SOME FIXED POINT THEOREMS FOR INTERPOLATIVE MEIR-KEELER-RÉICH CONTRACTION IN A COMPLETE METRIC SPACE WITH AN APPLICATION

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Abstract: This paper extends the contraction condition introduced by Karapinar [8] by proposing a new interpolative Reich-Meir-Keeler-type contraction condition in a complete metric space. We establish fixed-point results for two self-mappings in a complete metric space using this condition. We provide relevant examples and an application in physical chemistry to support our findings.

Keywords and Phrases: Fixed point, common fixed point, Meir-keeler contraction, Réich-Rus-Círíc contraction, complete metric space, Interpolative contraction.

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1. Introduction

Researchers in fixed point theory have generalized the well-known Banach contraction principle [5] in various ways, enabling its application across diverse fields, including differential and integral equations, fractional differential equations, mathematical biology, physics, and computer data flow. In 1975, Marcinkiewicz [16] proved a theorem, and around the same time, Riesz and Thorin [16] developed their theorem, known as the Riesz–Thorin theorem. These foundational theorems have been instrumental in the development of interpolative theory. In 2018, Karapinar [16] introduced the concept of interpolative Kannan-type contractions. This was later extended to interpolative Hardy-Roger-type contractions by Karapinar