

1. Record Nr.	UNINA9910139528103321
Autore	Haddad Wassim M. <1961->
Titolo	Nonnegative and compartmental dynamical systems [[electronic resource] /] / Wassim M. Haddad, VijaySekhar Chellaboina, Qing Hui
Pubbl/distr/stampa	Princeton, : Princeton University Press, c2010
ISBN	1-282-45879-5 9786612458798 1-4008-3224-1
Edizione	[Course Book]
Descrizione fisica	1 online resource (623 p.)
Classificazione	SK 520
Altri autori (Persone)	ChellaboinaVijaySekhar <1970-> HuiQing <1976->
Disciplina	515.39 515/.39
Soggetti	Differentiable dynamical systems Global analysis (Mathematics) Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Frontmatter -- Contents -- Preface -- Chapter 1. Introduction -- Chapter 2. Stability Theory for Nonnegative Dynamical Systems -- Chapter 3. Stability Theory for Nonnegative and Compartmental Dynamical Systems with Time Delay -- Chapter 4. Nonoscillation and Monotonicity of Solutions of Nonnegative Dynamical Systems -- Chapter 5. Dissipativity Theory for Nonnegative Dynamical Systems -- Chapter 6. Hybrid Nonnegative and Compartmental Dynamical Systems -- Chapter 7. System Thermodynamics, Irreversibility, and Time Asymmetry -- Chapter 8. Finite-Time Thermodynamics -- Chapter 9. Modeling and Analysis of Mass-Action Kinetics -- Chapter 10. Semistability and State Equipartition of Nonnegative Dynamical Systems -- Chapter 11. Robustness of Nonnegative Dynamical Systems -- Chapter 12. Modeling and Control for Clinical Pharmacology -- Chapter 13. Optimal Fixed-Structure Control for Nonnegative Systems -- Chapter 14. H2 Suboptimal Control for Nonnegative Dynamical Systems Using Linear Matrix Inequalities -- Chapter 15. Adaptive Control for Nonnegative Systems -- Chapter 16. Adaptive Disturbance Rejection

Control for Compartmental Systems -- Chapter 17. Limit Cycle Stability  
Analysis and Control for Respiratory Compartmental Models -- Chapter  
18. Identification of Stable Nonnegative and Compartmental Systems --  
Chapter 19. Conclusion -- Bibliography -- Index

---

Sommario/riassunto

This comprehensive book provides the first unified framework for stability and dissipativity analysis and control design for nonnegative and compartmental dynamical systems, which play a key role in a wide range of fields, including engineering, thermal sciences, biology, ecology, economics, genetics, chemistry, medicine, and sociology. Using the highest standards of exposition and rigor, the authors explain these systems and advance the state of the art in their analysis and active control design. Nonnegative and Compartmental Dynamical Systems presents the most complete treatment available of system solution properties, Lyapunov stability analysis, dissipativity theory, and optimal and adaptive control for these systems, addressing continuous-time, discrete-time, and hybrid nonnegative system theory. This book is an indispensable resource for applied mathematicians, dynamical systems theorists, control theorists, and engineers, as well as for researchers and graduate students who want to understand the behavior of nonnegative and compartmental dynamical systems that arise in areas such as biomedicine, demographics, epidemiology, pharmacology, telecommunications, transportation, thermodynamics, networks, heat transfer, and power systems.

---