

Reading: We will finish the discussion of spin systems, with the exact solution of the two-dimensional Ising model and then the role of randomness on spontaneous ordering. With the remaining course time, I will present some topics for “fun”.

Notes: The final examination is scheduled for Wednesday Dec. 20 at 12:30pm in SCI 113. Please plan for a 3-hour exam. The exam be closed book, with no notes, calculators, or other ancillary material allowed. Considerable algebra should not be needed in solving any problem.

Problems: Due Wednesday December 13 at 5pm.

1. (Huang 17.6) Derive the Ginzburg criterion for a tricritical point. What is the critical dimension in this case?
2. Following the approach developed in lecture, compute the first few terms of the high-temperature series for the susceptibility of the two-dimensional Ising model on the triangular lattice. Compute as many terms as you can; you should be able to reach to order v^5 without too much trouble. From your series, use the ratio analysis as outlined in lecture to estimate the critical temperature and the critical exponent γ . (For comparison, the corresponding exact values are $kT_c/J = 4/\ln 3 \approx 3.641$ and $\gamma = 7/4$.)