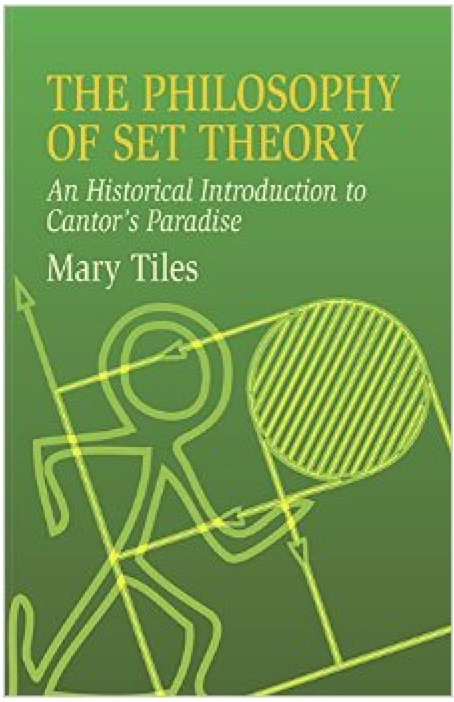
The Philosophy Of Set Theory: An Historical Introduction To Cantor's Paradise (Dover Books On Mathematics)



Synopsis

A century ago, Georg Cantor demonstrated the possibility of a series of transfinite infinite numbers. His methods, unorthodox for the time, enabled him to derive theorems that established a mathematical reality for a hierarchy of infinities. Cantor’s innovation was opposed, and ignored, by the establishment; years later, the value of his work was recognized and appreciated as a landmark in mathematical thought, forming the beginning of set theory and the foundation for most of contemporary mathematics.As Cantor’s sometime collaborator, David Hilbert, remarked, "No one will drive us from the paradise that Cantor has created." This volume offers a guided tour of modern mathematics’ Garden of Eden, beginning with perspectives on the finite universe and classes and Aristotelian logic. Author Mary Tiles further examines permutations, combinations, and infinite cardinalities; numbering the continuum; Cantor’s transfinite paradise; axiomatic set theory; logical objects and logical types; and independence results and the universe of sets. She concludes with views of the constructs and reality of mathematical structure.Philosophers with only a basic grounding in mathematics, as well as mathematicians who have taken only an introductory course in philosophy, will find an abundance of intriguing topics in this text, which is appropriate for undergraduate-and graduate-level courses.

Book Information

Series: Dover Books on Mathematics
Paperback: 272 pages
Publisher: Dover Publications (June 18, 2004)
Language: English
ISBN-10: 0486435202
ISBN-13: 978-0486435206
Product Dimensions: 5.5 x 0.6 x 8.5 inches
Shipping Weight: 4.8 ounces (View shipping rates and policies)
Average Customer Review: 4.4 out of 5 starsÂ Â See all reviewsÂ (7 customer reviews)
Best Sellers Rank: #139,500 in Books (See Top 100 in Books)   #15 inÂ Books > Science & Math > Mathematics > Pure Mathematics > Set Theory   #1303 inÂ Books > Textbooks > Science & Mathematics > Mathematics

Customer Reviews

The Philosophy of Set Theory - An Historical Introduction to Cantor’s Paradise by Mary Tiles is a fascinating mix of mathematics, mathematical logic, and philosophy that should appeal to (and challenge) both mathematics and philosophy majors at the undergraduate and graduate level.The focus is on the Generalized Continuum Hypothesis (GCH); the reader will meet topics like numbering the continuum, developing Cantor’s transfinite ordinal and cardinal numbers, evaluating the ZF axioms underlying set theory, and examining the work of Frege and Russell.The first four chapters (The Finite Universe; Classes and Aristotelian Logic; Permutations, Combinations, and Infinite Cardinalities; and Numbering the Continuum) provide a historical, philosophical, and mathematical context for the more challenging chapters that follow. Some readers may wish to skip familiar sections although I found these early chapters to be quite engaging.Chapter 5 - Cantor’s Transfinite Paradise is a good, standalone introduction to Cantor’s transfinite ordinal and cardinal numbers and to the General Continuum Hypothesis (GCH).Chapter 6 - Axiomatic Set Theory is another good standalone chapter. Mary Tiles introduces the Zermelo-Fraenkel axioms that underlie modern set theory and develops a restatement of the GCH in the language of the ZF axioms.Chapter 7 - Logical Objects and Logical Types delves deeply into the work of Frege and Russell. This was not the first time that I had encountered Russell’s ramified type hierarchy, but nonetheless I still found this section slow going.Chapter 8 - Independence Results and the Universe of Sets assumes substantial familiarity with model theory.

When Newton and his successors defined the calculus in the 17th and 18th centuries, they were quite cavalier about infinities. For example, they treated sums of infinitely many numbers essentially the same way they treated sums of finitely many numbers. And when talking about derivatives, they were content to talk of changes over infinitely shrinking intervals without quite saying what they meant by that. As mathematics developed increasingly abstract methods, more divorced from the simple observations of physics, many problems cropped up, mostly having to do with the careless use of infinities. In order to deal with these problems, mathematicians devised precise definitions which made no explicit use of infinities.But the new methods made it necessary for mathematicians to consider the sets of points where the methods broke down. In investigating them, Cantor had to consider infinite sets and even had to compare different sizes of infinity. Understandably, many mathematicians were upset. But others found Cantor’s mathematics useful and worked to put set theory on a solid basis. A new theory, the Zermelo-Frankel theory of sets, was the result. It’s not perfect, but it’s good enough for most mathematicians. Most mathematicians today are quite comfortable with infinite sets.I mention all this because Tiles doesn’t. Given the subtitle, "An Historical Introduction to Cantor’s Paradise", I was expecting to read about the intellectual climate in which Cantor developed his theory. So I am writing this book for the sake of anyone who might like a book putting Cantor’s theory into its historical context: this is not the book.It is a book about the philosophy of finitism, from ancient Greek times to the 20th century.

I’m a math enthusiast with no formal training in math. I’ve only studied finance/econ. So we use some areas of math heavily, but don’t tend to play around with the more pure analysis of math. I was enamored by set theory in the past, but the books I bought were just too intense. I lacked not only the background, but also the time to teach myself the intense complexity of high level set theory. However, I absolutely loved the insight even basic set-theory analysis offered me into calculus, which I gained from the back four pages of a game theory textbook I owned!This book was wonderful. It was conceptually challenging, and not uncommon for me to spend 5 minutes on a page. At the same time, it’s the type of book a clever person without an intense math background could take to a coffee shop. I also found the historical philosophy parts of the book fascinating, and offering a wonderful foundation for the reasons new models and ideas were formed.I initially found this book at a bookstore, and decided not to buy it, as I made the pretentious observation the author/professor did not teach at a ’prestigious school.’ I then doubled back and made the impulse purchase after getting hooked on one of the chapters in the middle of the book, and decided to give it a proper shot. I have to say, I absolutely love this book. The insights into critical analysis of algebra/geometry/infinite series, has legitimately helped me in my work in game theory. While I hope to eventually study a high level course in real-analysis, this book manages to be both captivating and as rigorous as possible without creating a full-blown mathematical textbook.

Cantor: Musical Authority, Cultural Investment (A Helen B. Schwartz Book in Jewish Studies) Songs and Prayers from Taize: Accompaniment Edition for Cantor & Instruments Jokes For Kids - Joke Books : Funny Books : Kids Books : Books for kids age 9 12 : Best Jokes 2016 (kids books, jokes for kids, books for kids 9-12, ... funny jokes, funny jokes for kids) (Volume 1) HISTORICAL ROMANCE: 5 CLEAN Book - Box Set (Medieval, Regency, Victorian, Scottish Time Travel Historical Romance) (With Collection of Additional 30 Bonus Short Stories - Total >410k words) Mathematics and the Imagination (Dover Books on Mathematics) Curvature in Mathematics and Physics (Dover Books on Mathematics)