

TABLE OF CONTENTS

<i>Chapter 1 Introduction: Some Concepts and Definitions</i>	1
1.0 Arguments and Argument Forms	1
1.1 Symbolic Logic and its Precursors	8
1.2 Symbolization	11
1.3 Logical Functors and Their Definitions	14
1.4 Tests of Validity Using Truth-tables	22
1.5 Proof and Derivation	29
1.6 The Axiomatic Method	36
1.7 Interpreted and Uninterpreted Systems	43
1.8 The Hierarchy of Logical Systems	45
1.9 The Systems of the Present Book	46
1.10 Abbreviations	47
<i>Chapter 2 The System \mathbf{P}_+</i>	48
2.1 Summary	48
2.2 Rules of Formation of \mathbf{P}_+	48
2.3 Rules of Transformation of \mathbf{P}_+	49
2.4 Axioms of \mathbf{P}_+	50
2.5 Definitions of \mathbf{P}_+	50
2.6 Deductions in \mathbf{P}_+	51
<i>Chapter 3 Standard Systems with Negation (\mathbf{P}_{LT}, $\mathbf{P}_{LT'}$, \mathbf{P}_{LTF}, \mathbf{P}_{PM})</i>	94
3.1 Summary	94
3.2 Rules of Formation of \mathbf{P}_{LT}	94
3.3 Rules of Transformation of \mathbf{P}_{LT}	95
3.4 Axioms of \mathbf{P}_{LT}	95
3.5 Definitions of \mathbf{P}_{LT}	96
3.6 Deductions in \mathbf{P}_{LT}	96

3.7	The Deduction Theorem	106
3.8	The System $\mathbf{P}_{LT'}$	116
3.9	Independence of Functors and Axioms	122
<i>Chapter 4 The System \mathbf{P}_{ND}. Systems of Natural Deduction</i>		130
4.1	Summary	130
4.2	The Bases of the System \mathbf{P}_{ND}	130
4.3	Proof and Derivation Techniques in \mathbf{P}_{ND}	130
4.4	Rules of Formation of \mathbf{P}_{ND}	132
4.5	The Structure of Proofs in \mathbf{P}_{ND}	132
4.6	Rules of Transformation of \mathbf{P}_{ND}	137
4.7	Proofs and Theorems of the System \mathbf{P}_{ND}	145
4.8	Theorems of the Full System \mathbf{P}_{ND}	169
4.9	A Decision Procedure for the System \mathbf{P}_{ND}	182
4.10	A Reduction of \mathbf{P}_{ND}	190
<i>Chapter 5 The Consistency and Completeness of Formal Systems</i>		193
5.1	Summary	193
5.2	The Consistency of $\mathbf{P}_{LT'}$	198
5.3	The Completeness of $\mathbf{P}_{I,T'}$	200
5.4	Metatheorems on \mathbf{P}_+	203
<i>Chapter 6 Some Non-Standard Systems of Propositional Logic</i>		207
6.1	Summary	207
6.2	What is a Non-Standard System?	207
6.3	The Intuitionistic System and the Fitch Calculus (\mathbf{P}_I and \mathbf{P}_F)	208
6.4	Rules of Formation of \mathbf{P}_I	209
6.5	Rules of Transformation of \mathbf{P}_I	210
6.6	Axioms of \mathbf{P}_I	210
6.7	Definitions of \mathbf{P}_I	211
6.8	Deductions in \mathbf{P}_I	211
6.9	The Propositional Logic of F.B. Fitch	223
6.10	The Johansson Minimum Calculus	229
<i>Chapter 7 The Lower Functional Calculus</i>		234
7.1	Summary and Remarks	234

TABLE OF CONTENTS

7.2	Rules of Formation of $\mathbf{LF}_{LT'}$	236
7.3	Transformation of $\mathbf{LF}_{LT'}$	237
7.4	Axioms of $\mathbf{LF}_{LT'}$	237
7.5	Definitions of $\mathbf{LF}_{LT'}$	238
7.6	Some Applications and Illustrations	239
7.7	Rules of Transformation of $\mathbf{LF}_{LT'}$	248
7.8	Axioms of $\mathbf{LF}_{LT'}$	255
7.9	The Propositional Calculus and $\mathbf{LF}_{LT'}$	258
7.10	Deductions in $\mathbf{LF}_{LT'}$	264
<i>Chapter 8 An Extension of $\mathbf{LF}_{LT'}$ and Some Theorems of the Higher Functional System. The Calculus of Classes</i>		284
8.1	Summary and Modification of the Formation Rules of $\mathbf{LF}_{LT'}$	284
8.2	The Lower Functional Calculus with Identity	285
8.3	Quantification over Predicate Variables. The System $\mathbf{2F}_{LT'}$	288
8.4	Abstraction and the Boolean Algebra	292
8.5	The Boolean Algebra and Propositional Logic	301
<i>Chapter 9 The Logical Paradoxes</i>		304
9.1	Self Membership	304
9.2	The Russell Paradox	305
9.3	Order Distinctions, Levels of Language, and the Semantic Paradoxes	306
9.4	The Consistency of $\mathbf{LF}_{LT'}$	308
9.5	The Decision Problem	309
9.6	Consistency and Decision in Higher Functional Systems	311
<i>Chapter 10 Non-Standard Functional Systems</i>		313
10.1	Summary	313
10.2	Intuitionistic and Johansson Functional Logics	313
10.3	The Fitch Functional Calculus of the First Order with Identity (\mathbf{LF}_{FF}^-)	316
<i>Bibliography</i>		344
<i>Index</i>		346