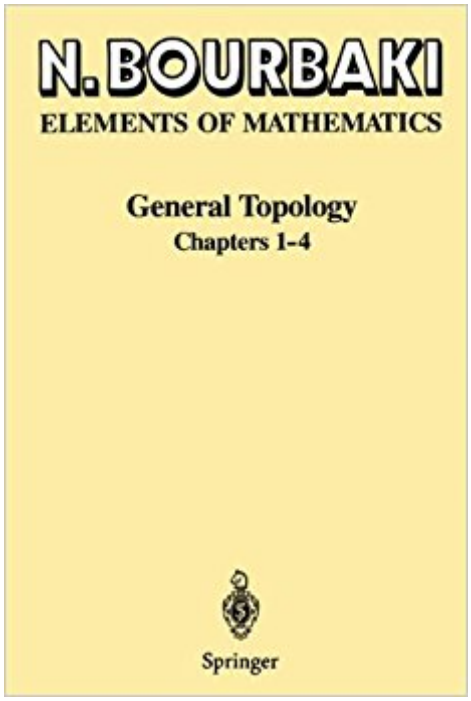
General Topology: Chapters 1Ã¢â‚¬â€œ4 (Ettore Majorana International Science)



Synopsis

This is the softcover reprint of the 1971 English translation of the first four chapters of BourbakiÃ¢â ¬â„¢s Topologie Generale. It gives all basics of the subject, starting from definitions. Important classes of topological spaces are studied, and uniform structures are introduced and applied to topological groups. In addition, real numbers are constructed and their properties established.

Book Information

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Customer Reviews

this book is a bit denser than most other introductory general topology books. But it does quite exhaustive survey of important concepts pertaining to general topology.Since Bourbaki series builds upon its previous materials, many set theoretic ideas and terminologies are used without explanations. So unless one does have access to their previous book "Theory of Sets" there will be some minor frustrations/annoyances when reading this book.For the content, it starts with open set axioms for the topology like any other intro. topology text.Then Bourbaki shows how the neighborhood system determines a unique topology on a set and conversely. Next topic covered is continuity and the initial and final topology induced by a family of mappings and defines subset, product, and quotient topology in terms of the these two natural constructions. After covering these topics Bourbaki covers quotient various quotient mapping and some useful criteria for determining when the map from quotient space to the codomain after the canonical decomposition of a map

becomes homeomorphism.Next topic covered is open and closed mapping along with equivalence relations being open or closed.After discussing general continuity without any major restrictions on the topological spaces, Bourbaki then introduces typical restrictions; namely compactness, Hausdorff, and regular conditions.Unlike many other major introductory topology books, Bourbaki does not talk about sequences nor nets in order to define compactness(quasi-compactness as Bourbaki calls it). Instead, he uses filters to define compactness. Using Zorn's lemma, existence of ultrafilter is shown and Tychnoff's theorem is proven using filter property in a very slick fashion.Also, there is a short section on germs, although this is not used in the rest of this book in any significant ways.Then, Bourbaki moves on to the topic of the limit and cluster(accumulation) point of a function of filtered space into a topological space and shows how the definition limit of a sequence or nets can be retrieved from a definition of limits of a function with respect to a filter.After covering this necessary tool or terminology, Bourbaki then covers Hausdorff space and regular space. Extension of a continuous function of a dense subset into a regular space, by continuity is shown in a very slick fashion. After covering this he does the typical stuff associated with compactness, paracompactness, and connectedness. These three sections are very similar to other intro. topology text in its content but with terminology adjusted for use of filter in these concepts.However, Bourbaki offers something you do not typically see in intro. topology text, in this section; proper mapping and inverse system.Proper mapping is shown as an alternative criterion for determining compactness, and other use of proper mappings are illustrated.Next section of this book is uniform space, which is a generalization of pseudo-metric spaces.Here, Bourbaki shows how a notion of completeness can be generalized to the setting of uniform spaces and introduces notion of Cauchy filter. The major result of this section is the construction of Hausdorff completion of a uniform space. This construction is essentially same as the construction of real numbers from Cauchy sequences of rational numbers but Bourbaki maintains the vocabulary of Cauchy filter. Also, instead of working with equivalent classes of Cauchy filters(or sequences if you prefer), Bourbaki uses a system of representatives called minimal Cauchy filters.Section 3 of this book, covers topological group. Using how a neighborhood systems determines a unique topology, he quickly determines criterion for existence of suitable topology such that this topology is compatible with the pre-existing algebraic structure; i.e. all the algebraic operations become continuous with this topology. Thus the completion stuff one might see in Lang's Algebra or in Atiyah's intro. commutative algebra will makes more sense after reading this section.Then the usual stuff of completion of topological group, ring, field, module is shown using tools developed in previous two sections. Also, using inverse system he does a few approximation stuff, which one can skip without disrupting further

reading.Section 4 is the last section of this book, and Bourbaki finally talks about real number. Since he talked about completion of topological group, he defines real number as the Hausdorff completion of rational numbers considered as an additive topological group. After this consideration many results just fall out; such as rational line being dense in real, etc.After this characterization supreme property of a bounded set of real number is proved using Archimedes' Axiom(which is proved also). Then the usual criterion of compactness and connectedness in real line is proved. Here the proof of these facts are not given in the standard way deriving contradiction using supreme property. So it is interesting to see how the previous materials are used to prove these well know facts.Then monotone convergence of a function from directed set into a real number is discussed and its consequences are discussed;limsup, upper envelope of a family of continuous functions, etc. Also, upper and lower continuity is discussed and some familiar results are discussed in brief fashion.Finally, Bourbaki talks about series of real number and standard facts such as Cauchy's convergence criterion, alternating series test, etc are given along with n-ary expansion of real numbers.And this is where part 1 of this book ends.My overall impression is that this book(just like other Bourbaki book) is very user friendly, in that it does each proof very carefully. However, due to its constant build of a long logical chains, you really cannot read this book like a typical textbook; meaning you cannot skip around and the entire book must be read in a linear fashion.Also, the filter and uniform stuff is not typically covered in the introductory topology courses so to a novice this stuff might not be useful to your classwork(at least for the undergraduate or beginning graduate level). However, reading this book broadens your view on general topology for this book explains ideas behind the common concepts you encounter in other courses; such as use of filtration in a module to define a topology in an algebra course.Anyway, it seems to me that the biggest disadvantage of reading Bourbaki is its inefficiency. Meaning, stuff you really wanna see is not discussed unless you read through first 200 or 300 pages of this wonderful book. And this is probably the main reason why Bourbaki is not used as a standard text anymore;not because categorical language is not used as some might argue. So to a student with not enough studying time, this book will not useful when it is needed.

i recently ordered "A GENERAL TOPOLOGY WORKBOOK" by Iain Adamson, as i very much wish to understand the mathematics of topology. as i would do with any other book, i started by reading the introduction and suggested readings. Mr. Adamson highly recommends the BOURBAKI series on topology as a reference material. he ascribes to this series as his text of choice and further states that this is the text that he has studied the most closely. it is for this reason that i am ordering

this series.i extend my thanks to mr. adamson for the recommendation. with the plethora of choices in study materials and a limited budget, i needed to narrow my scope and decide which text would best serve me.thanks again :-)

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