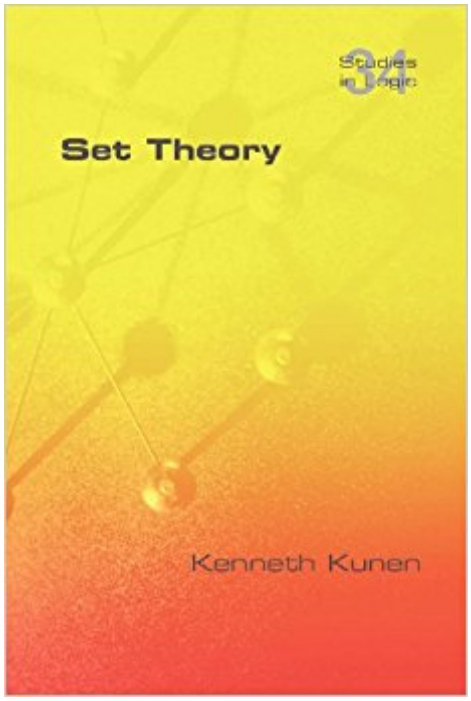
Set Theory (Studies In Logic: Mathematical Logic And Foundations)



Synopsis

This book is designed for readers who know elementary mathematical logic and axiomatic set theory, and who want to learn more about set theory. The primary focus of the book is on the independence proofs. Most famous among these is the independence of the Continuum Hypothesis (CH); that is, there are models of the axioms of set theory (ZFC) in which CH is true, and other models in which CH is false. More generally, cardinal exponentiation on the regular cardinals can consistently be anything not contradicting the classical theorems of Cantor and KÃ¶nig. The basic methods for the independence proofs are the notion of constructibility, introduced by GÃ¶del, and the method of forcing, introduced by Cohen. This book describes these methods in detail, verifi es the basic independence results for cardinal exponentiation, and also applies these methods to prove the independence of various mathematical questions in measure theory and general topology. Before the chapters on forcing, there is a fairly long chapter on "infi nitary combinatorics". This consists of just mathematical theorems (not independence results), but it stresses the areas of mathematics where set-theoretic topics (such as cardinal arithmetic) are relevant. There is, in fact, an interplay between infi nitary combinatorics and independence proofs. Infi nitary combinatorics suggests many set-theoretic questions that turn out to be independent of ZFC, but it also provides the basic tools used in forcing arguments. In particular, Martin's Axiom, which is one of the topics under infi nitary combinatorics, introduces many of the basic ingredients of forcing.

Book Information

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Customer Reviews

INITIAL REVIEWThis will be a short initial review prior to reading any of this very recently acquired

book. This book by master expositor Kenneth Kunen, emeritus at University of Wisconsin-Madison, is a newly rewritten 2011 update of his well regarded, rather standard 1980 edition, still available at Set Theory An Introduction To Independence Proofs (Studies in Logic and the Foundations of Mathematics). In Professor Kunen's short new preface, he cites two reasons why the new edition was needed, 1) more set theory has been discovered in the past 30 years, especially related to Martin's Axiom. 2) model theoretic methods are far more more known and used than in 1980. Another plus of this new edition is that it is published in a decent quality, but inexpensive College Publications paperback imprint. I've been handling this book a lot for over a month so far and the paper cover is still flat and undamaged.Long chapter I called 'Background Material' is rather similar to great chapter I on ZFC set theory in Kunen's excellent 2009 book The Foundations of Mathematics (Logic S.), which I have read thru 100 page chapter II on model theory and proof theory, with chapter II twice, and finally read short chapter III on philosophy of math. There is a huge review from this reader on the page for that foundations book.

Just started it and it looks like the best ever written; way beyond anything previously written. So far:It is flawless in both its delivery and coverage. It is consistent in style and detail, correct in order of events, and complete in coverage. Added is that it reads in a way that will intrigue you if you are slightly familiar with the ideas â " you will not be able to put it down. It is clever; Kunen knows not only the subject so well, but also how to present it.The book starts with explaining how language and philosophy is a major concern, and lays down the axioms of various set theories in a provocative way. Kunen takes the important variants of ZFC and shows which axioms are necessary for working in them; in doing so, you see how the axioms fit together to form all of ZFC and any of its cousins. This section is pedantic and must have been painstakingly written, but it reads like a novel and the clarity is quite remarkable. It conveys his in depth understanding, and any willing person can follow it, and with some thought pick up this understanding. There is a back and forth reading that most will take as many of the early ideas are talked about in terms of why and how they will affect the whole theory â " so parts of the later exposition is referenced early on. This gives those somewhat familiar with set theory the chance to skim through the whole of the first chapter and then return to get the full punch of the underpinnings. However, this might be a stumbling block for the near novice, but mountable by references given â " taking one to the exact definitions of the terms. There is also a handy 2 page symbol reference at the end of the book.

Set Theory (Studies in Logic: Mathematical Logic and Foundations) Foundations of Set Theory

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