Li, Dingshi; Chen, Guiling

Impulses-induced $p$-exponential input-to-state stability for a class of stochastic delayed partial differential equations. (English) Zbl 1421.93127
Int. J. Control 92, No. 8, 1827-1835 (2019).

Summary: This paper proposes a new stability concept called $p$-exponential input-to-state stability (pISS) for impulsive stochastic delayed partial differential equations (ISDPDEs). By employing the formula for the variation of parameters, the average impulsive interval approach and a new impulsive integral inequality, the sufficient conditions for pISS of ISDPDEs are derived. The issue of impulsive stabilisation to pISS of ISDPDEs is studied. It is unveiled that if the continuous stochastic delay partial differential equations may not be pISS, it can be stabilised by impulsive control. An example is given to illustrate our main results.

MSC:

93D25 Input-output approaches in control theory
93C20 Control/observation systems governed by partial differential equations
35R60 PDEs with randomness, stochastic partial differential equations
35R12 Impulsive partial differential equations
60H15 Stochastic partial differential equations (aspects of stochastic analysis)

Keywords:
input-to-state stability; average impulsive interval; impulsive stabilisation; stochastic PDEs

Full Text: DOI

References:


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Liu, J.; Liu, X.; Xie, W., Input-to-state stability of impulsive and switching hybrid systems with time-delay, 	extit{Automatica}, 47, 899-908, (2011) - Zbl 1233.93083


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