

Homework assignment two

Due Friday September 27, 2002, 4:00 PM

1. Yeomans, problem 2.1.
2. Yeomans, problem 2.2.
3. Yeomans, problem 2.3.
4. Yeomans, problem 2.4.
5. Estimate the susceptibility critical exponent γ for the two-dimensional ferromagnetic Ising model as follows.
 - (a) Using one of your existing Monte Carlo codes, do a run at a bunch of temperatures near the critical temperature, calculating χ at each temperature. A lattice size of around 100 by 100 should be sufficient.
 - (b) Then, make a log-log plot of the susceptibility χ versus the reduced temperature $T - T_c$. The slope of line is the critical exponent. Be sure to determine error bars to go along with your estimated slope.
 - (c) Compare your result with the known, exact critical exponent. Also compare your results with each other. Discuss briefly.
 - (d) Comment on sources of error in your calculation. You may wish to consult section 8.3.1 of Newman and Barkema.