

CONTENTS

1. THE MAXIMAL TYPE STRUCTURE	1
1.1 Functionals of higher types	1
1.2 Kleene's computations	6
1.3 A survey of recursion in normal functionals	19
2. THE COUNTABLE FUNCTIONALS	23
2.1 Type-structures	23
2.2 The countable functionals	30
2.3 Countable recursion and the associatés	40
3. $Ct(n)$ AS A TOPOLOGICAL SPACE	49
3.1 The topology	49
3.2 Convergent sequences	55
3.3 Compact sets in $Ct(k)$	65
3.4 Filter-spaces and the countable functionals	74
4. COMPUTABILITY VS RECURSION	80
4.1 Degrees of functionals	80
4.2 Irreducible functionals of type 2	83
4.3 The fan-functional	99
4.4 The Γ -functional	110
5. THE COMPUTABLE STRUCTURE ON $Ct(k)$	116
5.1 A dense set	116
5.2 The trace of a functional	124
5.3 The complexity of $Ct(k)$	129
5.4 On the definability of computations	132
5.5 Regularity of countable recursion	141
6. SECTIONS	145
6.1 1-sections in a general type-structure	145
6.2 The 1-section of a type-2 functional	152
6.3 The 1-section of a higher type functional	162
6.4 Another type-structure	168
7. SOME FURTHER RESULTS AND TOPICS	173
7.1 Irreducible and nonobtainable functionals	173
7.2 Concluding remarks	184

BIBLIOGRAPHY	186
ALPHABETIC LIST OF CONCEPTS	189
LIST OF SYMBOLS	191