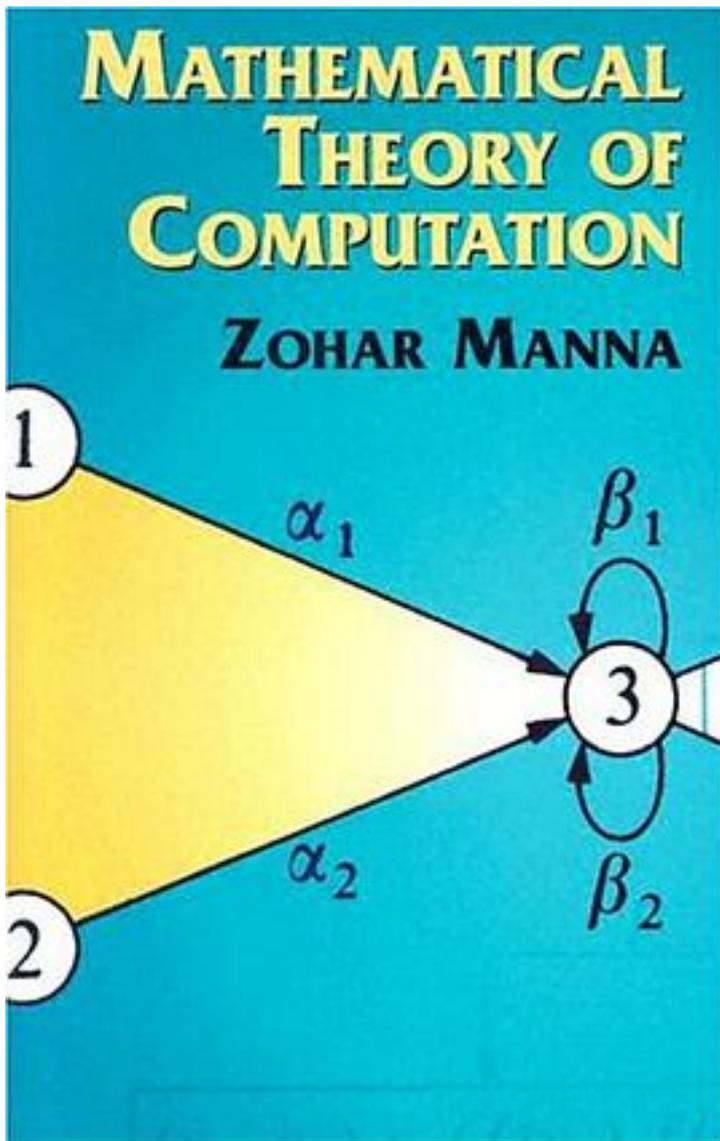


Mathematical Theory of Computation



[Mathematical Theory of Computation 下载链接1](#)

著者:Zohar Manna

出版者:Dover Publications

出版时间:2003-12

装帧:

isbn:9780486432380

With the objective of making into a science the art of verifying computer programs (debugging), the author addresses both practical and theoretical aspects. Subjects include computability (with discussions of finite automata and Turing machines); predicate calculus; verification of programs (both flowchart and algol-like programs); flowchart schemas; and the fixpoint theory of programs. 1974 edition. Includes 77 figures.

作者介绍:

目录: Preface

CHAPTER 1 COMPUTABILITY

INTRODUCTION 1

1-1 FINITE AUTOMATA 2

1-1.1 Regular Expressions 3

1-1.2 Finite Automata 7

1-1.3 Transition Graphs 9

1-1.4 Kleene's Theorem 11

1-1.5 The Equivalence Theorem 17

1-2 TURING MACHINES 20

1-2.1 Turing Machines 21

1-2.2 Post Machines 24

1-2.3 Finite Machines with Pushdown Stores 29

1-2.4 Nondeterminism 35

1-3 TURING MACHINES AS ACCEPTORS 37

1-3.1 Recursively Enumerable Sets 38

1-3.2 Recursive Sets 39

1-3.3 Formal Languages 41

1-4 TURING MACHINES AS GENERATORS 43

1-4.1 Primitive Recursive Functions 45

1-4.2 Partial Recursive Functions 50

1-5 TURING MACHINES AS ALGORITHMS 53

1-5.1 Solvability of Classes of Yes/No Problems 54

1-5.2 The Halting Problem of Turing Machines 56

1-5.3 The Word Problem of Semi-Thue Systems 58

1-5.4 Post Correspondence Problem 60

1-5.5 Partial Solvability of Classes of Yes/No Problems 64

BIBLIOGRAPHIC REMARKS 67

REFERENCES 68

PROBLEMS 70

CHAPTER 2 PREDICATE CALCULUS

INTRODUCTION 77

2-1 BASIC NOTIONS 81

2-1.1 Syntax 81

2-1.2 Semantics (Interpretations) 85

2-1.3 Valid Wffs 90

2-1.4 Equivalence of Wffs 95

2-1.5 Normal Forms of Wffs 101

2-1.6 The Validity Problem 105

2-2 NATURAL DEDUCTION 108

2-2.1 Rules for the Connectives 110

2-2.2 Rules for the Quantifiers	115
2-2.3 Rules for the Operators	122
2-3 THE RESOLUTION METHOD	125
2-3.1 Clause Form	125
2-3.2 Herbrand's Procedures	130
2-3.3 The Unification Algorithm	136
2-3.4 The Resolution Rule	140
BIBLIOGRAPHIC REMARKS	145
REFERENCES	146
PROBLEMS	147
CHAPTER 3 VERIFICATION OF PROGRAMS	161
INTRODUCTION	161
3-1 FLOWCHART PROGRAMS	161
3-1.1 Partial Correctness	170
3-1.2 Termination	182
3-2 FLOWCHART PROGRAMS WITH ARRAYS	189
3-2.1 Partial Correctness	189
3-2.2 Termination	195
3-3 ALGOL-LIKE PROGRAMS	202
3-3.1 While Programs	203
3-3.2 Partial Correctness	205
3-3.3 Total Correctness	211
BIBLIOGRAPHIC REMARKS	218
REFERENCES	220
PROBLEMS	223
CHAPTER 4 FLOWCHART SCHEMAS	241
INTRODUCTION	241
4-1 BASIC NOTIONS	242
4-1.1 Syntax	242
4-1.2 Semantics (Interpretations)	244
4-1.3 Basic Properties	248
4-1.4 Herbrand Interpretations	260
4-2 DECISION PROBLEMS	262
4-2.1 Unsolvability of the Basic Properties	264
4-2.2 Free Schemas	268
4-2.3 Tree Schemas	274
4-2.4 Inov Schemas	284
4-3 FORMALIZATION IN PREDICATE CALCULUS	294
4-3.1 The Algorithm	295
4-3.2 Formalization of Properties of Flowchart Programs	307
4-3.3 Formalization of Properties of Flowchart Schemas	311
4-4 TRANSLATION PROBLEMS	317
4-4.1 Recursive Schemas	319
4-4.2 Flowchart Schemas versus Recursive Schemas	322
BIBLIOGRAPHIC REMARKS	334
REFERENCES	335
PROBLEMS	337
CHAPTER 5 THE FIXPOINT THEORY OF PROGRAMS	356
INTRODUCTION	356
5-1 FUNCTIONS AND FUNCTIONALS	357
5-1.1 Monotonic Functions	359
5-1.2 Continuous Functionals	366
5-1.3 Fixpoints of Functionals	369
5-2 RECURSIVE PROGRAMS	374

5-2.1 Computation Rules 375
5-2.2 Fixpoint Computation Rules 384
5-2.3 Systems of Recursive Definitions 389
5-3 VERIFICATION METHODS 392
5-3.1 Stepwise Computational Induction 393
5-3.2 Complete Computational Induction 400
5-3.3 Fixpoint Induction 403
5-3.4 Structural Induction 408
BIBLIOGRAPHIC REMARKS 415
REFERENCES 416
PROBLEMS 418
NAME INDEX
SUBJECT INDEX
• • • • • ([收起](#))

[Mathematical Theory of Computation 下载链接1](#)

标签

计算机

计算理论、证明系统、形式语言

数学

TCS

评论

[Mathematical Theory of Computation 下载链接1](#)

书评

[Mathematical Theory of Computation_下载链接1](#)