References

Shawe-Taylor, J. and Cristianini, N. (2004). *Kernel Methods for Pattern Analysis*. New York: Cambridge University Press.

Vapnik, V. N. and Chervonenkis, A. Y. (1971). On the uniform convergence of relative frequencies of events to their probabilities. *Theory of Probability and its Applications* **16,** 264–280.

Valiant, L. G. (1984). A theory of the learnable. *Communications of the ACM* **27,** 1134–1142.

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KEELING, M. J. and ROHANI, P., **Modeling Infectious Diseases in Humans and Animals**. Princeton University Press, Princeton, New Jersey, 2007. 408 pp. US$65.00/ £38.95. ISBN 9780691116174.

Modeling Infectious Diseases in Humans and Animals by Matt J. Keeling and Pejman Rohani is an informative introductory book about modeling infectious diseases, which can have important applications in disease control. Infectious diseases remain one of the leading causes of death worldwide (contributing to 26% of global mortality in 2001; WHO, 2002). With the outbreak of SARS in 2003 and increasing concerns about biological terrorism, epidemic modeling has taken on an even more significant role for policy making from a public health perspective. Mathematical models of infectious diseases can help us understand disease dynamics and transmission. Models also allow us to simulate the spread of diseases in different settings and scenarios in order to develop and evaluate different intervention strategies to prevent or ameliorate infections and better allocate available resources (e.g., choosing the target population, the location, and time for intervention).

This book is well laid out. Each of the eight chapters has a similar structure and level of exposition. The authors start with the simplest deterministic models and then increase the complexity of the models to incorporate additional factors that can affect the dynamics of infectious agents. In each chapter, the needed terms, ideas, and models are introduced and followed by examples from recent research literature on human and infectious disease modeling. Chapter 1 gives a quick overview of infectious disease models and the contents of this book. Chapter 2 introduces the simplest epidemic models and key measurements of epidemic dynamics (i.e., basic reproduction ratio, equilibrium state, etc.). Chapter 3 extends the simplest models to incorporate host heterogeneity (i.e., population composed of different risk groups). Chapter 4 extends these models to consider multiple pathogens (i.e., different infectious diseases or different strains) and multiple hosts. Chapter 5 considers epidemic models taking into account seasonal factors. Chapter 6 extends the deterministic models to allow for greater flexibility to incorporate randomness. Chapter 7 presents models to account for spatial factors. Chapter 8 discusses the application of epidemic models for disease control in practice.

The authors have given much thought in making this book reader friendly. They have flagged the important points throughout the book and provide chapter summaries. Relevant figures illustrate various models and examples, which makes the book more interesting. A table of notation is provided at the end of the book. The introductory chapter also includes a webpage leading to downloads of `C++`, `Fortran`, and `Matlab` programs for practice.

The reader is assumed to have some understanding of calculus, probability, and statistics. Examples are generally useful but having more details in the examples would have been beneficial for readers at the introductory level. On a few occasions, when the authors referred back to the equations used in previous chapters, the order of terms appear differently, which some beginners may find confusing.

There is an increasing trend and acceptance for using mathematical modeling in the epidemiology literature. In an editorial of *The American Journal of Epidemiology* (Halloran and Lipsitch, 2005), the statistical editors proposed additional guidelines for preparing methodological papers. They stated, "Infectious disease epidemiology is also evolving. More complex and dynamic models are being used to develop novel estimation procedures, to motivate improve study designs, and to explore indirect effects of interventions." This book represents a valuable step toward educating readers to have greater appreciation and understanding of the development of mathematical models in infectious diseases.

The opinions expressed here are those of the author and do not necessarily represent the views of the U.S. Centers for Disease Control and Prevention.

References

Halloran, E. and Lipsitch, M. (2005). Infection disease modeling contributions to the American Journal of Epidemiology. *The American Journal of Epidemiology* **161,** 997–998.

World Health Organization. (2002). Scaling up the Response to Infectious Diseases. `http://www.who.it/infectious-disease-report`.

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FIELDING, A. H. **Cluster and Classification Techniques for the Biosciences.** Cambridge University Press, Cambridge, U.K., 2007. xii + 246 pp. US$55.00/£27.99 (Paperback) US$120.00/£65.00 (Hardback). ISBN 9780521618007 (Paperback), 9780521852814 (Hardback).

This book, written primarily for biologists, covers both cluster analysis (where the group structure is unknown) and classification (where training samples from known groups are available). There is relatively little in the way of mathematical detail, but an emphasis on real examples to illustrate the use of different methods. These examples are mainly drawn from biology and ecology, reflecting the author's background.

Chapter 1 introduces general concepts and provides a glossary and a short review of books and (mainly free)