

D. van Dalen

# Logic and Structure

Universitext

1980. Approx. 180 pages

ISBN 3-540-09893-3

This book provides an efficient introduction to logic students of mathematics. The central theme is that part of first order logic which can be handled directly on the basis of **derivation** and **validity**. Emphasis is placed on notions that play a role in every-day mathematics, such as models, truth, relativized quantifiers, consistency, Skolem functions, and extension by definition. Following a self-contained presentation of propositional logic (including completeness), predicate logic – with applications to elementary algebra – is treated systematically, leading to an exposition of the first principles of model theory. A unique feature of this book is the systematic use of Gentzen's system of **Natural Deduction**. Closer to natural informal reasoning than an axiomatic approach, it enables the student to devise derivations as a simple exercise. Inductive definitions have been employed wherever appropriate. Model-theoretic topics include the main facts of compactness, non-standard models of arithmetic and the reals, and, in a special section, some of the properties of second-order logic. The material is illustrated by many exercises and demands a minimum background in mathematics of the reader.



Springer-Verlag  
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# Perspectives in Mathematical Logic

Edited by the  $\Omega$ -Group: R. O. Gandy,  
H. Hermes, A. Levy, G. H. Müller,  
G. E. Sacks, D. S. Scott

J. Barwise

## Admissible Sets and Structures

An Approach to Definability Theory

1975. 22 figures, 5 tables. XIV, 394 pages  
ISBN 3-540-07451-1

This book presents the first systematic treatment of the theory of admissible sets to appear in print. Presupposing only the most basic material from logic, it takes the reader from first principles to more advanced topics and includes many applications to other parts of logic. The author has greatly increased the applicability of the theory by studying admissible sets built up from the structures of mathematics, not just those built up from the empty set. This innovation has already led to significant discoveries in model theory and definability theory.

P. G. Hinman

## Recursion-Theoretic Hierarchies

1978. XII, 480 pages  
ISBN 3-540-07904-1

This volume examines the theory of definability (emerging from the confluence of Descriptive Set Theory and Recursion Theory) as it relates to some

fundamental mathematical structures: natural numbers, sets of natural numbers (real numbers) and ordinal numbers. Other topics include the effects of additional set-theoretical hypotheses, and a study of generalized recursion theories in which the fundamental domain is extended to include functionals of higher types or ordinal numbers.

A. Levy

## Basic Set Theory

1979. 20 figures, 1 table. XIV, 391 pages  
ISBN 3-540-08417-7

Intended for graduate and advanced undergraduate students, this comprehensive work discusses set theory in considerable depth, providing an excellent foundation for further study on the more advanced topics of constructible sets, forcing and large cardinals. Covering over 100 years of set theory research, this book remains the only non-elementary resource on basic set theory available.



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