

# Contents

Preface	7
<b>1 Theoretical tasks of SLSD</b>	<b>9</b>
1.1 Major issues of the theory of SLSD . . . . .	10
1.2 The problem of testing assignment . . . . .	16
1.2.1 Testing graph and its diagnosis properties . . . . .	16
1.2.2 Evaluating of testing graph . . . . .	24
1.3 Problem with developing diagnosis algorithms . . . . .	32
1.3.1 Algorithms for uniquely diagnosable systems . . . . .	32
1.3.2 Probabilistic algorithms . . . . .	42
1.4 Diagnosis of intermittent faults . . . . .	54
1.5 Unconventional approach to SLSD . . . . .	65
1.5.1 Diagnosis of permanent faults . . . . .	66
1.5.2 Diagnosis of intermittent faults . . . . .	70
1.5.3 Hybrid-fault situation . . . . .	79
1.5.4 Diagnosis algorithm . . . . .	83
1.6 Comparison testing . . . . .	85
1.6.1 Comparison-based testing model . . . . .	88

1.6.2	Consistent sets and system diagnosis . . . . .	88
1.6.3	Comparison assignment . . . . .	90
<b>2</b>	<b>Organisation of SLSD</b>	<b>101</b>
2.1	Organization of tests performance . . . . .	101
2.1.1	Schedule of tests performance . . . . .	102
2.1.2	Random performing of tests . . . . .	108
2.2	Self-checking without analysis of formed TG . . . . .	112
2.2.1	Execution of tests without imposed constraints . . .	113
2.2.2	Execution of tests with imposed constraints . . . . .	118
2.2.3	Credibility of self-checking result . . . . .	121
2.3	Self-checking with analysis of the formed TG . . . . .	124
2.3.1	Model of self-checking process . . . . .	124
2.3.2	Determining the optimal duration of self-checking cycle	127
2.3.3	More detailed consideration of self-checking credibility	131
2.4	Schemes of system self-checking organization . . . . .	136
2.5	Organization of self-diagnosis . . . . .	137
2.5.1	Types of self-diagnosis organization and diagnostic nucleus . . . . .	137
2.5.2	Self-diagnosis organization with wandering diagnostic nucleus . . . . .	144
2.5.3	Distributed diagnosis . . . . .	149
2.6	Self-diagnosis and system fault-tolerance . . . . .	152
2.6.1	Initial model . . . . .	152
2.6.2	Refined model . . . . .	160
2.6.3	More detailed view of self-checking . . . . .	169