

Contents

1 The Theory of the Knowledge Square and the Information Structure: The Points of Entry and Departure.....	1
1.1 Pnts of Entry and Departure of the Theory of the Knowledge Square.....	2
1.2 The Knowledge Square.....	7
1.3 The Knowledge Square and the Concept of the Potential Space \mathfrak{U}	9
2 The Theory of the Knowledge Square and the Concept of the Possibility Space, \mathfrak{P}	13
2.1 The Concepts of Possibility and Possibility Space	13
2.2 The Possibility Space, the Spaces of Acquaintance and Language.....	16
2.3 From the Space of Acquaintance to the Possibility Space	20
2.4 The Possibility Space and the Possible Worlds in the Knowledge-Production Process	25
2.4.1 Classical Paradigm, Fuzzy Paradigm, Possibility Space and Possible Worlds	29
2.4.2 Mathematics in the Classification of Science and the Epistemic Process	30
2.5 The Possibility Space, the Primary Category and the Derived Category of Knowledge	32
2.5.1 Essential Postulates of the Primary and Derived Categories	33
2.5.2 The Establishing Characteristics of the Primary and Derived Categories	34
2.6 Possibility Space, Explanatory and Prescriptive Sciences in the Knowledge-Production Process	35
3 The Theory of the Knowledge Square and the Concepts of Probability and the Probability Space (\mathfrak{B})	43
3.1 The Knowledge Square and the Concept of the Probability Space \mathfrak{B}	43
3.2 The Concept of Probability and the Construction of the Probability Space.....	44
3.3 The Probability Space, Explanatory and Prescriptive Sciences	51
4 The Knowledge Square and the Concepts of Actual and the Space of the Epistemic Actual (\mathfrak{A})	55
4.1 The Knowledge Square and the Concept of the Epistemic Actual	55

4.2	Epistemic Clarifications of Discreteness, Continuum and Reality	63
4.2.1	Clarifications in the Ontological Concepts	63
4.2.2	Clarification of Epistemological Concepts	65
5	Paradigms of Thought in the Fuzzy and Classical Epistemic Systems under Knowledge Production	73
5.1	Some Essential Definitions on the Path of Knowing	73
5.2	Reflections on Paradigms and Categories of Laws of Thought in the Knowledge-Production Process	75
5.3	Similarities and Differences between Dualism and Duality in the Development of Laws of Thought	78
5.4	Exactness, Inexactness and the Classical Laws of Thought.....	81
5.5	Inexactness, Exactness and the Fuzzy Laws of Thought	86
5.5.1	How Do the Fuzzy Laws of Thought Apply?	87
6	Fuzziness, Science, the Knowledge Square and the Problem of Exact Science	95
6.1	The Partition of Science into Exact and Inexact Sciences	95
6.2	Problems of Explication and Definition in the Knowledge-Production Process	97
6.2.1	Concepts of Definition, Explication and Exactness in Information-Knowledge Representations	98
6.2.2	Exactness, Fuzzy Definitional Set and the Construct of the Explicator Set.....	99
6.3	Ontological Space, Epistemological Space and Defective Information Structure.....	103
6.3.1	Defective Information Structure and Cognition.....	103
6.4	Exact Symbolism, Intuitionist Mathematics and the Fixed Point Theorem.....	106
6.4.1	Qualitative Disposition, Vagueness and Exact Symbolism	106
6.4.2	Approaches to Solving the Vagueness Problem in Symbolism	109
6.4.3	Definability and Explicability Axioms in the Language \mathbf{L}	113
7	Ontology, Epistemology, Explication and Exactness in Mathematics and Sciences.....	117
7.1	Ontology, Epistemology and the Defective Information Structure.....	118
7.1.1	Inexactness, Exactness and Categorical Conversion in the Epistemological Space	123
7.2	Science and Non-science as Linguistic Categories in the Information-Knowledge Production Process	127
7.2.1	Characteristic Sets for Definition and Explication of Science	127
7.2.2	Explanation, Definition and the Grammar of Knowledge Areas	130
7.3	Science, Grammar and Acceptance of Knowledge.....	133

8 Knowledge and Science in the Theory of the Knowledge Square.....	139
8.1 The Identities of Knowledge and Science.....	139
8.2 Objectives and Classification of Science: The Inexactness of Exact Science.....	144
8.2.1 Goals and Objectives of Science.....	145
8.2.2 Classification of Science.....	148
8.3 The Scientific and Non-Scientific Methodology	155
References	163
R1. Bounded Rationality in Knowledge Systems.....	163
R2. Category Theory in Mathematics, Logic and Sciences.....	164
R3. Fuzzy Logic in Knowledge Production	165
R4. Fuzzy Mathematics in Approximate Reasoning under Conditions of Inexactness and Vagueness	168
R5. Fuzzy Optimization, Decision-Choices and Approximate Reasoning in Sciences	173
R6. Fuzzy Probability, Fuzzy Random Variable and Random Fuzzy Variable	175
R7. Ideology and the Knowledge Construction Process.....	177
R8. Information, Thought and Knowledge	179
R9. Language and the Knowledge-Production Process.....	182
R10. Probabilistic Concepts and Reasoning	183
R11. Optimality, Classical Exactness and Equilibrium in Knowledge Systems	185
R12. Possible Worlds and the Knowledge Production Process	189
R13. Rationality, Information, Games, Conflicts and Exact Reasoning.....	190
R14. Rationality and Philosophy of Exact and Inexact Sciences in the Knowledge Production.....	191
R15. Riskiness, Decision-Choice Process and Paradoxes in Knowledge Construction.....	196
R16. The Prescriptive Science, Theory of Planning and Cost-Benefit Analysis in Knowledge Construction	197
R17. Social Sciences, Mathematics and the Problems of Exact and Inexact Methods of Thought.....	198
R18. Theories of Utility, Expected Utility and Exact Problems of Exact Methods	199
R19. Vagueness, Approximation and Reasoning in the Knowledge Construction.....	200
Index	205