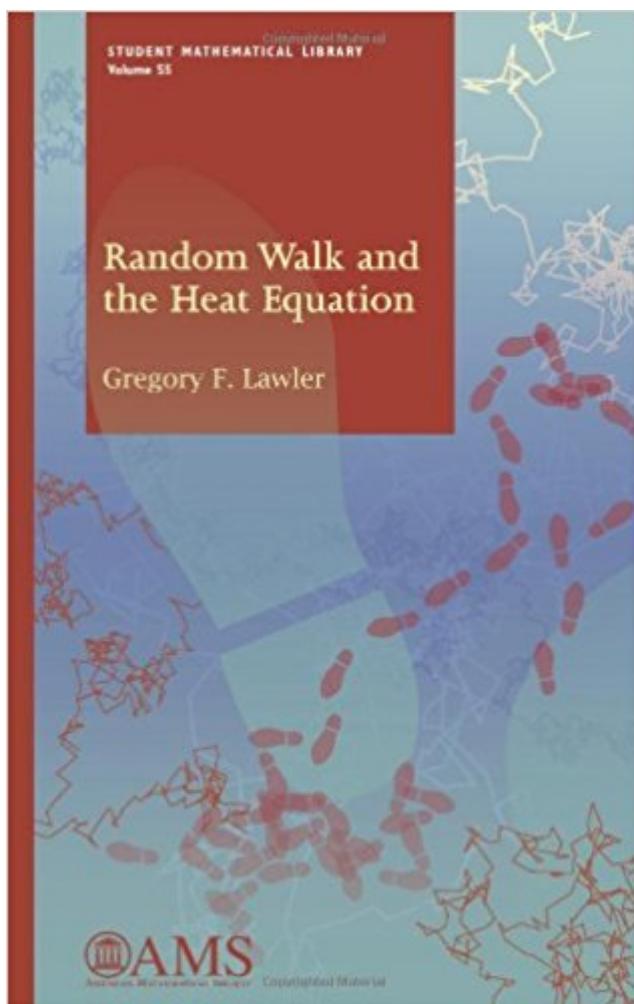


The book was found

Random Walk And The Heat Equation (Student Mathematical Library)



Synopsis

The heat equation can be derived by averaging over a very large number of particles. Traditionally, the resulting PDE is studied as a deterministic equation, an approach that has brought many significant results and a deep understanding of the equation and its solutions. By studying the heat equation by considering the individual random particles, however, one gains further intuition into the problem. While this is now standard for many researchers, this approach is generally not presented at the undergraduate level. In this book, Lawler introduces the heat equation and the closely related notion of harmonic functions from a probabilistic perspective. The theme of the first two chapters of the book is the relationship between random walks and the heat equation. The first chapter discusses the discrete case, random walk and the heat equation on the integer lattice; and the second chapter discusses the continuous case, Brownian motion and the usual heat equation. Relationships are shown between the two. For example, solving the heat equation in the discrete setting becomes a problem of diagonalization of symmetric matrices, which becomes a problem in Fourier series in the continuous case. Random walk and Brownian motion are introduced and developed from first principles. The latter two chapters discuss different topics: martingales and fractal dimension, with the chapters tied together by one example, a random Cantor set. The idea of this book is to merge probabilistic and deterministic approaches to heat flow. It is also intended as a bridge from undergraduate analysis to graduate and research perspectives. The book is suitable for advanced undergraduates, particularly those considering graduate work in mathematics or related areas.

Book Information

Series: Student Mathematical Library

Paperback: 156 pages

Publisher: American Mathematical Society (November 22, 2010)

Language: English

ISBN-10: 0821848291

ISBN-13: 978-0821848296

Product Dimensions: 0.2 x 5.5 x 8.2 inches

Shipping Weight: 7.2 ounces (View shipping rates and policies)

Average Customer Review: 3.6 out of 5 stars 3 customer reviews

Best Sellers Rank: #353,115 in Books (See Top 100 in Books) #41 in Books > Science & Math > Mathematics > Pure Mathematics > Fractals #1198 in Books > Textbooks > Science &

Customer Reviews

This is a very readable introductory course resource on topics...that have more than their fair share of unreadable textbooks...Its reader-friendly style makes it an ideal choice for a reading course or self-study. ...Given the paucity of quality books in this area, the work will be a critical resource for mathematics collections... Essential. --M. Bona, Choice This beautiful little book is an introduction to some of the key ideas of probability written at an advanced undergraduate level. ... This book is very well-written, self-contained up to material from elementary calculus and basic linear algebra, and has plenty of interesting exercises. It is well suited for an advanced undergraduate course, a student seminar or as material for an undergraduate project. --Mathematical Reviews

This is something I've wanted to know for a long time: how does the Heat Equation connect with The Drunkard's Path? The key seems to be Stirling's Formula. Now I have a framework to help me understand this.

The book gives a taste of probability theory and provides excellent introduction to random walks and diffusion processes. I strongly recommend it as a basic reading in the field and as a source for introductory courses.

terse and difficult style make the material less accessible -there are better alternatives online - also search the scientific american archives for a very nice expo on potential theory and brownian motion

[Download to continue reading...](#)

Random Walk and the Heat Equation (Student Mathematical Library) Elementary Algebraic Geometry (Student Mathematical Library, Vol. 20) (Student Mathematical Library, V. 20) Random Walks and Heat Kernels on Graphs (London Mathematical Society Lecture Note Series) The Equation That Couldn't Be Solved: How Mathematical Genius Discovered the Language of Symmetry An Introduction to the Mathematical Theory of Waves (Student Mathematical Library, V. 3) Escape to Hope Ranch: A Montana Heat Novel (Montana Heat Series, Book 2) Montana Heat: Escape to You: A Montana Heat Novel Edge of the Heat Box Set Books 1-7: Edge of the Heat Firefighter Romance Schaum's Outline of Probability, Random Variables, and Random Processes, Second Edition (Schaum's Outline Series) Schaum's Outline of Probability, Random Variables, and

Random Processes, 3rd Edition (Schaum's Outlines) Random House Webster's Word Menu (Random House Newer Words Faster) The Mathematical Theory of Non-uniform Gases: An Account of the Kinetic Theory of Viscosity, Thermal Conduction and Diffusion in Gases (Cambridge Mathematical Library) A Random Walk down Wall Street: The Time-tested Strategy for Successful Investing Random Walk Down Wall Street: A Time-Tested Strategy for Successful Investing (Eleventh Edition) A Random Walk Down Wall Street: The Time-Tested Strategy for Successful Investing (Eleventh Edition) A Random Walk in Science, The Lattice Boltzmann Equation for Fluid Dynamics and Beyond (Numerical Mathematics and Scientific Computation) Geometric Programming for Design Equation Development and Cost/Profit Optimization: (with illustrative case study problems and solutions), Third Edition (Synthesis Lectures on Engineering) Principles and Practice of Structural Equation Modeling, Fourth Edition (Methodology in the Social Sciences) God's Equation: Einstein, Relativity, and the Expanding Universe

[Contact Us](#)

[DMCA](#)

[Privacy](#)

[FAQ & Help](#)