estimate model parameters from incomplete data, pioneered by Adrian Raftery and his colleagues.

With the basic elements in place by Chapter 12, the book's focus moves to more complex models and applications. Time-variation is first discussed for cyclical environments in Chapter 13. A good account of temporally stochastic models (Chapter 14) covers both the formulation and simulation of environmentally driven stochasticity, as well as the key analytical and numerical methods for studying its consequences. Notable here are accounts of the errors in simulation studies, stochastic sensitivity and elasticity, and the estimation of extinction probabilities. This chapter will repay careful study by the growing number of ecologists who use stochastic models, especially in conservation and management work. Demographic stochasticity is generated by different random events that are important in smaller populations, and is discussed here in terms of simple and multitype branching processes (Chapter 15). As elsewhere, the discussion of stochasticity is made accessible by the inclusion of detailed and nontrivial examples.

The other important complexity that one expects is nonlinearity, and this book provides a fairly concise but clear account (Chapter 16) of the dynamics of nonlinear matrix models. The study of nonlinear dynamics centers on equilibria, bifurcations, and the nature of complex or chaotic dynamics. In one chapter this book takes the reader through the key ideas and methods, a remarkable achievement. Liapunov exponents are introduced and applied, and the remarkable work on nonlinear dynamics in Tribolium is used as an effective example. This account is complemented by a good discussion (Chapter 17) of two-sex models—sex is usually notable in demographic models by its absence—that covers both older work on mating functions and newer work on birth matrix-mating models. One important area that is not discussed here, but that any reader will be equipped to explore after this book, is the development of pair formation models used to study diseases such as HIV/AIDS.

The first 16 chapters, along with an especially readable appendix on matrix algebra, make for a solid contemporary account of the state of the art in matrix population modeling. As a showcase of the power and relevance of the methods, the book closes with an account of applications to conservation and management (Chapter 18). Here the reader will find a crisp and thoughtful discussion of particular examples and of several broader issues concerning the strengths and limits of matrix models. This chapter nicely illustrates how many of the methods developed earlier can be used, often in complementary ways, to illuminate ecological questions.

I am not sure how one could easily fashion an acceptable course in a biology department that would cover a large chunk of this book. But it would be quite easy to construct a two-quarter sequence that covers the main ideas and methods, or to use the book as a resource for a seminar built around a selection from the continuing stream of papers that deploy matrix models in ecology. As Caswell says, it would today be hard to imagine studying ecology without some use of matrix models.

I enjoyed the many quotes that pepper the book. I cannot resist pointing out that the quote attributed to Yogi Berra (page 622) is actually due to Niels Bohr: "It is difficult to make predictions, especially about the future." For me, the real attribution adds impact.

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Optimal Solution of Nonlinear Equations. *By Krzysztof A. Sikorski.* Oxford University Press, Oxford, UK, 2001. $55.00. xiii+238 pp., hardcover. ISBN 0-19-510690-3.

This book provides an excellent overview of optimal computational methods for the solution of nonlinear equations, for fixed points of contractive and noncontractive mappings, as well as for the topological degree. Optimal methods solve the problem in the shortest possible time. In this book the worst case scenario is analyzed, which means that for a given error criterion and a tolerance ε the methods guarantee the computation of an ε-approximation to

the solution for every function in a given class.

Numerous problems in different areas of science and technology can be reduced to a study of a set of solutions of nonlinear equations or a set of fixed points of nonlinear mappings. Topological degree examines this solution set and obtains information concerning the existence of solutions, their number, and their nature. Topological degree theory is widely used in the study of nonlinear differential (ordinary and partial) equations. It is useful, for example, in bifurcation theory and in providing information about the existence and stability of periodic solutions of ordinary differential equations as well as the existence of solutions of certain partial differential equations. Several of these applications involve the use of various fixed point theorems that can be provided by means of topological degree. Based on the above considerations, *Optimal Solution of Nonlinear Equations* should be of interest to a fairly wide audience.

The main subjects treated in this book are:

1. formalization in the language of information-based complexity theory,
2. worst case complexity,
3. optimal or nearly optimal methods,
4. optimal methods for solving univariate and multivariate nonlinear equations,
5. fixed point problems for contractive and noncontractive functions,
6. lower and upper bounds on the complexity of computing topological degree of Lipschitz functions.

The book is devoted to the study of worst case complexity results and optimal or nearly optimal methods for approximation of solutions of nonlinear equations, approximation of fixed points, and computation of topological degree. The methods are global in nature and guarantee that the computed solution is within a specified error from the exact solution for every function in a given class of functions.

The book is appealing to the reader. Each section of the text ends with exercises that vary in difficulty: More difficult exercises are marked with an asterisk (*), while open research problems are marked with two asterisks (**). Each chapter closes with annotations, which indicate the source of the material and include historical remarks. An adequate bibliography is included at the end of each chapter, and overall this book is highly cross-referenced. Moreover, a special page-based format for numbering theorems, lemmas, examples, corollaries, figures, and formulas is used, which I believe will serve the reader well by providing a more structured and self-contained text.

As stated earlier, *Optimal Solution of Nonlinear Equations* should be of interest to a fairly wide audience. It is a good reference for the solution of nonlinear equations, thus researchers in this area will be interested. Since open problems are mentioned, researchers in optimal solution of nonlinear equations will also find the book useful. Since connections are made to general complexity theory, the book should also be of value to the complexity theory community as a whole.

This book should be viewed as a report on work in progress. It contains polished, interesting results of original work by the author. Furthermore, the book is clearly written, self-contained, and thus accessible to nonexperts. In summary, the book is a comprehensive overview of research in optimal solution of nonlinear equations and constitutes a unified treatment of complexity results in this area. I believe it is an excellent book, and thus I strongly recommend it.

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Wavelets: Tools for Science & Technology. *By Stéphane Jaffard, Yves Meyer, and Robert D. Ryan.* SIAM, Philadelphia, PA, 2001. $62.00. xiv+256 pp., hardcover. ISBN 0-89871-448-6.

The New Version. This green book is an extensive revision of the blue SIAM paperback *Wavelets: Algorithms and Applications* [13], which itself was Robert Ryan's translation and revision of Yves Meyer's original pink book, *Les Ondelettes: Algorithmes et Applications* [12], which in turn evolved from Meyer's 1991 lectures to the Spanish Institute in Madrid. I reviewed [19] the blue book in 1994 and delighted in Meyer's succinct yet colorful perspective on the history