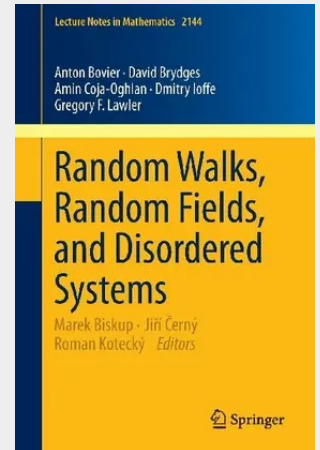


Random Walks, Random Fields, and Disordered Systems

Focusing on the mathematics that lies at the intersection of probability theory, statistical physics, combinatorics and computer science, this volume collects together lecture notes on recent developments in the area. The common ground of these subjects is perhaps best described by the three terms in the title: Random Walks, Random Fields and Disordered Systems. The specific topics covered include a study of Branching Brownian Motion from the perspective of disordered (spin-glass) systems, a detailed analysis of weakly self-avoiding random walks in four spatial dimensions via methods of field theory and the renormalization group, a study of phase transitions in disordered discrete structures using a rigorous version of the cavity method, a survey of recent work on interacting polymers in the ballistic regime and, finally, a treatise on two-dimensional loop-soup models and their connection to conformally invariant systems and the Gaussian Free Field. The notes are aimed at early graduate students with a modest background in probability and mathematical physics, although they could also be enjoyed by seasoned researchers interested in learning about recent advances in the above fields.

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