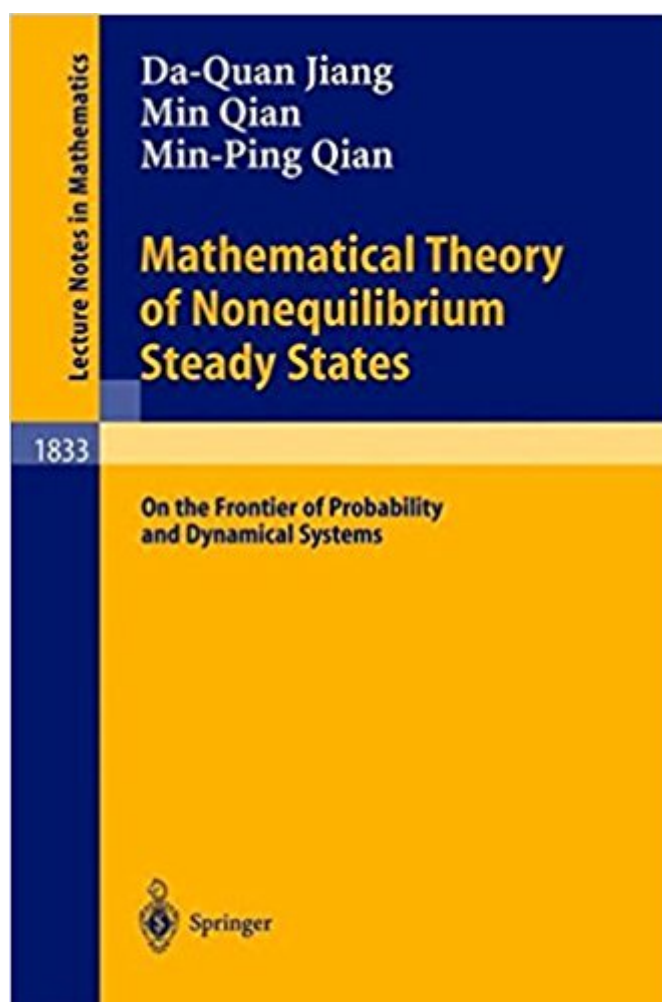


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Mathematical Theory Of Nonequilibrium Steady States: On The Frontier Of Probability And Dynamical Systems (Lecture Notes In Mathematics)





Synopsis

This volume provides a systematic mathematical exposition of the conceptual problems of nonequilibrium statistical physics, such as entropy production, irreversibility, and ordered phenomena. Markov chains, diffusion processes, and hyperbolic dynamical systems are used as mathematical models of physical systems. A measure-theoretic definition of entropy production rate and its formulae in various cases are given. It vanishes if and only if the stationary system is reversible and in equilibrium. Moreover, in the cases of Markov chains and diffusion processes on manifolds, it can be expressed in terms of circulations on directed cycles. Regarding entropy production fluctuations, the Gallavotti-Cohen fluctuation theorem is rigorously proved.

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