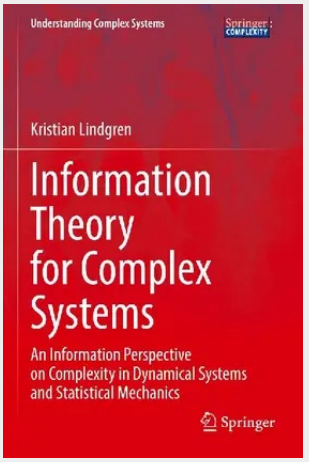
Lindgren

Information Theory for Complex Systems

An Information Perspective on Complexity in Dynamical Systems and Statistical Mechanics



This book introduces a comprehensive framework tailored for dissecting complex systems across diverse disciplines. What defines a complex system? How can we harness information to quantify its order, structure, and intricacy? Delving into phenomena from the intricate processes in physical systems to the dynamic behaviours in cellular automata and pattern formation, readers will uncover the profound interplay between physics and information theory. This intricate relationship provides fresh insight into physical phenomena, reimagining them through the lens of information. Notably, the book demystifies how seemingly opposing forces—rising order and increasing disorder—coexist, ultimately shedding light on the second law of thermodynamics as an outcome of deterministic, reversible dynamics beneath the surface. Geared towards graduate students, this book presumes an undergraduate foundation in mathematics and physics, ensuring a deep, engaging exploration for its readers.

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