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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.