Contemporary problems in statistical physics

Abstrak

This collection of independent articles describes some mathematical problems recently developed in statistical physics and theoretical chemistry. The book introduces and reviews current research on such topics as nonlinear systems and colored noise, stochastic resonance, percolation, the trapping problem in the theory of random walks, and diffusive models for chemical kinetics. Some of these topics have never before been presented in expository book form.
Applied mathematicians will be introduced to some contemporary problems in statistical physics. In addition, a number of unsolved problems currently attracting intensive research efforts are described, and some of the techniques used in this research are outlined, along with principal results and outstanding questions.
A wide spectrum of mathematical techniques is covered, but the main emphasis is on introducing the mathematician to different research areas with open and interesting problems. This is an ideal starting point for the mathematician with an elementary acquaintance with the methodology of statistical physics. The material is meant to be introductory and terms are carefully defined. Many topics that require further study are introduced, providing new research ideas for the applied mathematician or thesis problems for the graduate student.