

## REFERENCES AND SUGGESTIONS FOR FURTHER READING

- Daniel J. Amit, G. Parisi, and L. Peletti, "Asymptotic behavior of the "true" self-avoiding walk," *Phys. Rev. B* **27**, 1635–1645 (1983).
- Panos Argyrakis, "Simulation of diffusion-controlled chemical reactions," *Computers in Physics* **6**, 525–579 (1992).
- G. T. Barkema, Parthapratim Biswas, and Henk van Beijeren, "Diffusion with random distribution of static traps," *Phys. Rev. Lett.* **87**, 170601 (2001).
- J. M. Bernardo and A. F. M. Smith, *Bayesian Theory* (John Wiley & Sons, 1994). Bayes theorem is stated concisely on page 2.
- J. Bernasconi and L. Pietronero, "True self-avoiding walk in one dimension," *Phys. Rev. B* **29**, 5196–5198 (1984). The authors present results for the exponent  $\nu$  accurate to 1%.
- Philip R. Bevington and D. Keith Robinson, *Data Reduction and Error Analysis for the Physical Sciences*, 3rd ed. (McGraw-Hill, 2003).
- I. Carmesin and Kurt Kremer, "The bond fluctuation model: A new effective algorithm for the dynamics of polymers in all spatial dimensions," *Macromolecules* **21**, 2819–2823 (1988). The bond fluctuation model is an efficient method for simulating the dynamics of polymer chains and would be the basis of an excellent project.
- S. Chandrasekhar, "Stochastic problems in physics and astronomy," *Rev. Mod. Phys.* **15**, 1–89 (1943). This article is reprinted in M. Wax, *Selected Papers on Noise and Stochastic Processes* (Dover, 1954).
- William S. Cleveland and Robert McGill, "Graphical perception and graphical methods for analyzing scientific data," *Science* **229**, 828–833 (1985). There is more to analyzing data than least squares fits.
- Mohamed Daoud, "Polymers," Chapter 6 in Armin Bunde and Shlomo Havlin, editors, *Fractals in Science* (Springer-Verlag, 1994).
- Roan Dawkins and Daniel ben-Avraham, "Computer simulations of diffusion-limited reactions," *Comput. Sci. Eng.* **3** (1), 72–76 (2001).
- R. Everaers, I. S. Graham, and M. J. Zuckermann, "End-to-end distance and asymptotic behavior of self-avoiding walks in two and three dimensions," *J. Phys. A* **28**, 1271–1293 (1995).
- Jesper Ferkinghoff-Borg, Mogens H. Jensen, Joachim Mathiesen, Poul Olesen, and Kim Sneppen, "Competition between diffusion and fragmentation: An important evolutionary process of nature," *Phys. Rev. Lett.* **91**, 266103 (2003). The results of the model were compared with experimental data on ice crystal sizes and the length distribution of  $\alpha$  helices in proteins.
- Richard P. Feynman, Robert B. Leighton, and Matthew Sands, *The Feynman Lectures on Physics* (Addison-Wesley, 1963). See Vol. 1, Chapter 26 for a discussion of the principle of least time and Vol. 2, Chapter 19, for a discussion of the principle of least action.
- Pierre-Giles de Gennes, *Scaling Concepts in Polymer Physics* (Cornell University Press, 1979). A difficult but important text.
- Peter Grassberger, "Pruned-enriched Rosenbluth method: Simulations of  $\theta$  polymers of chain length up to 1,000,000," *Phys. Rev. E* **56**, 3682–3693 (1997).
- Shlomo Havlin and Daniel ben-Avraham, "Diffusion in disordered media," *Adv. Phys.* **36**, 695 (1987). Section 7 of this review article discusses trapping and diffusion-limited reactions. Also see Daniel ben-Avraham and Shlomo Havlin, *Diffusion and Reactions in Fractals and Disordered Systems* (Cambridge University Press, 2001).

- Shlomo Havlin, George H. Weiss, James E. Kiefer, and Menachem Dishon, "Exact enumeration of random walks with traps," *J. Phys. A: Math. Gen.* **17**, L347 (1984). The authors discuss a method based on exact enumeration for calculating the survival probability of random walkers on a lattice with randomly distributed traps.
- Brian Hayes, "How to avoid yourself," *Am. Scientist* **86** (4), 314–319 (1998).
- Z. Jiang and C. Ebner, "Simulation study of reaction fronts," *Phys. Rev. A* **42**, 7483–7486 (1990).
- Peter R. Keller and Mary M. Keller, *Visual Cues* (IEEE Press, 1993). A well-illustrated book on data visualization techniques.
- Donald E. Knuth, *Seminumerical Algorithms*, 2nd ed., Vol. 2 of *The Art of Computer Programming* (Addison-Wesley, 1981). The standard reference on random number generators.
- Bruce MacDonald, Naeem Jan, D. L. Hunter, and M. O. Steinitz, "Polymer conformations through 'wiggling'," *J. Phys. A* **18**, 2627–2631 (1985). A discussion of the pivot algorithm summarized in Project 7.41. Also see Tom Kennedy, "A faster implementation of the pivot algorithm for self-avoiding walks," *J. Stat. Phys.* **106**, 407–429 (2002).
- Vishal Mehra and Peter Grassberger, "Trapping reaction with mobile traps," *Phys. Rev. E* **65**, 050101-1–4 (R) (2002). This paper discusses the model of a single walker moving on a lattice of traps.
- Elliott W. Montroll and Michael F. Shlesinger, "On the wonderful world of random walks," in *Nonequilibrium Phenomena II: From Stochastics to Hydrodynamics*, J. L. Lebowitz and E. W. Montroll, eds. (North-Holland Press, 1984). The first part of this delightful review article chronicles the history of the random walk.
- M. E. J. Newman and G. T. Barkema, *Monte Carlo Methods in Statistical Physics* (Oxford University, 1999). This book has a good section on random number generators.
- Daniele Passerone and Michele Parrinello, "Action-derived molecular dynamics in the study of rare events," *Phys. Rev. Lett.* **87**, 108302 (2001). This paper describes a deterministic algorithm for finding extrema of the action. Also see D. Passerone, M. Ceccarelli, and M. Parrinello, *J. Chem. Phys.* **118**, 2025–2032 (2003).
- John E. Pearson, "Complex patterns in a simple fluid," *Science* **261**, 189–192 (1993) or patsol/9304003. See also P. Gray and S. K. Scott, "Sustained oscillations and other exotic patterns of behavior in isothermal reactions," *J. Phys. Chem.* **89**, 22–32 (1985).
- Thomas Prellberg, "Scaling of self-avoiding walks and self-avoiding trails in three dimensions," *J. Phys. A* **34**, L599–602 (2001). The author estimates that  $\nu \approx 0.5874(2)$  for the self-avoiding walk in three dimensions.
- Thomas Prellberg and Jaroslaw Krawczyk, "Flat histogram version of the pruned and enriched Rosenbluth method," *Phys. Rev. Lett.* **92**, 120602 (2004). The authors discuss an improved algorithm for simulating self-avoiding walks.
- William H. Press, Saul A. Teukolsky, William T. Vetterling, and Brian P. Flannery, *Numerical Recipes*, 2nd ed. (Cambridge University Press, 1992). This classic book is available online at <http://www.nr.com/>. See Chapter 15 for a general discussion of the modeling of data, including general linear least squares and nonlinear fits, and Chapter 19 for a discussion of the Crank-Nicholson method for solving diffusion-type partial equations.
- Sidney Redner, *A Guide to First-Passage Processes* (Cambridge University Press, 2001).
- Sidney Redner and Francois Leyvraz, "Kinetics and spatial organization of competitive reactions," Chapter 7 in Armin Bunde and Shlomo Havlin, eds., *Fractals in Science* (Springer-Verlag, 1994).