SOME RESULTS ON THE STOCHASTIC RICCATI EQUATION IN INFINITE DIMENSIONS

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Abstract

We study backward stochastic Riccati equations (BSREs) arising in linear quadratic optimal control for infinite dimensional SDEs. We allow the coefficients, both in the state equation and in the cost, to be random. In such a context BSREs are backward stochastic differential equations living in a non-Hilbert space and involving quadratic non-linearities. We propose different notions of solutions to BSREs and prove, for all of them, existence and uniqueness results. We also show that such solutions allow to perform the synthesis of the optimal control. Finally we apply our results to optimal control of a SPDE with random coefficients (in the equation and in the cost).