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Nota di contenuto	Contents ; Foreword ; Chapter 1 Introduction ; 1.1 Scientific Discoveries ; 1.2 Nonlinear Science ; 1.3 Some Ancient Thoughts of the East and the West ; 1.4 Determinacy and Randomness ; 1.5 Equal Quantitative Effects ; 1.6 Organization of This Book ; 1.7 References Chapter 2 Nonlinearity: The Conclusion of Calculus 2.1 A Brief History of Calculus ; 2.2 The Method of Differential Analysis ; 2.2.1 Functions and Their Properties ; 2.2.1.1 Representations of Functions ; 2.2.1.2 General Properties of Function ; 2.2.2 Limits of Functions 2.2.3 Continuous Functions 2.2.4 The Concept and Properties of Differentials ; 2.3 The Well-Posedness and Singularity of Differential Equations ; 2.4 Discontinuity: The Mathematical Characteristic of Nonlinear Evolutions ; 2.5 Question the Traditional Treatments of Nonlinearity 2.5.1 Linearization 2.5.2 Stabilization ; 2.5.3 Comparison between Spectral Method and Numerical Schemes ; 2.5.4 Limitations of Lyapunov Exponents ; 2.6 References ; Chapter 3 Blown-Up Theory: The Beginning of the Era of Discontinuity

; 3.1 Looking at Whole Evolutions
3.2 Mathematical Physics Meanings of Blown-Ups
3.3 Nonlinear Transitional Changes: A Mathematical Character of Blown-Ups ; 3.3.1 Blown-Ups of Quadratic Nonlinear Models
; 3.3.2 Blown-Ups of Cubic Polynomial Models
; 3.3.3 Blown-Ups of nth Degree Polynomial Models
3.3.4 Blown-Ups of Higher Order Nonlinear Evolution Systems

Sommario/riassunto

This book summarizes the main scientific achievements of the blown-up theory of evolution science, which was first seen in published form in 1994. It explores - using the viewpoint and methodology of the blown-up theory - possible generalizations of Newtonian particle mechanics and computational schemes, developed on Newton's and Leibniz's calculus, as well as the scientific systems and the corresponding epistemological propositions, introduced and polished in the past three hundred years. The authors briefly explain the fundamental concepts, then analyze a series of topics and problems of t