

Index

A

Abstract structures, 149-151
 binary, 116
 bistable, 149, 150
 concept of, 116
 technical embodiment of, 116
 Abstract synthesis, 187
 problems of, 188
 Algorithms, 304-354
 concept of recognition of, 221
 defined, 376
 directionality of, 309
 equivalence of, 316
 Euclidean, 305, 308, 309, 322
 general properties of, 308
 logical, 305
 Markov's normal, 314, 316-318, 321, 324, 349
 mathematical theory of, 310
 normal, 317, 318
 examples of, 317
 numerical, 305
 theory of, 321
 range of application of, 309
 theory of, 203, 221
 Amplifier, magnetic, 44, 46
 Arithmetical functions, 324, 325
 Associative calculus, 311-314, 317, 319
 word problem in, 310
 Associative systems, theory of, 310
 Aufenkamp algorithm 246, 401
 Aufenkamp constraints, 220, 235, 246, 250, 252, 257, 282, 382
 Aufenkamp-Hohn algorithm 394, 395
 Aufenkamp-Hohn theorem 226, 230
 Aufenkamp-type restrictions 398, 400, 401
 Aufenkamp's theorem 247, 249, 250
 Automata, abstract aggregates of, 107
 finite, 61-63
 abstract concept of, 64
 theory of, 66
 terminology in, 378
 interconnection of, 99

Automaton, abstract structure of, 91, 93
 autonomous, 66, 123, 126-128, 144-148, 151, 153, 172, 173, 176, 185
 diagrams of, 129
 finite, 62, 63
 basic table of, 69
 bistable structure of, 149, 150
 concept of, 68, 116
 definition of, 63
 tapes of, 159
 nonautonomous, 185
 self-contained, 66
 state diagram of, 70
 tape of, 77, 78
 Automaton-converter system, 67

B

Bloch's method, 141
 Boolean algebra, 20, 23, 37
 Boolean function, 52
 Boolean identities, 23

C

Church's thesis, 222, 348, 349, 366, 376
 Circuit, analysis of, 37
 theory of relay-contact, 235
 Clock rate transformation, 260-283
 law of, 403
 rule of, 262
 Components, magnetic, 44
 networks using, 44
 Computable functions, theory of, 321
 Contact diagrams, 387
 construction of, 387
 by block method, 387
 by canonical method, 387
 Continuum sets, 61

Converters, electrical-to-mechanical, 27
 functions, 58
 logical, 58
 abstract concept of, 58
 mechanical-to-electrical, 27, 29, 32
 output, 67
 Coordinates, generalized, 60
 Correspondences, table of, 9, 10
 Cycle timing, fast, 126-128
 slow, 126
 Cycle timing transformation, concept of, 130

D

Decision problem, 19
 Defining language, 188
 Delay element, one-instant 117, 119, 121, 124, 128, 129
 electromechanical embodiment of, 121
 relay-based, 121, 129
 Delay line 102, 268
 De Morgan's law, 18
 Diode logic, 40
 Discrete-action devices, 59
 Discrete-action systems, 1
 Discrete clock, defined, 65
 Discrete devices, 187
 Discrete moments, 59
 Discrete time, 59
 Disjunctions, multiplication of, 82
 Dynamical systems, 60, 61
 finite, 61, 62
 time-continuous, 60
 time-discrete, 60

E

Electromechanical relays, 128
 Euclidean algorithm, 305, 308, 309, 322
 range of application of, 309, 310
 Events, classification of, 160
 representation of, 163, 186
 concept of, 163
 language of, 186
 specific, 171

F

Flip-flop, 266, 267
 electromechanical, 123
 gas-operated, 123
 Function converter, 58
 Functional relationship, 2, 3
 Functional signs, 341
 Functions, identity, 11
 logical, 5
 heterogeneous, 5
 homogeneous, 5, 6
 theory of, 6
 table of, 282
 two-valued, 7

G

Gill's method, 250
 Glushkov's method, 171, 217
 Gödelization procedure, 324, 337, 338, 343
 Gödel number, 322, 324, 337, 345, 346, 347, 349, 354
 Gödel's definition, 333
 Gödel's method, 322
 Gödel's proposal, 339

H

Herbrand-Gödel definition, 339, 342
 Hill's method, 401
 Huffman realizations, 391
 Huffman's circuit, 130
 Huffman's flow table, 130, 134, 136, 280
 Huffman's method, 130, 134
 Huffman's minimization method, 282
 Huffman's realization, 130, 141, 143

I

Infinite labyrinth, search in, 310
 Infinite sequences, determination of a term in, 304
 Inhibit function, 13
 Interconnection matrix, 71, 75, 76, 80, 82
 transformation of, 272, 273, 278
 Intermediate relays, 128
 Input sequences, 84
 restriction of, 84
 Input tapes, regular set of, 170, 171

K

Kleene's operations, 164-167
 Kleene's theorems, 168, 186, 378, 380
 Kleene's first theorem 171, 176, 182, 206, 208
 Kleene's second theorem, 176
 proof of, 180, 181

L

Labyrinthine paths, 176, 177
 Language, defining, 188
 Logic, binary, 7
 formal, 1
 mathematical, 1
 aspects of, 2
 basic concepts of, 2, 4
 constructs of, 1
 triode, 43
 Logical algorithms, 305
 Logical converter, 58
 abstract concept of, 58

Logical functions, 325
 Logical systems, theory of, 384

M

McCulloch-Pitts neural net, 109-111, 115
 McCulloch-Pitts neurons 109, 110, 113, 114, 391
 Markov's hypothesis, 318
 Markov's normal algorithm, 314, 316, 317, 318, 321, 324, 349
 Markov's refinement, 318, 320
 Matrix, interconnection, 71, 75, 76, 80, 82
 transformation of, 272, 273, 278
 Mealy machine, 69
 Memory cells, schematic diagrams of, 119, 120
 series-connected, 121
 Minimalization operator, 335, 337, 344, 345
 Minimization problem, 51
 Moore machine, 69
 Moore-Karatsuba theorem, 294
 Moore's approach, 299
 Moore's theorem, 234, 286, 288
 proof of, 287

N

Nets, concept of, 68
 defined, 100
 delay, 100
 loop-free, 101
 neural, 109
 McCulloch-Pitts, 109-111, 115
 models of, 109
 Networks, four-terminal, 60
 pendulum, 60
 switching, 30, 31
 two-terminal, 31
 Neurons, abstract, 109
 Number theory, 326, 336
 Numerical algorithms, 305
 theory of, 321

P

Peirce stroke function, 13, 15
 Pendulum networks, 60
 Péter's method, 348
 Péter's reasoning, 338
 Predicate calculus, restricted, 26
 two-valued, 23
 Predicates, 333
 primitive-recursive, 334, 343, 345
 Propositional calculus, 6, 7
 algebra of, 19
 functions of, 25
 methods of, 154
 symbolism of, 24
 Pseudoequivalent states, 235

Q

Quantifiers, defined, 24
 existential, 24, 25
 universal, 24, 25
 Quine's algorithm, 388
 Quine's procedure, 53
 Quine's solution, 52

R

Real variables, theory of, 5
 Realizations, defined, 130
 Recognition problem, 187
 Recursive events, regularity of, 206
 Recursive functions, 203, 205, 376
 theory of, 221, 310
 Regular expressions, 169
 language of, 206, 207
 Regular formulas, language of, 188, 207
 Relay circuits, 129
 theory of, 27
 Relay switching, theory of, 1, 27
 Relays, critical race of, 129
 electromechanical, 128
 input, 128
 intermediate, 128
 multiple-coil, 30
 output, 128
 Representation, definition of relative, 263
 Reproduction, relative, 264-266
 Rice's theorem, 205

S

Sequential machines, 61, 66-68, 78, 103
 abstract aggregates of, 107
 basic table of, 73
 concept of, 116
 equivalence of, 262
 definition of, 254, 255
 technique of synthesizing, 128
 Sets, finite, 2
 infinite, 2
 union of, 164, 168, 169, 174, 175
 Sheffer stroke, 13, 15
 Specific event, 171
 Stable symbol, 145
 State diagrams, superposition of, 91
 Stimulation, threshold of, 110
 Switching circuits, 1
 analysis of relay, 27
 combinational relay, 27
 analysis of, 33
 schematic of, 32
 synthesis of, 37
 pneumatically operated, 47, 49
 theory of, 384
 Switching network, design of, 39
 Systems, discrete-actions, 1

T

Tape representations, gödelization of, 376
Timing, transformation of, 126
Trakhtenbrot's predicate language, 381
Trakhtenbrot's theorem, 206
Triad chains, regular set of, 178, 179
Triad Labyrinth, 176, 177, 179
Triode logic, 43
Tseytin's associative calculus, 320
Turing machines, 61, 263, 355-376, 379
 basic components of, 355, 356
 composition of, 363
 computation on, 366
 proof of existence of, 372
 rest state of, 357
 synthesis of, 373

U

Union of sets, 164, 168, 169, 174, 175

V

Variable, independent, 2, 5
 logical, 4
 theory of, 5

W

Words, process of transformation of, 311