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Monte Carlo Simulation in Statistical Physics

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Monte Carlo Simulation in Statistical Physics deals with the computer simulation of many-body systems in condensed-matter physics and related fields of physics, chemistry and beyond, to traffic flows, stock market fluctuations, etc.). Using random numbers generated by a computer, probability distributions are calculated, allowing the estimation of the thermodynamic properties of various systems. This book describes the theoretical background to several variants of these Monte Carlo methods and gives a systematic presentation from which newcomers can learn to perform such simulations and to analyze their results. The fifth edition covers Classical as well as Quantum Monte Carlo methods. Furthermore a new chapter on the sampling of free energy landscapes has been added. To help students in their work a special web server has been installed to host programs and discussion groups (<http://www.ccp.tphys.uni-heidelberg.de>). Prof. Binder was the winner of the Berni J. Alder CECAM Award for Computational Physics 2001 as well as the Boltzmann Medal in 2007.

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