A Note on the Controllability of Stochastic Partial Differential Equations Driven by Lévy Noise

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Abstract: This paper discusses the exact controllability for impulsive neutral stochastic delay partial differential equations driven by Lévy noise in Hilbert spaces. Under the Lipschitz conditions, the linear growth conditions are weakened and under the condition that the corresponding linear system is exactly controllable, a new set of sufficient conditions is derived by using a fixed point approach without imposing a severe compactness condition on the semigroup.

Keywords: *exact controllability; neutral stochastic partial differential equations; impulse; delay; Lévy noise.*

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1 Introduction

Exact controllability is one of the fundamental concepts in mathematical control theory, it plays an important role in both deterministic and stochastic control systems. It is well known that the controllability of deterministic systems is widely used in many fields of science and technology (for instance, see [4, 7, 21, 26, 28]). Stochastic control theory is a stochastic generalization of classic control theory. The theory of controllability of differential equations in infinite dimensional spaces has been extensively studied in the literature, and the details can be found in various papers and monographs, see [3, 16, 29] and the references therein. Besides white noise or stochastic perturbation, many systems, for example, predator-prey systems, arising from realistic models depend heavily on the histories or impulsive effect [10, 12, 13, 17, 20, 24, 28]. Therefore, there is a real need to discuss impulsive neutral partial differential systems with delays. Tai and Lun [25]

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