

Pattern Dynamics

A Theory of Self-Organization

Shoji Makishima

2001

KODANSHA SCIENTIFIC LTD.

Tokyo

Contents

Preface vii

Part I Basics of Pattern Dynamics

Chapter 1 Introduction 3

- 1-1 Introduction 3
- 1-2 Classification in terms of Ordering/Disordering Effect 4

Chapter 2 Pattern Conditions 6

- 2-1 Definition and Characteristics of Pattern 6
- 2-2 Basic Pattern Variables and Mathematical Expressions 7
- 2-3 Pattern Conditions 9
- 2-4 Life Conditions 10

Chapter 3 Pattern Variables 12

- 3-1 Dynamical Features of Pattern 12
- 3-2 Coherency, W 12
- 3-3 Pattern Time/ Sub-Pattern Time 13
- 3-4 Maturity of Sub-Pattern, M_j 13
- 3-5 Pattern Logics 14

Chapter 4 Dynamics of Pattern 16

- 4-1 Parity of Pattern 16
- 4-2 Pattern Isomers 17
- 4-3 Influence of Environment: Three Factor Nature of Pattern 18
- 4-4 Pattern Growth and Limiting Size 19
- 4-5 Dynamics of Pattern Growth 19

Chapter 5 Trans-Pattern Process 22

Chapter 6 Life Conditions 25

- 6-1 Auto Reproduction and Rejuvenation 25
- 6-2 Auto-Replication and Life Conditions 26
- 6-3 Pair Patterns 29
- 6-4 Pattern Quality: Its Extremum and Life Conditions 30

Part II Original Papers

- [A] "Pattern Dynamics. Macrodynamical Approach to Nonlinear Problems Including Life, Mind, Thoughts etc." in *the Journal of the Faculty of Engineering, The University of Tokyo (B)*, (1993 to 1995).

Part I. General Theory of Pattern Dynamics	37
Part II. Life Conditions for Pattern, and Features of Pattern of Perfect Life	73
Part III. Specific Features of Non-linearity in Organizing Systems, Soliton, Fractal and Chaos as Intermediate Steps to Reach Life	117
Part IV. Quartet and Sextet Logic as Guiding Principles to Creation Technology Connected with Life	143
Part V. Pattern-dynamical Mechanism for "What are Thinking, Mind and Consciousness". Establishment of Mental Biology	165
Summarized Review of Pattern Dynamics up to Present, Making Clear Collectively 36 Creative Concepts Underlying, and Expecting Further Extension to More Difficult Problems Connected with Life	197

- [B] "Pattern Dynamics" in *the Annual Report of the Noguchi Institute* (野口研究所時報論説), (1988 to 1997).

Pattern Dynamics (I) Prologue to Pattern Dynamics, Four Strata Structure of Dynamics of Assembled Systems: Random, Chaos, Fractal and Pattern [パターンダイナミクス(1) 序章—4階層の集合体系の力学, ランダム, カオス, フラクタル, 及びパターン]	237
Pattern Dynamics (II) Establishment of Life Conditions, Bio-mathematical Expression for "What is Life?" [パターンダイナミクス(2) 生命条件の樹立—“生きているとは何か?”の数式化]	253
Pattern Dynamics (III) Super Quality of Perfect Life Pattern,—Parity, Isomer, and "Self and Non-self" of a Pattern [パターンダイナミクス(3) 完全生命パターンの超優秀性, パターンのParity, Isomerと“自他性”]	265
Pattern Dynamics (IV) Repeated Auto-Replication and Life Function of Extensive Pattern, Necessary Reason for Existence of Virus [パターンダイナミクス(4) 自己複製の繰り返しとパターンの生命関数, Virus 存在の必然性]	275
Pattern Dynamics (V) Life Function of Dynamic Pattern and Serious Meaning of This Theory [パターンダイナミクス(5) ダイナミックパターンの生命関数, 近年の生命理論の批判とこの理論の革新的意義]	285
Pattern Dynamics (VI) Extension to Second Round. Small Integer Rules for Attacking New Category of Science [パターンダイナミクス(6) この理論の第2ラウンドとその為の創造法則—4値論理と6値論理]	301

Pattern Dynamics (VII) Expectation for Ultra-Longevity by Activation of Second Neo-cortex of Brain and Gravitation-Resistivity of Under-half Part of Human Body

[パターンダイナミクス(7) 大脳の新皮質と下半身の抗重力性の活性化による超長寿への期待] 315

Pattern Dynamics (VIII) Establishment of Mental Biology (1), Novel Mechanism of Transmission of Information through Peripheral Nerve Systems

[パターンダイナミクス(8) 感覚, 知覚, 運動等の神経機構と感情, 思考, 意識, 心等の脳機構, 即ちMental Biologyの新設立—その(1)] 333

Pattern Dynamics (VIII) Establishment of Mental Biology (2), Establishment of Mental Biology, Novel Mechanism of Thoughts, Mind and Consciousness, etc.

[パターンダイナミクス(8) 感覚, 知覚, 運動等の神経機構と感情, 思考, 意識, 心等の脳機構, 即ちMental Biologyの新設立—その(2) Mental Biologyの樹立と心や意識の問題] 349

Pattern Dynamics (IX) Novel Approach to Renaissance of Theories of Science, Approach to Renaissance of Science - (1) Where to Go Pattern Dynamics - (2) Four Grounds of Renaissance for Pattern Dynamics - (3) New Position of Pattern Dynamics - Robots Can Substitute Ultimately Human Activities? - (4)

[パターンダイナミクス(9) 科学理論のルネサンスへのアプローチ その(1) 科学のRenaissanceへ その(2) Pattern Dynamicsはどこへ行くか その(3) Renaissanceへの根拠 その(4) Pattern Dynamicsの新しい立場—Computerで人間を代替できるか?—否! 否! 否!] 361

Part III Recent Developments

Chapter 1 Novel Theory of Self-Organization Processes in Nature 371

1-1 Introduction 371

1-2 "Life" Has Never Been Understood Even by a Bunch of Nobel Laureates in the Santa Fe Institute. ... Why? 371

1-3 Why have I succeeded in Solving Hitherto Unsolvable Problems? 372

1-4 Complexity of Gene and the Number of Chromosome 375

1-5 Conclusions 375

Chapter 2 Theory of the Beginning of the Universe: Auto-coagulation Based on Gravity Pattern Dynamics, instead of Gravity Thermodynamics 379

2-1 Introduction 379

2-2 Auto Coagulation in the Cosmic System 380

Chapter 3 Introduction of Grassmann Arithmetic: Renaissance (I) 382

Chapter 4 Application to Economics: Renaissance (II) 385

Chapter 5	Pattern Dynamics on Life, Thought and Mind	387
5-1	Pattern Dynamics on Universe	387
5-2	Pattern Dynamics on Economics	387
5-3	Pattern Dynamics on Life, Thought and Mind - The Fourth Life	388
Appendix: List of Other Publications on Pattern Dynamics		391
About the Author		399