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FUZZY WEAK n-INNER PRODUCT SPACE

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Abstract: The paper is concerned with fuzzy real numbers and Felbin-type fuzzy inner product spaces. At first, we study fuzzy 2-inner product and discuss a few basic results of fuzzy inner product and fuzzy 2-inner product. The existence of fuzzy 2-inner product is proved with the help of an example. We introduce the notion of Felbin- type fuzzy weak n-inner product, which is a generalized concept of fuzzy n-inner product. Finally, we construct an n-iterated fuzzy 2-inner product and prove that it is a fuzzy weak n-inner product, also furnish an example of a 3-iterated fuzzy 2-inner product which is not a fuzzy 3-inner product.

Keywords and Phrases: Fuzzy real numbers, fuzzy inner product, weak n-inner product.

2020 Mathematics Subject Classification: Primary 54A40, 03E72; Secondary 46Cxx.

1. Introduction

A. Misiak [12], in 1989 generalized the idea of 2-inner product to n-inner product. Recently Minculete and Păltănea initiated the concept of weak n-inner product [9], with several applications. A classification of results related to the theory of 2-inner product and n-inner product can be found in [2], [3], [4], [5], [7], [12]. The notion of fuzzy norm on a vector space was first introduced by Katsaras, in 1984 [10]. In 1992 [6], Felbin introduced an alternative definition of fuzzy norm and discussed standard results of general normed linear spaces in Felbin-type fuzzy normed