studied by Kaleva [24, 25] by using fuzzy number as a fuzzy set on the real axis. Kaleva also has recently showed that a fuzzy metric space can be embedded in a complete fuzzy metric space [26]. In [14], Felbin introduced the concept of fuzzy normed linear space (FNLS); Xiao and Zhu [59] studied its linear topological structures and some basic properties of a fuzzy normed linear space. It is

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