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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Chapter 1. Introduction -- Chapter 2. Nonlinear physics and synergetics -- Chapter 3. Epidemiological models and COVID-19 epidemics -- Chapter 4. Nonlinear physics of epidemics: part A -- Chapter 5. Nonlinear physics of epidemics: part B -- Chapter 6. Nonlinear physics of epidemics: part C -- Chapter 7. Model-based reproduction numbers -- Chapter 8. Modeling interventions -- Chapter 9. Models of virus dynamics -- Chapter 10. Virus dynamics in humans: unstable directions and order parameters.
Sommario/riassunto	This book addresses the COVID-19 pandemic from a quantitative perspective based on mathematical models and methods largely used

in nonlinear physics. It aims to study COVID-19 epidemics in countries and SARS-CoV-2 infections in individuals from the nonlinear physics perspective and to model explicitly COVID-19 data observed in countries and virus load data observed in COVID-19 patients. The first part of this book provides a short technical introduction into amplitude spaces given by eigenvalues, eigenvectors, and amplitudes.In the second part of the book, mathematical models of epidemiology are introduced such as the SIR and SEIR models and applied to describe COVID-19 epidemics in various countries around the world. In the third part of the book, virus dynamics models are considered and applied to infections in COVID-19 patients. This book is written for researchers, modellers, and graduate students in physics and medicine, epidemiology and virology, biology, applied mathematics, and computer sciences. This book identifies the relevant mechanisms behind past COVID-19 outbreaks and in doing so can help efforts to stop future COVID-19 outbreaks and other epidemic outbreaks. Likewise, this book points out the physics underlying SARS-CoV-2 infections in patients and in doing so supports a physics perspective to address human immune reactions to SARS-CoV-2 infections and similar virus infections.