

**Hilbert, Astrid**

**Stochastic perturbations of Hamiltonian systems.** (English) [Zbl 0715.34110](#)  
Bochum: Univ. Bochum, Fak. f. Math., Diss. 61 p. (1989).

In the theory of dynamical systems the subject of Hamiltonian systems has seen many fundamental new results during the last twenty years. One of the natural extensions of the theory is the addition of stochastic perturbations which is studied in this thesis. First existence and uniqueness is established in the case of potential problems with reasonable regularity properties. In another chapter it is shown that the ideas for a stochastically perturbed linear oscillator carry over to the nonlinear case leading to a Girsanov-like lemma. In the last chapters the attention is on the statistical properties of the energy process and the evolution of phase space. The asymptotics for large time developed here comes very near to exit problems; a final chapter specifies results for the linear case. The thesis has been written in a clear definition-lemma- proof style, the theory is potentially useful. Some subsequent applications should be coming forth.

Reviewer: [F.Verhulst](#)

**MSC:**

- [34F05](#) Ordinary differential equations and systems with randomness
- [60H10](#) Stochastic ordinary differential equations (aspects of stochastic analysis)
- [37-XX](#) Dynamical systems and ergodic theory

**Keywords:**

[Hamiltonian systems](#); [stochastic perturbations](#); [stochastically perturbed linear oscillator](#)