What Do We Know About the Metropolis Algorithm?

Abstract:

The Metropolis algorithm is a mainstay of scientific computing. I will explain its history (looking for phase transitions in packing hard discs) and some properties. Analysis of the algorithm for real applications lies mainly in the future. For simple special cases, Gilles Lebeau and I can use spectral techniques to get a sharp analysis of rates of convergence. This is a case study in the joys of trying to make mathematical sense out of the tools of statistical mechanics.

This is the first in a seminar series “Statistical Mechanics at Stanford” which will meet every other Monday.