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Nota di contenuto	1. Goal -- 1.1 Order and Disorder: Some Typical Phenomena -- 1.2 Some Typical Problems and Difficulties -- 1.3 How We Shall Proceed -- 2. Probability -- 2.1 Object of Our Investigations: The Sample Space -- 2.2 Random Variables -- 2.3 Probability -- 2.4 Distribution -- 2.5 Random Variables with Densities -- 2.6 Joint Probability -- 2.7 Mathematical Expectation $E(X)$, and Moments -- 2.8 Conditional Probabilities -- 2.9 Independent and Dependent Random Variables -- 2.10 Generating Functions and Characteristic Functions -- 2.11 A Special Probability Distribution: Binomial Distribution -- 2.12 The Poisson Distribution -- 2.13 The Normal Distribution (Gaussian Distribution) -- 2.14 Stirling's Formula -- 2.15 Central Limit Theorem -- 3. Information -- 3.1 Some Basic Ideas -- 3.2 Information Gain: An Illustrative Derivation -- 3.3 Information Entropy and Constraints -- 3.4 An Example from Physics: Thermodynamics -- 3.5 An Approach to Irreversible Thermodynamics -- 3.6 Entropy—Curse of Statistical Mechanics? -- 4. Chance -- 4.1 A Model of Brownian Movement -- 4.2 The Random Walk Model and Its Master Equation -- 4.3 Joint Probability and Paths. Markov Processes. The Chapman-Kolmogorov Equation. Path Integrals -- 4.4 How to Use Joint Probabilities. Moments. Characteristic Function. Gaussian Processes -- 4.5 The Master Equation -- 4.6 Exact Stationary Solution of the Master Equation for Systems in Detailed Balance -- 4.7 The Master Equation with Detailed Balance. Symmetrization, Eigenvalues and Eigenstates -- 4.8 Kirchhoff's Method

of Solution of the Master Equation -- 4.9 Theorems about Solutions of the Master Equation -- 4.10 The Meaning of Random Processes. Stationary State, Fluctuations, Recurrence Time -- 4.11 Master Equation and Limitations of Irreversible Thermodynamics -- 5. Necessity -- 5.1 Dynamic Processes -- 5.2 Critical Points and Trajectories in a Phase Plane. Once Again Limit Cycles -- 5.3 Stability -- 5.4 Examples and Exercises on Bifurcation and Stability -- 5.5 Classification of Static Instabilities, or an Elementary Approach to Thom's Theory of Catastrophes -- 6. Chance and Necessity -- 6.1 Langevin Equations: An Example -- 6.2 Reservoirs and Random Forces -- 6.3 The Fokker-Planck Equation -- 6.4 Some Properties and Stationary Solutions of the Fokker-Planck Equation -- 6.5 Time-Dependent Solutions of the Fokker-Planck Equation -- 6.6 Solution of the Fokker-Planck Equation by Path Integrals -- 6.7 Phase Transition Analogy -- 6.8 Phase Transition Analogy in Continuous Media: Space-Dependent Order Parameter -- 7. Self-Organization -- 7.1 Organization -- 7.2 Self-Organization -- 7.3 The Role of Fluctuations: Reliability or Adaptability? Switching -- 7.4 Adiabatic Elimination of Fast Relaxing Variables from the Fokker-Planck Equation -- 7.5 Adiabatic Elimination of Fast Relaxing Variables from the Master Equation -- 7.6 Self-Organization in Continuously Extended Media. An Outline of the Mathematical Approach -- 7.7 Generalized Ginzburg-Landau Equations for Nonequilibrium Phase Transitions -- 7.8 Higher-Order Contributions to Generalized Ginzburg-Landau Equations -- 7.9 Scaling Theory of Continuously Extended Nonequilibrium Systems -- 7.10 Soft-Mode Instability -- 7.11 Hard-Mode Instability -- 8. Physical Systems -- 8.1 Cooperative Effects in the Laser: Self-Organization and Phase Transition -- 8.2 The Laser Equations in the Mode Picture -- 8.3 The Order Parameter Concept -- 8.4 The Single-Mode Laser -- 8.5 The Multimode Laser -- 8.6 Laser with Continuously Many Modes. Analogy with Superconductivity -- 8.7 First-Order Phase Transitions of the Single-Mode Laser -- 8.8 Hierarchy of Laser Instabilities and Ultrashort Laser Pulses -- 8.9 Instabilities in Fluid Dynamics: The Bénard and Taylor Problems -- 8.10 The Basic Equations -- 8.11 Damped and Neutral Solutions ($R \neq R_c$) -- 8.12 Solution Near $R = R_c$ (Nonlinear Domain). Effective Langevin Equations -- 8.13 The Fokker-Planck Equation and Its Stationary Solution -- 8.14 A Model for the Statistical Dynamics of the Gunn Instability Near Threshold -- 8.15 Elastic Stability: Outline of Some Basic Ideas -- 9. Chemical and Biochemical Systems -- 9.1 Chemical and Biochemical Reactions -- 9.2 Deterministic Processes, Without Diffusion, One Variable -- 9.3 Reaction and Diffusion Equations -- 9.4 Reaction-Diffusion Model with Two or Three Variables: The Brusselator and the Oregonator -- 9.5 Stochastic Model for a Chemical Reaction Without Diffusion. Birth and Death Processes. One Variable -- 9.6 Stochastic Model for a Chemical Reaction with Diffusion. One Variable -- 9.7 Stochastic Treatment of the Brusselator Close to Its Soft-Mode Instability -- 9.8 Chemical Networks -- 10. Applications to Biology -- 10.1 Ecology, Population-Dynamics -- 10.2 Stochastic Models for a Predator-Prey System -- 10.3 A Simple Mathematical Model for Evolutionary Processes -- 10.4 A Model for Morphogenesis -- 11. Sociology: A Stochastic Model for the Formation of Public Opinion -- 12. Some Historical Remarks and Outlook -- References, Further Reading, and Comments.

Sommario/riassunto

The spontaneous formation of well organized structures out of germs or even out of chaos is one of the most fascinating phenomena and most challenging problems scientists are confronted with. Such phenomena are an experience of our daily life when we observe the growth of plants and animals. Thinking of much larger time scales,

scientists are led into the problems of evolution, and, ultimately, of the origin of living matter. When we try to explain or understand in some sense these extremely complex biological phenomena it is a natural question, whether processes of self-organization may be found in much simpler systems of the un-animated world. In recent years it has become more and more evident that there exist numerous examples in physical and chemical systems where well organized spatial, temporal, or spatio-temporal structures arise out of chaotic states. Furthermore, as in living of these systems can be maintained only by a flux of organisms, the functioning energy (and matter) through them. In contrast to man-made machines, which are to exhibit special structures and functionings, these structures develop spontaneously. It came as a surprise to many scientists that spontaneously-they are self-organizing. Numerous such systems show striking similarities in their behavior when passing from the disordered to the ordered state. This strongly indicates that the functioning of such systems obeys the same basic principles. In our book we wish to explaining such basic principles and underlying conceptions and to present the mathematical tools to cope with them.
