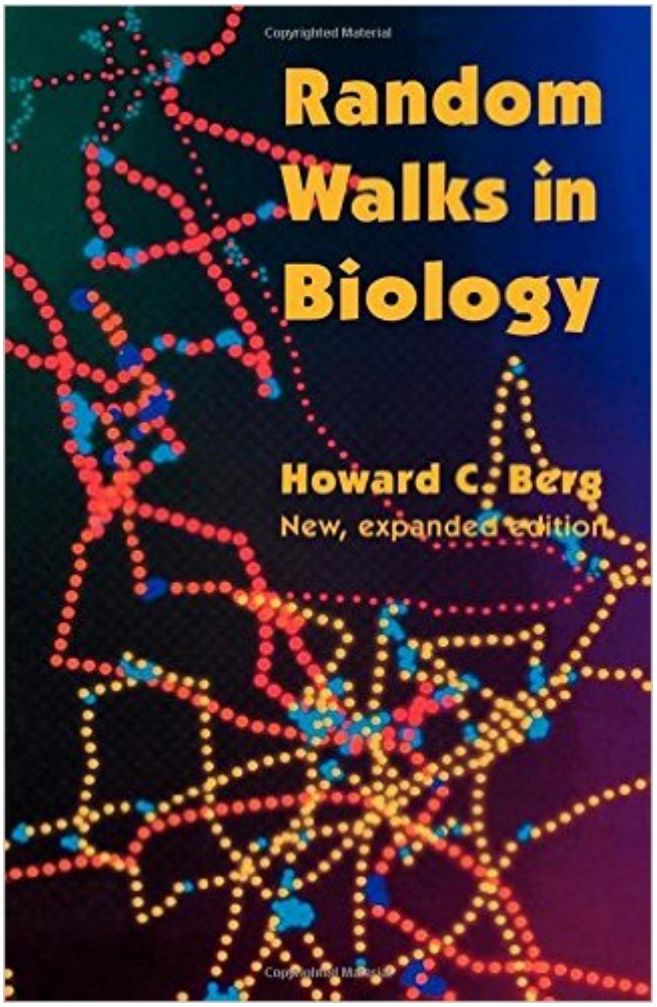
Random Walks In Biology



Synopsis

This book is a lucid, straightforward introduction to the concepts and techniques of statistical physics that students of biology, biochemistry, and biophysics must know. It provides a sound basis for understanding random motions of molecules, subcellular particles, or cells, or of processes that depend on such motion or are markedly affected by it. Readers do not need to understand thermodynamics in order to acquire a knowledge of the physics involved in diffusion, sedimentation, electrophoresis, chromatography, and cell motility--subjects that become lively and immediate when the author discusses them in terms of random walks of individual particles.

Book Information

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Customer Reviews

Random walks in Biology explains concepts of diffusion driven processes in a lucid, intuitive and didactic fashion. The approach lacks mathematical rigor, but abounds in examples to incite interest in one and all. For physicists, this book offers a delightful peek into biophysical processes where their mathematical skills and knowledge of random processes can be utilized and tested. For biologists and chemists, the book presents an erudite route to understanding how these random processes, diffusion and fluctuations influence function and design of biological contrusts.

I bought this book in 1995 to get an understanding of random walk phenomena.The random walk equations are mostly biologically based.That is equations that describe the motion of biological things.Type of things covered (including but not limited to)Ficks equationsDiffusionDriftdragDiffusion at EquilibriumDerivation of Boltzman equationImportance of

KTMean Square VelocityEinstien-Scmoluchowski relationFlagellar propulsionMotility of Escherichia ColiProbability Distributions (Gaussian , Binomial , Poisson)etcThe book is a fairly easy read.You'll need at least high school to uni maths background.The maths is fairly practical stuff (translatable to s/w code)There are plenty of graphs and diagrams.

This book is a classic for good reasons: It describes random walk and diffusion in a way that makes it very intuitive, and focuses on cases that are important for applications. I keep looking up useful things like the formula for a disc-shaped absorper, the drag coefficient of an elliposoid etc.

A wonderful book -- an exceptionally clear, well-written introduction to diffusion, random walks, and bacterial chemotaxis. I return to it often, have recommended it to many students, and have taught from it in various contexts. Not only is it a biophysical classic, it contains a lot of material that is invaluable to any student of physics or of biology -- things like the statistical properties of random walks, the consequences of run-and-tumble chemotaxis, and more.

This book intertwines the physics and the mathematics of basic diffusion phenomena within a biology setting in a very well balanced manner. As such, it may appeal to the biology/biochemistry/biophysics student interested in the role of diffusion phenomena in biology, including chemotaxis and bacterial motility. No doubt this little book has its value. Howard Berg is an authority in the subject, a member of learned societies, and teaches at Harvard.However, I found the book a little meagre for its price. You can find similar material intended for the same audience for free on the internet. Moreover---perhaps due to its age, most probably deliberately---, the text does not discuss the role of stochasticity in biology in general, an important topic in modern molecular and cell biology. Definitely does not worth the dollars. I read an exemplar from the local library---with much profit---, but would buy it only if its price were half the current price tag ($32), at maximum.

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