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ON ROUGH CONVERGENCE OF SEQUENCES OF BICOMPLEX NUMBERS

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Abstract. In this paper, using the concept of convergence sequences of bicomplex number and rough convergence, we introduce the notion of rough convergence sequences of bicomplex number and the set of rough limit points of a sequence of bicomplex number. Moreover later we show that the set of all r-limit($r \geq 0$) points of bicomplex sequences (ξ_k), denoted by $\mathrm{LIM}^r_{\mathbb{BC}}\xi_k$ is bounded, closed and convex. Further results, in particular the relation between this rough convergence and other convergence of bicomplex number are investigated.

Keywords. Rough convergence sequence, bicomplex number, rough limit set of bicomplex sequences.

AMS (MOS) subject classification: 40A05, 40A30, 46A45, 46S10.

1 Introduction

In 1892, Segre [25] introduced the concept of bicomplex numbers, which form an algebra isomorphic to the field of bicomplex literariness. A comprehensive study of analysis based on bicomplex numbers has been presented in Price's book [19]. Later, Alpay et al. [1] developed a high-level framework of functional analysis over bicomplex scalars. In 2020, Sager and Sagir [22] studied bicomplex sequence spaces equiped with the Euclidean norm in the set of bicomplex numbers and in [23], they have been established the quasi-Banach algebra $\mathbb{BC}(\mathbb{N})$ by defining non-Newtonian bicomplex numbers as a generalization of both bicomplex numbers and non-Newtonian complex numbers. Over the past years, different significant contributions have been seen in this field, few of which are closely related to and motivate the present work.

Convergence theory is one of the central themes in analysis. In 2001 H. X. Phu introduced the concept of rough convergence. One can read ([2] - [17],