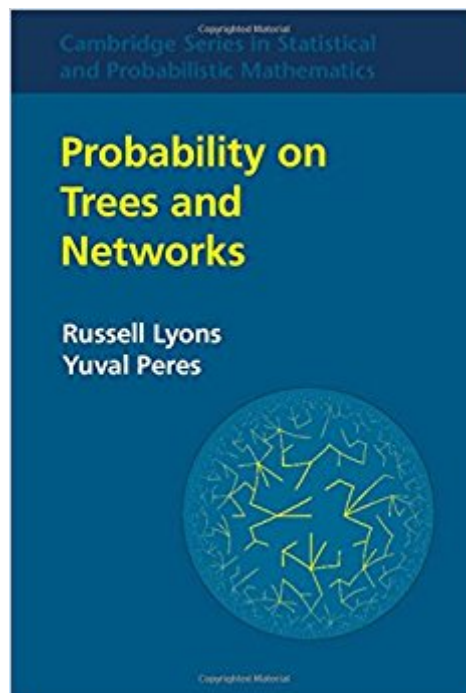




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Probability On Trees And Networks (Cambridge Series In Statistical And Probabilistic Mathematics)



Synopsis

Starting around the late 1950s, several research communities began relating the geometry of graphs to stochastic processes on these graphs. This book, twenty years in the making, ties together research in the field, encompassing work on percolation, isoperimetric inequalities, eigenvalues, transition probabilities, and random walks. Written by two leading researchers, the text emphasizes intuition, while giving complete proofs and more than 850 exercises. Many recent developments, in which the authors have played a leading role, are discussed, including percolation on trees and Cayley graphs, uniform spanning forests, the mass-transport technique, and connections on random walks on graphs to embedding in Hilbert space. This state-of-the-art account of probability on networks will be indispensable for graduate students and researchers alike.

Book Information

Series: Cambridge Series in Statistical and Probabilistic Mathematics (Book 42)

Hardcover: 600 pages

Publisher: Cambridge University Press; 1 edition (January 20, 2017)

Language: English

ISBN-10: 1107160154

ISBN-13: 978-1107160156

Product Dimensions: 7 x 1.7 x 10 inches

Shipping Weight: 3.1 pounds (View shipping rates and policies)

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Best Sellers Rank: #940,092 in Books (See Top 100 in Books) #133 in [Books > Science & Math > Mathematics > Applied > Graph Theory](#) #2744 in [Books > Textbooks > Science & Mathematics > Mathematics > Statistics](#) #3985 in [Books > Science & Math > Mathematics > Applied > Probability & Statistics](#)

Customer Reviews

"This long-awaited work focuses on one of the most interesting and important parts of probability theory. Half a century ago, most work on models such as random walks, Ising, percolation and interacting particle systems concentrated on processes defined on the d-dimensional Euclidean lattice. In the intervening years, interest has broadened dramatically to include processes on more general graphs, with trees being a particularly important case. This led to new problems and richer behavior, and as a result, to the development of new techniques. The authors are two of the major

developers of this area; their expertise is evident throughout." Thomas M. Liggett, University of California, Los Angeles"Masterly, beautiful, encyclopaedic, and yet browsable - this great achievement is obligatory reading for anyone working near the conjunction of probability and network theory." Geoffrey Grimmett, University of Cambridge"For the last ten years, I have not let a doctoral student graduate without reading this [work]. Sadly, the earliest of those students are missing a considerable amount of material that the bound and published edition will contain. Not only are the classical topics of random walks, electrical theory, and uniform spanning trees covered in more coherent fashion than in any other source, but this book is also the best place to learn about a number of topics for which the other choices for textual material are limited. These include mass transport, random walk boundaries, and dimension and capacity in the context of Markov processes." Robin Pemantle, University of Pennsylvania"Lyons and Peres have done an amazing job of motivating their material and of explaining it in a conversational and accessible fashion. Even though the book emphasizes probability on infinite graphs, it is one of my favorite references for probability on finite graphs. If you want to understand random walks, isoperimetry, random trees, or percolation, this is where you should start." Daniel Spielman, Yale University, Connecticut"This long-awaited book offers a splendid account of several major areas of discrete probability. Both authors have made outstanding contributions to the subject, and the exceptional quality of the book is largely due to their high level of mastery of the field. Although the only prerequisites are basic probability theory and elementary Markov chains, the book succeeds in providing an elegant presentation of the most beautiful and deepest results in the various areas of probability on graphs. The powerful techniques that made these results available, such as the use of isoperimetric inequalities or the mass-transport principle, are also presented in a detailed and self-contained manner. This book will be indispensable to any researcher working in probability on graphs and related topics, and it will also be a must for anybody interested in the recent developments of probability theory." Jean-François Le Gall, Université Paris-Sud

This authoritative state-of-the-art account of probability on networks for graduate students and researchers in mathematics, statistics, computer science, and engineering, brings together sixty years of research, including many developments where the authors played a leading role. The text emphasizes intuition, while also giving complete proofs.

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