STOCHASTIC EVOLUTION EQUATIONS ON HILBERT SPACES WITH PARTIALLY OBSERVED RELAXED CONTROLS AND THEIR NECESSARY CONDITIONS OF OPTIMALITY

N.U. AHMED

University of Ottawa

Abstract

In this paper we consider the question of optimal control for a class of stochastic evolution equations on infinite dimensional Hilbert spaces with controls appearing in both the drift and the diffusion operators. We consider relaxed controls (measure valued random processes) and briefly present some results on the question of existence of mild solutions including their regularity followed by a result on existence of partially observed optimal relaxed controls. Then we develop the necessary conditions of optimality for partially observed relaxed controls. This is the main topic of this paper. Further we present an algorithm for computation of optimal policies followed by a brief discussion on regular versus relaxed controls. The paper is concluded by an example of a non-convex problem which is readily solvable by our approach.

Keywords: differential equations, Hilbert spaces, relaxed controls, optimal control, necessary conditions of optimality.

2010 Mathematics Subject Classification: 49J27, 60H15, 93E20.

References


Received 3 February 2014