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**Models of Science Dynamics**

Encounters Between Complexity Theory and Information Sciences

- ▶ Edited and Authored by leading researchers in the field
- ▶ First interdisciplinary treatment of this topic and the interface of information and systems sciences, scientometrics and social complex networks
- ▶ Addresses a wider academic and professional audience

Models of science dynamics aim to capture the structure and evolution of science. They are developed in an emerging research area in which scholars, scientific institutions and scientific communications become themselves basic objects of research. In order to understand phenomena as diverse as the structure of evolving co-authorship networks or citation diffusion patterns, different models have been developed. They include conceptual models based on historical and ethnographic observations, mathematical descriptions of measurable phenomena, and computational algorithms. Despite its evident importance, the mathematical modeling of science still lacks a unifying framework and a comprehensive research agenda. This book aims to fill this gap, reviewing and describing major threads in the mathematical modeling of science dynamics for a wider academic and professional audience. The model classes presented here cover stochastic and statistical models, game-theoretic approaches, agent-based simulations, population-dynamics models, and complex network models. The book starts with a foundational chapter that defines and operationalizes terminology used in the study of science, and a review chapter that discusses the history of mathematical approaches to modeling science from an algorithmic-historiography perspective. It concludes with a survey of future challenges for science modeling and discusses their relevance for science policy and science policy studies.



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