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Autore	Kiss Istvan Z.
Titolo	Mathematics of Epidemics on Networks : From Exact to Approximate Models / / by István Z. Kiss, Joel C. Miller, Péter L. Simon
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Descrizione fisica	1 online resource (xviii, 413 pages) : illustrations
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Disciplina	614.4
Soggetti	Biomathematics
	Dynamics
	Graph theory
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	Dynamical Systems
	Graph Theory
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Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Preface -- Introduction to Networks and Diseases -- Exact Propagation Models: Top Down -- Exact Propagation Models: Bottom-Up -- Mean-Field Approximations for Heterogeneous Networks -- Percolation-Based Approaches for Disease Modelling -- Hierarchies of SIR Models -- Dynamic and Adaptive Networks -- Non-Markovian Epidemics -- PDE Limits for Large Networks -- Disease Spread in Networks with Large-scale structure -- Appendix: Stochastic Simulation -- Index.
Sommario/riassunto	This textbook provides an exciting new addition to the area of network science featuring a stronger and more methodical link of models to their mathematical origin and explains how these relate to each other with special focus on epidemic spread on networks. The content of the book is at the interface of graph theory, stochastic processes and dynamical systems. The authors set out to make a significant contribution to closing the gap between model development and the

supporting mathematics. This is done by: Summarising and presenting the state-of-the-art in modeling epidemics on networks with results and readily usable models signposted throughout the book; Presenting different mathematical approaches to formulate exact and solvable models; Identifying the concrete links between approximate models and their rigorous mathematical representation; Presenting a model hierarchy and clearly highlighting the links between model assumptions and model complexity; Providing a reference source for advanced undergraduate students, as well as doctoral students, postdoctoral researchers and academic experts who are engaged in modeling stochastic processes on networks; Providing software that can solve the differential equation models or directly simulate epidemics in networks. Replete with numerous diagrams, examples, instructive exercises, and online access to simulation algorithms and readily usable code, this book will appeal to a wide spectrum of readers from different backgrounds and academic levels. Appropriate for students with or without a strong background in mathematics, this textbook can form the basis of an advanced undergraduate or graduate course in both mathematics and biology departments alike. .