

# Probability on Trees and Networks

**Russell Lyons**

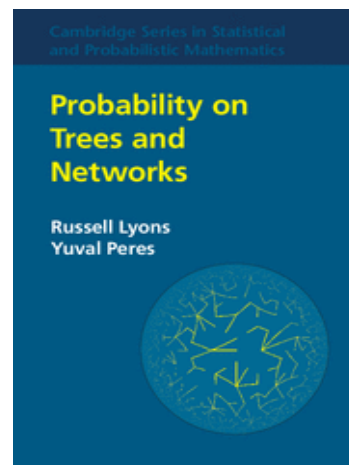
*Indiana University, Bloomington*

**and Yuval Peres**

*Microsoft Research, Washington*

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.

1. Some highlights; 2. Random walks and electric networks; 3. Special networks; 4. Uniform spanning trees; 5. Branching processes, second moments, and percolation; 6. Isoperimetric inequalities; 7. Percolation on transitive graphs; 8. The mass-transport technique and percolation; 9. Infinite electrical networks and Dirichlet functions; 10. Uniform spanning forests; 11. Minimal spanning forests; 12. Limit theorems for Galton–Watson processes; 13. Escape rate of random walks and embeddings; 14. Random walks on groups and Poisson boundaries; 15. Hausdorff dimension; 16. Capacity and stochastic processes; 17. Random walks on Galton–Watson trees.



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### Advance praise:

"...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*



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