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Controllability of Neutral Functional Differential Equations Driven by Fractional Brownian Motion with Infinite Delay

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Abstract: This paper is concerned with the controllability of neutral stochastic functional differential equations with infinite delay driven by fractional Brownian motion in a real separable Hilbert space. The controllability results are obtained using stochastic analysis and a fixed-point strategy.

Keywords: *Controllability; neutral functional differential equations; fractional powers of closed operators; infinite delay; fractional Brownian motion.*

Mathematics Subject Classification (2010): 35R10, 93B05, 60G22, 60H20.

1 Introduction

For the practical applications in the areas such as biology, medicine, physics, finance, electrical engineering, telecommunication networks, and so on, the theory of stochastic evolution equations has attracted research's great interest. For more details, one can see Da Prato and Zabczyk [5], and Ren and Sun [14] and the references therein. In many areas of science, there has been an increasing interest in the investigation of the systems incorporating memory or aftereffect, i.e., there is the effect of delay on state equations. Therefore, there is a real need to discuss stochastic evolution systems with delay. In many mathematical models the claims often display long-range memories, possibly due to extreme weather, natural disasters, in some cases, many stochastic dynamical systems depend not only on present and past states, but also contain the derivatives with delays. Neutral functional differential equations are often used to describe such systems.

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