

two stage sampling, Professor Cochran has omitted the elementary theory based on an infinite population of units each of which contains an infinite number of elements and by the use of two general results by Durbin has presented the general theory in a very clear and concise manner. Chapter 11 has been considerably strengthened by a more detailed discussion of the mean square error when there is more than one strata. Finally one must note the new sections of Chapter 13 with particular reference to the effectiveness of call-backs when dealing with non-response. The number of exercises, with answers, has been greatly increased and there is a full list of references covering 148 authors as against 85 in the first edition.

This book is invaluable to all statisticians and to all those interested in sample surveys.

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GOODSTEIN, R. L., *Boolean Algebra* (The Commonwealth and International Library of Science, Technology, Engineering and Liberal Studies, Vol. 6, Pergamon Press, Oxford, 1963), 140 pp., 12s. 6d.

The book begins with an excellent elementary and informal introduction to the algebra of sets. The word "class" is used rather than "set", and the notation employed, e.g. 1 and 0 for universal set and empty set, is geared towards the later work on Boolean algebra. The proofs of properties of the operations $-$, $+$ and \times provide good illustrations of the use of the basic properties of union, intersection and complementation of sets.

In Chapter II, Boolean algebra is defined after careful motivation. Four suitable properties (2-01-2-04) of union, intersection and complementation together with axioms covering equality are extracted from the many properties in Chapter I and it is shown that 2-01-2-04 and their consequences are complete with respect to their interpretation as an algebra of classes. The four axioms 2-01-2-04 are shown, by the use of suitable examples, to be independent of one another. Homomorphism and isomorphism of Boolean algebras is introduced by a consideration of the cartesian product of a Boolean algebra with itself. This may be difficult for a reader who has not already met these ideas.

A different set of axioms for Boolean algebra, based only on intersection and complementation, is given at the beginning of Chapter III and a detailed proof is given that this set is equivalent to that of Chapter II. The chapter contains also the derivation of the general solutions of several Boolean equations.

In Chapter IV a model for Boolean algebra in terms of sentence logic is given, and it is proved in detail that the axioms used (together with the rules of inference) are complete with respect to the truth tables. The independence of the axioms and the Deduction theorem for sentence logic are established.

In the final chapter lattices are introduced and it is shown that a complemented distributive lattice is a Boolean algebra, and conversely. The important representation theorem for a finite Boolean algebra in terms of the atoms of the algebra and Stone's theorem on infinite Boolean algebras are proved.

Each chapter contains a carefully selected group of examples and there are fifteen pages of solutions to these at the end of the book.

The printing and layout are excellent and only a few printer's errors were noticed, the most serious of these being in axiom 4-24 on page 78 (where $r \rightarrow q$ appears in place of $r \vee q$) and in the important statement on page 89 (probable for provable).

The only other minor criticism that might be made is in the use of reference numbers; it would probably have been better not to have dropped the chapter number in many of the back references.

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