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Predators -- 18 Epidemic Models with COVID-19.

Sommario/riassunto

This book provides an introduction to the theory of ordinary differential equations and its applications to population dynamics. Part I focuses on linear systems. Beginning with some modeling background, it considers existence, uniqueness, stability of solution, positivity, and the Perron–Frobenius theorem and its consequences. Part II is devoted to nonlinear systems, with material on the semiflow property, positivity, the existence of invariant sub-regions, the Linearized Stability Principle, the Hartman–Grobman Theorem, and monotone semiflow. Part III opens up new perspectives for the understanding of infectious diseases by applying the theoretical results to COVID-19, combining data and epidemic models. Throughout the book the material is illustrated by numerical examples and their MATLAB codes are provided. Bridging an interdisciplinary gap, the book will be valuable to graduate and advanced undergraduate students studying mathematics and population dynamics.