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Nota di contenuto	Advanced Control of Aircraft, Spacecraft and Rockets; Contents; Series Preface; Preface; 1 Introduction; 1.1 Notation and Basic Definitions; 1.2 Control Systems; 1.2.1 Linear Tracking Systems; 1.2.2 Linear Time-Invariant Tracking Systems; 1.3 Guidance and Control of Flight Vehicles; 1.4 Special Tracking Laws; 1.4.1 Proportional Navigation Guidance; 1.4.2 Cross-Product Steering; 1.4.3 Proportional-Integral-Derivative Control; 1.5 Digital Tracking System; 1.6 Summary; Exercises; References; 2 Optimal Control Techniques; 2.1 Introduction; 2.2 Multi-variable Optimization 2.3 Constrained Minimization 2.3.1 Equality Constraints; 2.3.2 Inequality Constraints; 2.4 Optimal Control of Dynamic Systems; 2.4.1 Optimality Conditions; 2.5 The Hamiltonian and the Minimum Principle; 2.5.1 Hamilton-Jacobi-Bellman Equation; 2.5.2 Linear Time-Varying System with Quadratic Performance Index; 2.6 Optimal Control with End-Point State Equality Constraints; 2.6.1 Euler-Lagrange Equations;

2.6.2 Special Cases; 2.7 Numerical Solution of Two-Point Boundary Value Problems; 2.7.1 Shooting Method; 2.7.2 Collocation Method; 2.8 Optimal Terminal Control with Interior Time Constraints
 2.8.1 Optimal Singular Control 2.9 Tracking Control; 2.9.1 Neighboring Extremal Method and Linear Quadratic Control; 2.10 Stochastic Processes; 2.10.1 Stationary Random Processes; 2.10.2 Filtering of Random Noise; 2.11 Kalman Filter; 2.12 Robust Linear Time-Invariant Control; 2.12.1 LQG/LTR Method; 2.12.2 H2/H8 Design Methods; 2.13 Summary; Exercises; References; 3 Optimal Navigation and Control of Aircraft; 3.1 Aircraft Navigation Plant; 3.1.1 Wind Speed and Direction; 3.1.2 Navigational Subsystems; 3.2 Optimal Aircraft Navigation; 3.2.1 Optimal Navigation Formulation
 3.2.2 Extremal Solution of the Boundary-Value Problem: Long-Range Flight Example 3.2.3 Great Circle Navigation; 3.3 Aircraft Attitude Dynamics; 3.3.1 Translational and Rotational Kinetics; 3.3.2 Attitude Relative to the Velocity Vector; 3.4 Aerodynamic Forces and Moments; 3.5 Longitudinal Dynamics; 3.5.1 Longitudinal Dynamics Plant; 3.6 Optimal Multi-variable Longitudinal Control; 3.7 Multi-input Optimal Longitudinal Control; 3.8 Optimal Airspeed Control; 3.8.1 LQG/LTR Design Example; 3.8.2 H8 Design Example; 3.8.3 Altitude and Mach Control; 3.9 Lateral-Directional Control Systems
 3.9.1 Lateral-Directional Plant 3.9.2 Optimal Roll Control; 3.9.3 Multi-variable Lateral-Directional Control: Heading-Hold Autopilot; 3.10 Optimal Control of Inertia-Coupled Aircraft Rotation; 3.11 Summary; Exercises; References; 4 Optimal Guidance of Rockets; 4.1 Introduction; 4.2 Optimal Terminal Guidance of Interceptors; 4.3 Non-planar Optimal Tracking System for Interceptors: 3DPN; 4.4 Flight in a Vertical Plane; 4.5 Optimal Terminal Guidance; 4.6 Vertical Launch of a Rocket (Goddard's Problem); 4.7 Gravity-Turn Trajectory of Launch Vehicles
 4.7.1 Launch to Circular Orbit: Modulated Acceleration

Sommario/riassunto

"Advanced Control of Aircraft, Missiles and Spacecraft introduces the reader to the concepts of modern control theory applied to the design and analysis of general flight control systems in a concise and mathematically rigorous style. It presents a comprehensive treatment of both atmospheric and space flight control systems including aircraft, rockets (missiles and launch vehicles), entry vehicles and spacecraft (both orbital and attitude control). The broad coverage of topics emphasizes the synergies among the various flight control systems and attempts to show their evolution from the same set of physical principles as well as their design and analysis by similar mathematical tools. In addition, this book presents state-of-art control system design methods - including multivariable, optimal, robust, digital and nonlinear strategies - as applied to modern flight control systems. Advanced Control of Aircraft, Missiles and Spacecraft features worked-out examples and problems at the end of each chapter as well as a number of MATLAB/ SIMULINK examples that are realistic and representative of the state-of-the-art in flight control"--
 "this book presents state-of-art control system design methods - including multivariable, optimal, robust, digital and nonlinear strategies - as applied to modern flight control systems"--