

**Freidlin, M. I.; Wentzell, A. D.**

**Random perturbations of dynamical systems. Transl. from the Russian by Joseph Szuecs. 2nd ed.** (English) [Zbl 0922.60006](#)

*Grundlehren der Mathematischen Wissenschaften.* 260. New York, NY: Springer. xi, 430 p. (1998).

This is the enlarged second edition of the English edition of the book which appeared in 1984 ([Zbl 0522.60055](#)). The original Russian edition appeared in 1979 ([Zbl 0499.60053](#)).

The book is as before focused on a very detailed and deep mathematical treatment of the long term behaviour of randomly perturbed dynamical systems. The main topics include exit problems, metastable states, optimal stabilization and invariant measures. They are investigated with the powerful tools of large deviations theory and the averaging principle. A new chapter has been added, dedicated to a broader and detailed treatment of Hamiltonian systems with fast oscillations by means of averaging. The book, written in the unmatched Russian mathematical physics style, has lost nothing of its great importance for many areas of mathematics and physics. On the contrary: it is gaining recognition also for example in theoretical engineering, where applications of averaging are used for example in the study of bifurcation phenomena.

Reviewer: [Peter Imkeller \(Berlin\)](#)

**MSC:**

- [60-02](#) Research exposition (monographs, survey articles) pertaining to probability theory
- [60Hxx](#) Stochastic analysis
- [58J65](#) Diffusion processes and stochastic analysis on manifolds
- [60F10](#) Large deviations

Cited in **12** Reviews  
Cited in **361** Documents