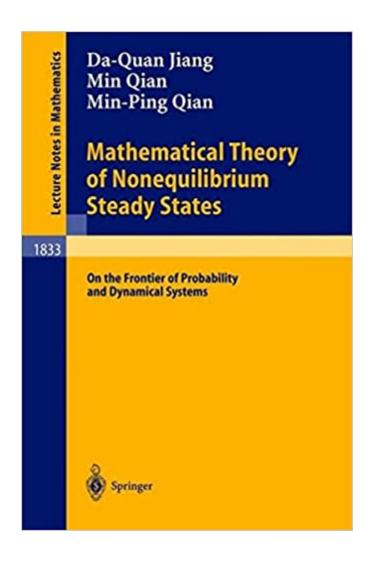


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Mathematical Theory Of Nonequilibrium Steady States: On The Frontier Of Probability And Dynamical Systems (Lecture Notes In Mathematics)





Synopsis

Thisà Â 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.

Book Information

Series: Lecture Notes in Mathematics (Book 1833)

Paperback: 286 pages

Publisher: Springer; 2004 edition (February 12, 2004)

Language: English

ISBN-10: 3540206116

ISBN-13: 978-3540206118

Product Dimensions: 6.1 x 0.7 x 9.2 inches

Shipping Weight: 1.2 pounds (View shipping rates and policies)

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