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Nota di contenuto	1 Introduction -- 1.1 Motivation -- 1.2 Systems theory concepts in finite dimensions -- 1.3 Aims of this book -- 2 Semigroup Theory -- 2.1 Strongly continuous semigroups -- 2.2 Contraction and dual semigroups -- 2.3 Riesz-spectral operators -- 2.4 Delay equations -- 2.5 Invariant subspaces -- 2.6 Exercises -- 2.7 Notes and references -- 3 The Cauchy Problem -- 3.1 The abstract Cauchy problem -- 3.2 Perturbations and composite systems -- 3.3 Boundary control systems -- 3.4 Exercises -- 3.5 Notes and references -- 4 Inputs and Outputs -- 4.1 Controllability and observability -- 4.2 Tests for approximate controllability and observability -- 4.3 Input-output maps -- 4.4 Exercises -- 4.5 Notes and references -- 5 Stability, Stabilizability, and Detectability -- 5.1 Exponential stability -- 5.2 Exponential stabilizability and detectability -- 5.3 Compensator design -- 5.4 Exercises -- 5.5 Notes and references -- 6 Linear Quadratic Optimal Control -- 6.1 The problem on a finite-time interval -- 6.2 The problem on the infinite-time interval -- 6.3 Exercises -- 6.4 Notes and references -- 7 Frequency-Domain Descriptions -- 7.1 The Callier-Desoer class of scalar transfer functions -- 7.2 The multivariable extension -- 7.3 State-space interpretations -- 7.4 Exercises -- 7.5 Notes and references -- 8 Hankel Operators and the Nehari Problem -- 8.1 Frequency-domain formulation -- 8.2 Hankel operators in the time domain -- 8.3 The Nehari extension problem for state linear systems --

8.4 Exercises -- 8.5 Notes and references -- 9 Robust Finite-Dimensional Controller Synthesis -- 9.1 Closed-loop stability and coprime factorizations -- 9.2 Robust stabilization of uncertain systems -- 9.3 Robust stabilization under additive uncertainty -- 9.4 Robust stabilization under normalized left-coprime-factor uncertainty -- 9.5 Robustness in the presence of small delays -- 9.6 Exercises -- 9.7 Notes and references -- A. Mathematical Background -- A.1 Complex analysis -- A.2 Normed linear spaces -- A.2.1 General theory -- A.2.2 Hilbert spaces -- A.3 Operators on normed linear spaces -- A.3.1 General theory -- A.3.2 Operators on Hilbert spaces -- A.4 Spectral theory -- A.4.1 General spectral theory -- A.4.2 Spectral theory for compact normal operators -- A.5 Integration and differentiation theory -- A.5.1 Integration theory -- A.5.2 Differentiation theory -- A.6 Frequency-domain spaces -- A.6.1 Laplace and Fourier transforms -- A.6.2 Frequency-domain spaces -- A.6.3 The Hardy spaces -- A.7 Algebraic concepts -- A.7.1 General definitions -- A.7.2 Coprime factorizations over principal ideal domains -- A.7.3 Coprime factorizations over commutative integral domains -- References -- Notation.

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## Sommario/riassunto

Infinite dimensional systems is now an established area of research. Given the recent trend in systems theory and in applications towards a synthesis of time- and frequency-domain methods, there is a need for an introductory text which treats both state-space and frequency-domain aspects in an integrated fashion. The authors' primary aim is to write an introductory textbook for a course on infinite dimensional linear systems. An important consideration by the authors is that their book should be accessible to graduate engineers and mathematicians with a minimal background in functional analysis. Consequently, all the mathematical background is summarized in an extensive appendix. For the majority of students, this would be their only acquaintance with infinite dimensional systems.

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