

Invariant measures for stochastic Cauchy problems with asymptotically unstable drift semigroup

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Abstract

We investigate existence and permanence properties of invariant measures for abstract stochastic Cauchy problems of the form

$$dU(t) = (AU(t) + f) dt + B dW_H(t),$$

governed by the generator A of an asymptotically unstable C_0 -semigroup on a Banach space E . Here f in E is fixed, W_H is a cylindrical Brownian motion over a separable real Hilbert space H , and B is a bounded operator from H to E . We show that if E does not contain a copy of C_0 , such invariant measures fail to exist generically but may exist for a dense set of operators B . It turns out that many results on invariant measures which hold under the assumption of uniform exponential stability of S break down without this assumption.

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Published on: March 29, 2006

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