

## CONTROLLABILITY RESULT FOR NONLINEAR IMPULSIVE NEUTRAL FUZZY STOCHASTIC DIFFERENTIAL EQUATIONS IN BANACH SPACE

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**Abstract.** This paper deals with sufficient conditions for the controllability of a class of nonlinear impulsive neutral fuzzy stochastic differential equations with nonlocal condition in Banach space by using the concept of fuzzy number whose values are normal, convex, upper semicontinuous and compact. And we drive the hypotheses by using fixed point theorems. As an application, an example is provided to illustrated.

**Keywords.** Controllability, Impulsive neutral Fuzzy Stochastic differential equation, Fuzzy number, Mild solution, fixed point theorem.

**AMS (MOS) subject classification:** 93B05, 65C30, 49N25, 93C42.

### 1 Introduction

Mathematical modelling of real life problems usually results in functional equations, like ordinary or partial differential equations, integral equations, integrodifferential equations and stochastic equations. Stochastic differential equations are used to model diverse phenomena such as fluctuating stock prices and physical systems subject to thermal fluctuations. In [11] studied S-DEs incorporate random white noise which can be thought of as the derivative of Brownian motion (or the Wiener process), however, it should be mentioned that other types of random fluctuations are possible such as jump process. In [3, 4, 9, 14] discussed impulsive effects exist widely in many evolution processes in which states are changed abruptly at certain moments of time, involving such fields are medicine and biology, economics, electronics and telecommunications etc., However, besides impulsive effects, stochastic effects likewise exist in real systems.

Neutral element is a special type of element in mathematics with respect to the binary operator on a set. In [3, 16] studied binary operations for