

Contents

Preface	5
1 Introduction	9
1.1 History of the problems	9
1.2 Why homomorphisms?	11
1.3 Why unary algebras and homomorphisms?	19
1.4 Preliminaries	26
2 Homomorphisms of unary algebras	33
2.1 Ordinals and cardinals	34
2.2 Mono-unary algebras	42
2.3 Homomorphisms	50
2.4 Applications	61
2.5 Classes of mono-unary algebras.	66
2.6 Partial mono-unary algebras	71
2.7 Generalizations	86
3 Homomorphisms of algebras	99
3.1 Decomposable mappings	100
3.2 Categories ALG n and MAP n	102
3.3 Categories ALG n and PUR n	107
3.4 Other constructions of homomorphisms	110
3.5 Groupoids	114
3.6 Structural changes of algebras	124
3.7 General algebras	130
3.8 Endomorphisms of linear spaces	143
4 Homomorphisms of structures	157
4.1 Totally additive mappings	158
4.2 Categories REL ($n + 1$) and PSA n	161
4.3 Binary relational structures	168
4.4 Ternary relational structures	174

4.5	Hypergroupoids	178
4.6	Construction of homomorphisms	186
4.7	Homomorphisms of graphs	190
4.8	General relational structures	197
4.9	Heterogeneous algebras	203
5	Examples of homomorphic thinking	219
5.1	History, School, simple Algorithms	220
5.2	Graphs and Relations	233
5.3	Computer science	242
5.4	Functional equations	248
5.5	Methods of this book	256
6	A formula for homomorphisms	263
6.1	Operations with mappings	265
6.2	Constructions \bar{C} and \bar{K}	270
6.3	Constructions B and D	284
6.4	The formula	308
7	Homomorphisms from memory	317
8	Outlook	343
	Index	357