Dynamics of Continuous, Discrete and Impulsive Systems Series A: Mathematical Analysis 30 (2023) 421-436 Copyright ©2023 Watam Press

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ON EXISTENCE OF MILD SOLUTIONS OF RANDOM IMPULSIVE STOCHASTIC INTEGRODIFFERENTIAL EQUATIONS WITH FINITE DELAYS

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Abstract. In this work, we examine the existence and continuous dependence on initial data of solutions of random impulsive stochastic functional integrodifferential equations with finite delays. We prove the existence of mild solutions to the equations by using Krasnoselskiis-Schaefer type fixed point theorem. Also, we investigate the continuous dependence on initial data results under the Lipschitz condition on a bounded and closed interval. Then give an illustrative example of our main results.

Keywords. Existence of mild solutions, continuous dependence, random impulsive, integro differential equations, finite delay.

AMS (MOS) subject classification: 34K20, 34K45, 45J05.

1 Introduction

In recent decades, the theory of stochastic differential equations (SDEs) has gained importance as a result of their numerous applications to a wide range of problems in biology, mechanics, electrical engineering, physics, and among other fields, [1], [2], [3], [4], [5]. Many systems are designed employing SDEs with impulses. In general, impulses may take place at random moments or fixed moments, hence the impulse time and the impulsive function are both random variables. The ergodicity of dissipative differential equations (DEs) subject to random impulses was explored by [6]. Many authors have studied the existence, uniqueness, and stability of solutions to random impulsive DEs are investigated see [7], [8], [10], [11] [18].

In addition, SDEs with random impulsive are widely used in the fields of medicine, biology, finance, economics, and so on, see [12]. Several scholars were also interested in impulsive differential equations (IDEs). The theory and application of IDEs have become a hot topic in the scientific community. In [13], [14], significant progress has been made. The Hyers-Ulam stability problem of SDEs, on the other hand, has not been discussed in many studies. Only a few papers on Hyers-Ulam stability for SDEs have been published, see [15][16], [17]. Recently, there have been massive studies covering the existence and stability of solutions to partial integrodifferential equations (PIDEs) with