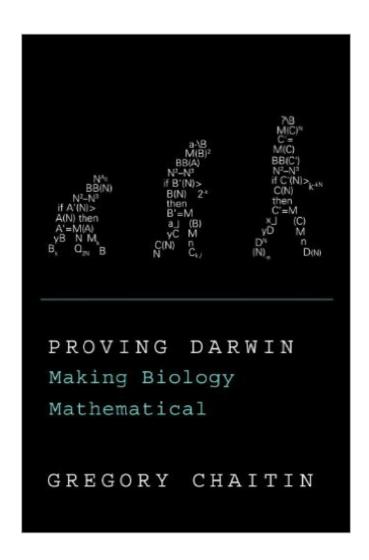
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Proving Darwin: Making Biology Mathematical





Synopsis

Groundbreaking mathematician Gregory Chaitin gives us the first book to posit that we can prove how Darwinâ TMs theory of evolution works on a mathematical level. For years it has been received wisdom among most scientists that, just as Darwin claimed, all of the Earthâ TMs life-forms evolved by blind chance. But does Darwinâ TMs theory function on a purely mathematical level? Has there been enough time for evolution to produce the remarkable biological diversity we see around us? Itâ TMs a question no one has yet answeredâ "in fact, no one has even attempted to answer it until now. In this illuminating and provocative book, Gregory Chaitin argues that we canâ TMt be sure evolution makes sense without a mathematical theory. He elucidates the mathematical scheme heâ TMs developed that can explain life itself, and examines the works of mathematical pioneers John von Neumann and Alan Turing through the lens of biology. Chaitin presents an accessible introduction to metabiology, a new way of thinking about biological science that highlights the mathematical structures underpinning the biological world. Fascinating and thought-provoking, Proving Darwin makes clear how biology may have found its greatest ally in mathematics.

Book Information

File Size: 6105 KB

Print Length: 144 pages

Publisher: Vintage; 1 edition (May 8, 2012)

Publication Date: May 8, 2012

Sold by: A Digital Services LLC

Language: English

ASIN: B006E512HU

Text-to-Speech: Enabled

X-Ray: Not Enabled

Word Wise: Enabled

Lending: Not Enabled

Enhanced Typesetting: Enabled

Best Sellers Rank: #189,944 Paid in Kindle Store (See Top 100 Paid in Kindle Store) #7 in Books > Science & Math > Mathematics > Applied > Biomathematics #11 in Kindle Store > Kindle eBooks > Nonfiction > Science > Mathematics > Pure Mathematics > Discrete Mathematics #71 in Books > Science & Math > Evolution > Organic

Customer Reviews

Mathematician Gregory Chaitin attempts to provide a mathematical model of evolution in this short book based on a university course given in the Spring of 2011 at the Federal University of Rio de Janeiro, where the author is a professor. It also adapts material given at one of his lectures at the Santa Fe Institute. It is a quick read and an outline at best of his work, but it does give the reader a general idea of the concepts behind what the author calls "metabiology", an attempt to model evolutionary adaptation through computer software rather than natural software, otherwise known as DNA. The central premise of this book is that by utilizing algorithmic information theory and the flexible and creative nature of postmodern mathematics, one can construct a working mathematical toy model of evolution, creating a piece of randomly mutating software that selects for a fitness trait. The main idea here is that DNA is a naturally occurring piece of software, our internal programming language as it were. This is not an original concept, but it is one that Chaitin expands upon greatly in the text. I'll admit that it's an absolutely compelling idea. Evolution, after all, is the backbone of modern biology, but its main concepts are often misunderstood or outright rejected by a significant portion of the population. If one can really take a mathematical model and "prove" that the basic mechanisms of evolution (random mutations and natural selection) work as advertised, then it could go a long way towards advancing scientific literacy. Keep in mind that the author's model is simplistic at best, selecting for only one trait and having none of the environmental pressures that truly drive adaptation.

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