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Nota di contenuto	Electromechanical Motion Systems; Contents; Acknowledgements; 1 Introduction; 1.1 Targeted Readership; 1.2 Motion System History; 1.3 Suggested Library for Motion System Design; Reference; 2 Control Theory Overview; 2.1 Classic Differential/Integral Equation Approach; 2.2 LaPlace Transform-the S Domain; 2.3 The Transfer Function; 2.4 Open versus Closed Loop Control; 2.4.1 Transient and Frequency Response; 2.5 Stability; 2.6 Basic Mechanical and Electrical Systems; 2.6.1 Equations and Constants; 2.6.2 Power Test; 2.6.3 Retardation Test; 2.7 Sampled Data Systems/Digital Control; 2.7.1 Sampling 2.7.2 Quantization 2.7.3 Computational Delay; 2.7.4 System Analysis; References; 3 System Components; 3.1 Motors and Amplifiers; 3.1.1 Review of Motor Theory; 3.1.2 The Brush Motor; 3.1.3 The "H" Drive PWM Amplifier; 3.1.4 The Brushless Motor [2, 3]; 3.1.5 Speed/Torque Curves; 3.1.6 Thermal Effects; 3.1.7 Motor Constant; 3.1.8 Linear Motor [7-10]; 3.1.9 Stepper Motors [12]; 3.1.10 Induction Motors; 3.2 Gearheads; 3.2.1 Spur Gearhead; 3.2.2 Planetary Gearhead; 3.2.3 Hybrid Gearhead; 3.2.4 Worm Gearhead; 3.2.5 Harmonic Gearhead; 3.2.6 Gearhead Sizing - Continuous Operation

3.2.7 Gearhead Sizing - Intermittent Operation 3.2.8 Axial and Radial Load; 3.2.9 Backlash and Stiffness; 3.2.10 Temperature/Thermal Resistance; 3.2.11 Planetary/Spur Gearhead Comparison; 3.3 Leadscrews and Ballscrews; 3.3.1 Leadscrew Specifications; 3.3.2 Ball Screw Specifications; 3.3.3 Critical Speed; 3.3.4 Column Strength; 3.3.5 Starts, Pitch, Lead; 3.3.6 Encoder Lead; 3.3.7 Accuracy; 3.3.8 Backdrive - Self-Locking; 3.3.9 Assemblies; 3.4 Belt and Pulley; 3.4.1 Belt; 3.4.2 Guidance/Alignment; 3.4.3 Belt and Pulley versus Ball Screw; 3.5 Rack and Pinion; 3.5.1 Design Highlights
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4.5.5 Power versus Optimum Ratio - Gearhead

Sommario/riassunto

An introductory reference covering the devices, simulations and limitations in the control of servo systems Linking theoretical material with real-world applications, this book provides a valuable introduction to motion system design. The book begins with an overview of classic theory, its advantages and limitations, before showing how classic limitations can be overcome with complete system simulation. The ability to efficiently vary system parameters (such as inertia, friction, dead-band, damping), and quickly determine their effect on performance, stability, efficiency