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Autore	Schmidt Robert Munnig
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Altri autori (Persone)	SchitterGeorg EijkJan van
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Nota di contenuto	Title page; Contents; Preface; Motivation; Acknowledgements; Summary of the contents; Mechatronics in the Dutch high-tech industry; Historical background; The Video Long-play Disk (VLP); Signal encoding and read-out principle; The Compact Disc and its family members; The Silicon Repeater; IC manufacturing process; The accurate wafer stage; The impact of mechatronics on our world; Definition and international positioning; Different views on mechatronics; Cultural differences in mechatronics; Focus on precision-controlled motion; Systems engineering and design; Definitions and V-model The product creation process Requirement budgeting; Road mapping; Design methodology; Concurrent engineering; Modular design and platforms; Electricity and frequency; Electricity and signals; Electric field; Potential difference; Electric field in an electric element; Electric current and voltage; Voltage source; Electric power; Ohm's law; Practical values and summary; Variability of electric signals; The concept of frequency; Random signals or noise; Power of alternating signals; Representation in the complex plane; Energy propagation and

waves; Mechanical and acoustic waves

Electromagnetic waves Transferred energy and amplitude; Reflection of waves; Standing waves; Mathematical analysis of signals and dynamics; Fourier transform; Triangle waveform; Sawtooth waveform; Square waveform; Fourier analysis of non-periodic signals; Laplace transform; Dynamic system response to a stimulus; Step response; Impulse response; Frequency response; Graphical representation in the frequency domain; Bode-plot; Nyquist plot; Dynamics of motion systems; Introduction; Stiffness; Importance of stiffness for precision; Active stiffness; Mass-spring systems with damping
Compliance of dynamic elements Combining dynamic elements; Transfer functions of the compliance; Damped mass-spring system; Critical damping and definition of zeta; Quality-factor Q; Behaviour around the natural frequency; Transmissibility of a damped mass-spring system; Multi-body dynamics and eigenmodes; Dynamics of a two body mass-spring system; Analytical description; Multiplicative expression; Effect of different mass ratios; The additive method with eigenmodes; Multiple eigenmodes and modal analysis; Location of actuators and sensors; Summary; Motion Control; Introduction
A walk around the control loop Poles and zeros; Controlling unstable mechanical systems; Creating instability by active control; The zeros; Properties of feed forward control; Properties of feedback control; Feed forward control; Model based open-loop control; Input-shaping; Adaptive feed forward control; PID feedback control; PD-control of a Compact-Disc player; Proportional feedback; Proportional-differential feedback; Limiting the differentiating action; Sensitivity functions of feedback control; Stability and robustness in feedback control; PID-control of a mass-spring system; P-control
D-control

Sommario/riassunto

Since they entered our world around the middle of the 20th century, the application of mechatronics has enhanced our lives with functionality based on the integration of electronics, control systems and electric drives. This book deals with the special class of mechatronics that has enabled the exceptional levels of accuracy and speed of high-tech equipment applied in the semiconductor industry, realising the continuous shrink in detailing of micro-electronics and MEMS. As well as the more frequently presented standard subjects of dynamics, motion control, electronics and electromechanics,