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EXISTENCE AND EXPONENTIAL STABILITY FOR STOCHASTIC NEUTRAL PARTIAL FUNCTIONAL INTEGRODIFFERENTIAL EQUATIONS WITH POISSON JUMPS

A. Anguraj[1] K. Ravikumar[2] and K. Ramkumar[3]

[1,2,3]Department of Mathematics, PSG College of Arts and Science,
Coimbatore, 641 014, India.

Email:angurajpsg@yahoo.com, ravikumarkpsg@gmail.com, ramkumarkpsg@gmail.com.

Abstract. In this paper, the existence, uniqueness and exponential stability of mild solutions for some stochastic neutral partial functional integrodifferential equations with Poisson jumps are studied in a real separable Hilbert space. we suppose that the linear part has a resolvent operator in the sense given in Grimmer [5]. The nonlinear part is assumed to be continuous and Lipschitz conditions with respect to the second argument. Firstly, we study the existence of mild solutions. Secondly we give some results on the exponential stability in mean square sense.

Keywords. Neutral stochastic system, Exponential stability, Mild solutions, Resolvent operator, Picard iteration method.

AMS (MOS) subject classification: 60H10, 60H15, 60H25, 35R60, 47B80, 35F05.

1 Introduction

Many real world problems in science and engineering can be modeled by stochastic partial differential equations. The qualitative behavior of stochastic partial differential equations, regarding the stability, oscillation, boundedness and the existence of periodic solutions, have been extensively studied by many investigators [1, 2, 3, 4, 6, 7].

The problem of stability for stochastic neutral partial functional differential equations has been investigated in many authors, [8, 9, 10, 11, 12, 13]. The classical technique applied in the study of stability of stochastic delay differential equations is based on a stochastic version of Lyapunov's direct method. However, it may be difficult to apply Lyapunov's direct method to specific problems on exponential stability of solutions in stochastic delay differential equations. To overcome this difficulty, Luo [9] firstly applied fixed point theory to study the exponential stability of mild solutions of stochastic delay differential equations. In [14, 15], Sakthivel and Luo have investigated the asymptotic stability of mild solutions of impulsive stochastic partial differential equations with infinite delays by using fixed point method. In[12],