

Contents

Part I Foundations

1 An Introduction to Modeling Science: Basic Model Types, Key Definitions, and a General Framework for the Comparison of Process Models	3
Katy Börner, Kevin W. Boyack, Staša Milojević, and Steven Morris	
2 Mathematical Approaches to Modeling Science from an Algorithmic-Historiography Perspective	23
Diana Lucio-Arias and Andrea Scharnhorst	

Part II Exemplary Model Types

3 Knowledge Epidemics and Population Dynamics Models for Describing Idea Diffusion	69
Nikolay K. Vitanov and Marcel R. Ausloos	
4 Agent-Based Models of Science	127
Nicolas Payette	
5 Evolutionary Game Theory and Complex Networks of Scientific Information	159
Matthias Hanauske	

Part III Exemplary Model Applications

6 Dynamic Scientific Co-Authorship Networks	195
Franc Mali, Luka Kronegger, Patrick Doreian, and Anuška Ferligoj	
7 Citation Networks	233
Filippo Radicchi, Santo Fortunato, and Alessandro Vespignani	

Part IV Outlook

8 Science Policy and the Challenges for Modeling Science	261
Peter van den Besselaar, Katy Börner, and Andrea Scharnhorst	
Index	267

Models of Science Dynamics

Encounters Between Complexity Theory and Information
Sciences

Scharnhorst, A.; Börner, K.; van den Besselaar, P.
(Eds.)

2012, XXX, 270 p., Hardcover

ISBN: 978-3-642-23067-7