



Fundamentals of Ecological Modelling, Volume 21, Fourth Edition: Applications in Environmental Management and Research (Developments in Environmental Modelling)

By S.E. Jorgensen

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Fundamentals of Ecological Modelling: Applications in Environmental Management and Research, Fourth Edition, provides a comprehensive discussion of the fundamental principles of ecological modeling. The first two editions of this book (published in 1986 and 1994) focused on the roots of the discipline the four main model types that dominated the field 30-40 years ago: (1) dynamic biogeochemical models; (2) population dynamic models; (3) ecotoxicological models; and (4) steady-state biogeochemical and energy models. The third edition focused on the mathematical formulations of ecological processes that are included in ecological models.

This fourth edition uses the four model types previously listed as the foundation and expands the latest model developments in spatial models, structural dynamic models, and individual-based models. As these seven types of models are very different and require different considerations in the model development phase, a separate chapter is devoted to the development of each of the model types. Throughout the text, the examples given from the literature emphasize the application of models for environmental management and research.

- Presents the most commonly used model types with a step-by-step outline of the modeling procedure used for each
- Shows readers through an illustrated example of how to use each model in research and management settings
- New edition is revised to include only essential theory with a focus on applications
- Includes case studies, illustrations, and exercises (case study of an ecological problem with full illustration on how to solve the problem)

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Review

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Information Eaux

...this book will be an invaluable source of information for a variety of engineers and ecologists, who have a mathematical background and may wish to gain an introduction to the rapidly growing field of ecological and environmental modelling. This book will also be very adequate for courses on this subject.

International Journal of Environmental Analytical Chemistry

About the Author

Brian D. Fath is Associate Professor in the Department of Biological Sciences at Towson University (MD, USA). He teaches courses in ecosystem ecology, environmental biology, networks, and human ecology and sustainability. Dr. Fath has also taught short-courses on ecological modelling in Portugal, Croatia, and Denmark. Since 2002, he is a regular summer research scientist at the International Institute for Applied Systems Analysis (Austria). Dr. Fath graduated in 1990 from Miami University (OH) with degrees in Physics and Aeronautics. He completed an M.S. degree in Environmental Science at Ohio State University (1993) and earned a Ph.D. in Ecology from the University of Georgia in 1998. He was a Post-Doctoral Fellow at the University of Georgia (1998-2000) and the U.S. EPA in Cincinnati (2000-2001). Dr. Fath researches system sustainability using ecological network analysis, integrated environmental assessment, and information theory. He has published research papers in Journal of Theoretical Biology, Ecological Modelling, Biosystems, Ecological Complexity, Environmental Modelling and Software, and Ecosystems. He has co-authored the book A New Ecology: Systems Perspective. Professional Service includes: Associate Editor for the journal Ecological Modelling (since 2005), Associate Editor-in-chief for the Encyclopedia of Ecology, President, North American Chapter of International Society for Ecological Modelling (since 2006), Editorial Board, The Scientific World Journal (2001-present), Editorial Board, International Journal of Ecodynamics (2004-present), Board of Directors, International Environmental Modelling and Software Society (2004-present), Baltimore County Commission on Environmental Quality (2005-present).

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