Basic Training in Condensed–Matter Physics

Spring 2006, James P. Sethna
528 Clark, 255-5132, sethna@lassp.cornell.edu
Office Hours: Mondays 3-4

Homework 2, due Wednesday April 12

Latest revision: April 3, 2006

Computational complexity and NP-completeness

First read: *Can get satisfaction*, Carla P. Gomes and Bart Selman, *Nature* **435**, 751-752 (2005), `http://www.cs.cornell.edu/selman/papers/pdf/05.nature.can-get-satisfaction.pdf`.

Then do: Exercise 1.5, *Satisfactory map colorings*.

Then read: *Satisfied with Physics*, Carla P. Gomes and Bart Selman, *Science* **297**, 784-5 (2002). `http://www.cs.cornell.edu/selman/papers/pdf/02.science.physics.pdf`, and *Passing messages between disciplines*, Marc Mézard, *Science* **301**, 1685-6 (2003).

Combinatorial optimization, and phase transitions in complexity

First read: *The easiest hard problem*, Brian Hayes, *American Scientist* **90**, 113-117 (2002).

Then do: Exercise 1.6, *A fair split? Number partitioning*.

Then read: *Constraint satisfaction networks in Physics and Computation*, M. Mézard and A. Montanari, `http://ipnweb.in2p3.fr/lptms/membres/mezard/main.pdf`, chapter 7, pp. 128-141.