REFERENCES AND SUGGESTIONS FOR FURTHER READING

David C. Champeney, *Fourier Transforms and Their Physical Applications* (Academic Press, 1973).

James B. Cole, Rudolph A. Krutar, Susan K. Numrich, and Dennis B. Creamer, "Finite-difference time-domain simulations of wave propagation and scattering as a research and educational tool," Computers in Physics **9**, 235–239 (1995).

Frank S. Crawford, *Waves* (Berkeley Physics Course, Vol. 3, McGraw–Hill, 1968). A delightful book on waves of all types. The home experiments are highly recommended. One observation of wave phenomena equals many computer demonstrations.

Paul DeVries, *A First Course in Computational Physics* (John Wiley & Sons, 1994). Part of our discussion of the wave equation is based on Chapter 7. There are also good sections on the numerical solution of other partial differential equations, Fourier transforms, and the FFT.

N. A. Dodd, "Computer simulation of diffraction patterns," Phys. Educ. **18**, 294–299 (1983).

P. G. Drazin and R. S. Johnson, *Solitons: An Introduction* (Cambridge University Press, 1989). This book focuses on analytic solutions to the Korteweg–de Vries equation which has soliton solutions.

Richard P. Feynman, Robert B. Leighton, and Matthew Sands, *The Feynman Lectures on Physics*, Vol. 1 (Addison–Wesley, 1963). Chapters relevant to wave phenomena include Chapters 28–30 and Chapter 33.

A. P. French, *Vibrations and Waves* (W. W. Norton & Co., 1971). An introductory level text that emphasizes mechanical systems.

Robert Guenther, *Modern Optics*, Vol. 1 (Wiley, 1990). Chapter 6 discusses Fourier analysis and Chapters 9–12 apply Fourier analysis to the study of Fraunhofer and Fresnel diffraction and holography.

Eugene Hecht, *Optics*, 4th ed. (Addison–Wesley, 2002). An intermediate level optics text that emphasizes wave concepts.

Akira Hirose and Karl E. Lonngren, *Introduction to Wave Phenomena* (John Wiley & Sons, 1985). An intermediate level text that treats the general properties of waves in various contexts.

Amy Kolan, Barry Cipra, and Bill Titus, "Exploring localization in nonperiodic systems," Computers in Physics **9** (4), 387–395 (1995). An elementary discussion of how to solve the problem of a chain of coupled oscillators with disorder using transfer matrices.

J. F. James, *A Student's Guide to Fourier Transforms*, 2nd ed. (Cambridge University Press, 2002).

William H. Press, Saul A. Teukolsky, William T. Vetterling, and Brian P. Flannery, *Numerical Recipes*, 2nd ed. (Cambridge University Press, 1992). See Chapter 12 for a discussion of the fast Fourier transform.

Iain G. Main, *Vibrations and Waves in Physics* (Cambridge University Press, 1993). See Chapter 12 for a discussion of a chain of coupled oscillators.

Masud Mansuripur, *Classical Optics and its Applications* (Cambridge University Press, 2002). See Chapter 2 for a discussion of Fourier optics.

Timothy J. Rolfe, Stuart A. Rice, and John Dancz, "A numerical study of large amplitude motion on a chain of coupled nonlinear oscillators," J. Chem. Phys. **70**, 26–33 (1979). Problem 9.30 is based on this paper.

Garrison Sposito, *An Introduction to Classical Dynamics* (John Wiley & Sons, 1976). A good discussion of the coupled harmonic oscillator problem is given in Chapter 6.

William J. Thompson, *Computing for Scientists and Engineers* (John Wiley & Sons, 1992). See Chapters 9 and 10 for a discussion of Fourier transform methods.

Michael L. Williams and Humphrey J. Maris, "Numerical study of phonon localization in disordered systems," Phys. Rev. B **31**, 4508–4515 (1985). The authors consider the normal modes of a two-dimensional system of coupled oscillators with random masses. The idea of using mechanical resonance to extract the normal modes is the basis of a new numerical method for finding the eigenmodes of large lattices. See Kousuke Yukubo, Tsuneyoshi Nakayama, and Humphrey J. Maris, "Analysis of a new method for finding eigenmodes of very large lattice systems," J. Phys. Soc. Japan **60**, 3249 (1991).