



A Guide to First-Passage Processes

By Sidney Redner

Download now

Read Online ➔

A Guide to First-Passage Processes By Sidney Redner

First-passage properties underlie a wide range of stochastic processes, such as diffusion-limited growth, neuron firing and the triggering of stock options. This book provides a unified presentation of first-passage processes, which highlights its interrelations with electrostatics and the resulting powerful consequences. The author begins with a presentation of fundamental theory including the connection between the occupation and first-passage probabilities of a random walk, and the connection to electrostatics and current flows in resistor networks. The consequences of this theory are then developed for simple, illustrative geometries including the finite and semi-infinite intervals, fractal networks, spherical geometries and the wedge. Various applications are presented including neuron dynamics, self-organized criticality, diffusion-limited aggregation, the dynamics of spin systems and the kinetics of diffusion-controlled reactions. First-passage processes provide an appealing way for graduate students and researchers in physics, chemistry, theoretical biology, electrical engineering, chemical engineering, operations research and finance to understand all of these systems.

↓ [Download A Guide to First-Passage Processes ...pdf](#)

📖 [Read Online A Guide to First-Passage Processes ...pdf](#)

A Guide to First-Passage Processes

By Sidney Redner

A Guide to First-Passage Processes By Sidney Redner

First-passage properties underlie a wide range of stochastic processes, such as diffusion-limited growth, neuron firing and the triggering of stock options. This book provides a unified presentation of first-passage processes, which highlights its interrelations with electrostatics and the resulting powerful consequences. The author begins with a presentation of fundamental theory including the connection between the occupation and first-passage probabilities of a random walk, and the connection to electrostatics and current flows in resistor networks. The consequences of this theory are then developed for simple, illustrative geometries including the finite and semi-infinite intervals, fractal networks, spherical geometries and the wedge. Various applications are presented including neuron dynamics, self-organized criticality, diffusion-limited aggregation, the dynamics of spin systems and the kinetics of diffusion-controlled reactions. First-passage processes provide an appealing way for graduate students and researchers in physics, chemistry, theoretical biology, electrical engineering, chemical engineering, operations research and finance to understand all of these systems.

A Guide to First-Passage Processes By Sidney Redner Bibliography

- Rank: #1340921 in eBooks
- Published on: 2001-08-06
- Released on: 2001-08-06
- Format: Kindle eBook

 [Download A Guide to First-Passage Processes ...pdf](#)

 [Read Online A Guide to First-Passage Processes ...pdf](#)

Editorial Review

Review

"...original and refreshing..." Journal of Mathematical Psychology

"This is the first book entirely devoted to first-passage processes... Well designed and typeset, [it] is written in an easy-to-read style with a generous assortment of clearly drawn graphs. The book is very useful for anyone working in the area of stochastic processes." Mathematical Reviews

"...clearly written...the organisation and presentation of the material are excellent...a useful repository of standard and not-so-standard techniques which anyone working in the area of stochastic processes in general, and first-passage problems in particular, will want to have on their shelves." --Alan Bray, Journal of Statistical Physics

"Unquestionably a valuable book, written at an accessible level for graduate students while providing a nice summary of the last century's--and notably the last two decades'--developments of these methods. It fills a hole in the literature that's needed filling for at least ten years. Moreover, the author's style is relaxed and crystal clear while maintaining mathematical precision and power." --Charles Doering, University of Michigan

"to practitioners in the field of first- passage problems, and to students entering the field...I can recommend it strongly. It is clearly written, and the organisation and presentation of the material are excellent. It serves as a useful repository of standard and not-so-standard techniques which anyone working in the area of stochastic process in general, and first-passage problems in particular, will want to have on their shelves." Alan J. Bray, Dept of Physics and Astronomy, University of Manchester, UK

"Redner's approach is always remarkably clear and it is often aimed to develop intuition....The book is explicitly intended for allowing those with a modest background to learn essential results quickly. This goal intrinsically places it on the border between the category of textbooks and that of reference books. The author's style, colloquial and concise, yet precise, is definately appropriate for the purpose." Paolo Laureti, Econophysics

"The book is very well written and provides clear explanations of the techniques used to determine first passage probabilities and related quantities, under a variety of circumstances...this book [is] highly recommended to anyone interested in its subject, both for its clarity of presentation and for the wide range of problems treated." J.R. Dorfman, American Journal of Physics

About the Author

Sid Redner is a condensed-matter theorist whose research focuses on non-equilibrium statistical physics and its applications. Dr Redner has been on the physics faculty at Boston University since 1978 and has been a full professor since 1989. He has published 230 research articles and is the author of A Kinetic View of Statistical Physics with P. L. Krapivsky and E. Ben-Naim (Cambridge University Press, 2010). Dr Redner is a Fellow of the American Physical Society and was a visiting scientist at Schlumberger Research in 1984-1985, the Ulam Scholar at Los Alamos National Laboratory in 2004-2005 and a visiting professor at the Universite Paul Sabatier (Toulouse) and Universite Pierre et Marie Curie (Paris) in 2008.

Users Review

From reader reviews:

Leta Welter:

Reading a e-book tends to be new life style in this era globalization. With examining you can get a lot of information that may give you benefit in your life. Along with book everyone in this world may share their idea. Ebooks can also inspire a lot of people. Plenty of author can inspire their own reader with their story or even their experience. Not only the storyline that share in the books. But also they write about the data about something that you need illustration. How to get the good score toefl, or how to teach your young ones, there are many kinds of book that exist now. The authors in this world always try to improve their talent in writing, they also doing some research before they write to the book. One of them is this A Guide to First-Passage Processes.

Eric Freeman:

Reading can called mind hangout, why? Because if you are reading a book especially book entitled A Guide to First-Passage Processes your thoughts will drift away trough every dimension, wandering in each aspect that maybe unidentified for but surely can become your mind friends. Imaging every word written in a publication then become one form conclusion and explanation that maybe you never get before. The A Guide to First-Passage Processes giving you another experience more than blown away your mind but also giving you useful info for your better life with this era. So now let us show you the relaxing pattern at this point is your body and mind are going to be pleased when you are finished studying it, like winning an activity. Do you want to try this extraordinary paying spare time activity?

Jeffrey Garner:

This A Guide to First-Passage Processes is great guide for you because the content that is full of information for you who have always deal with world and possess to make decision every minute. This book reveal it facts accurately using great arrange word or we can point out no rambling sentences in it. So if you are read the item hurriedly you can have whole data in it. Doesn't mean it only offers you straight forward sentences but challenging core information with splendid delivering sentences. Having A Guide to First-Passage Processes in your hand like having the world in your arm, details in it is not ridiculous a single. We can say that no e-book that offer you world inside ten or fifteen small right but this publication already do that. So , this can be good reading book. Hey there Mr. and Mrs. stressful do you still doubt that?

Richard Diller:

Don't be worry should you be afraid that this book will filled the space in your house, you could have it in e-book approach, more simple and reachable. This particular A Guide to First-Passage Processes can give you a lot of friends because by you checking out this one book you have matter that they don't and make an individual more like an interesting person. This specific book can be one of one step for you to get success. This guide offer you information that possibly your friend doesn't recognize, by knowing more than other make you to be great folks. So , why hesitate? Let's have A Guide to First-Passage Processes.

**Download and Read Online A Guide to First-Passage Processes By
Sidney Redner #4X1VN2UI760**

Read A Guide to First-Passage Processes By Sidney Redner for online ebook

A Guide to First-Passage Processes By Sidney Redner Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read A Guide to First-Passage Processes By Sidney Redner books to read online.

Online A Guide to First-Passage Processes By Sidney Redner ebook PDF download

A Guide to First-Passage Processes By Sidney Redner Doc

A Guide to First-Passage Processes By Sidney Redner Mobipocket

A Guide to First-Passage Processes By Sidney Redner EPub

4X1VN2UI760: A Guide to First-Passage Processes By Sidney Redner