



# Approximate Controllability of Nonlinear Fractional Impulsive Stochastic Differential Equations with Nonlocal Conditions and Infinite Delay

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Received: April 6, 2015; Revised: January 27, 2016

**Abstract:** This paper is concerned with the approximate controllability of nonlinear fractional impulsive stochastic differential equations with nonlocal conditions and infinite delay in Hilbert spaces. By using the Krasnoselskii-Schaefer-type fixed point theorem and stochastic analysis theory, some sufficient conditions are given for the approximate controllability of the system. At the end, an example is given to illustrate the application of our result.

**Keywords:** *approximate controllability; fixed point principle; fractional impulsive stochastic differential equations; mild solution; nonlocal conditions.*

**Mathematics Subject Classification (2010):** 65C30, 93B05, 34K40, 34K45.

## 1 Introduction

The controllability is one of the fundamental concepts in linear and nonlinear control theory, and plays a crucial role in both deterministic and stochastic control systems (see e.g. Zabczyk, [27]). The controllability of nonlinear systems represented by evolution equations or inclusions in abstract spaces and qualitative theory of fractional differential equations has been extensively considered in many publications and monographs, an

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