1. Record Nr. UNINA9910554255703321 Autore Schaum Alexander Titolo Dissipativity in control engineering: applications in finite- and infinitedimensional systems / / Alexander Schaum Pubbl/distr/stampa Berlin; Boston, MA:,: Walter de Gruyter GmbH., [2021] ©2021 **ISBN** 1-5231-5442-X 3-11-067794-6 Descrizione fisica 1 online resource (XIV, 228 p.) Disciplina 629.8 Soggetti Automatic control - Design and construction Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Frontmatter -- Preface -- Contents -- About the author -- List of Nota di contenuto Figures -- Part I: Introduction and motivation -- 1 Motivation and problem formulation -- Part II: Theoretical foundations -- 2 Stability, dissipativity and some system-theoretic concepts -- 3 Dissipativitybased observer and feedback control design -- Part III: Application examples -- Introduction -- 4 Finite-dimensional systems -- 5 Infinite-dimensional systems -- 6 Conclusions and outlook -- A Lemmata on quadratic forms -- B Kalman decomposition for observer design -- C The algebraic Riccati equation, optimality and dissipativity -- D Kernel derivations for the backstepping approach -- Bibliography -- Index Sommario/riassunto Dissipativity, as a natural mechanism of energy interchange is common to many physical systems that form the basis of modern automated control applications. Over the last decades it has turned out as a useful concept that can be generalized and applied in an abstracted form to very different system setups, including ordinary and partial differential equation models. In this monograph, the basic notions of stability, dissipativity and systems theory are connected in order to establish a common basis for designing system monitoring and control schemes. The approach is illustrated with a set of application examples covering

finite and infinite-dimensional models, including a ship steering model, the inverted pendulum, chemical and biological reactors, relaxation

oscillators, unstable heat equations and first-order hyperbolic integrodifferential equations.