

<<执行器技术>>

图书基本信息

书名 : <<执行器技术>>

13位ISBN编号 : 9787030182586

10位ISBN编号 : 7030182588

出版时间 : 2006-12

出版时间 : 科学

作者 : 庞斯

页数 : 278

版权说明 : 本站所提供之下载的PDF图书仅提供预览和简介,请支持正版图书。

更多资源请访问 : <http://www.tushu007.com>

<<执行器技术>>

内容概要

执行器是将电能转换成机械能的装置，通常用于电气、气动、液压系统。

由于执行器技术在生物医学、人工器官修复、器械矫形中应用的需要，对高效且具有微纳米尺寸级别的复杂精密机械产品的需要不断增长。

本书对执行器的新应用进行了全面的介绍，内容包括：介绍了压电执行器、形状记忆执行器、磁致伸缩执行器的机电一体化设计、控制、集成技术；检验了微纳米级别新兴执行器的特性和性能；评估了各种执行器技术的优点，勾画了今后的应用领域。

本书可供从事微纳器件设计制造领域的科研人员、工程师参考。

<<执行器技术>>

书籍目录

1 Actuators in motion control systems: mechatronics 1.1 What is an actuator? 1.2 Transducing materials as a basis for actuator design 1.2.1 Energy domains and transduction phenomena 1.2.2 Transducer basics 1.3 The role of the actuator in a control system: sensing, processing and acting 1.3.1 Sensing 1.3.2 Processing 1.3.3 Actuation 1.3.4 Impedance matching 1.4 What is mechatronics? Principles and biomimesis 1.4.1 Principles 1.4.2 Mechatronics and biomimesis 1.5 Concomitant actuation and sensing: smart structures 1.6 Figures of merit of actuator technologies 1.6.1 Dynamic performance 1.6.2 Actuator behavior upon scaling 1.6.3 Suitability for the application 1.6.4 Static performance 1.6.5 Impact of environmental parameters 1.7 A classification of actuator technologies 1.7.1 Semiactive versus active actuators 1.7.2 Translational versus rotational actuators 1.7.3 Input energy domain 1.7.4 Soft versus hard actuators 1.8 Emerging versus traditional actuator technologies 1.9 Scope of the book: emerging actuators 1.10 Other actuator technologies 1.10.1 Electrostatic actuators 1.10.2 Thermal actuators 1.10.3 Magnetic shape memory actuators 2 Piezoelectric actuators 2.1 Piezoelectricity and piezoelectric materials 2.2 Constitutive equations of piezoelectric materials 2.3 Resonant piezoelectric actuators 2.3.1 Basics of resonant operation of piezoelectric loads... 2.3.2 Rotational ultrasonic motors 2.3.3 Linear ultrasonic motors 2.4 Nonresonant piezoelectric actuators 2.4.1 Bimorph actuators 2.4.2 Stack piezoelectric actuators 2.4.3 Inchworm actuators 2.5 Control aspects of piezoelectric motors 2.5.1 Control circuits and resonant drivers 2.5.2 Control of nonresonant actuators 2.6 Figures of merit of piezoelectric actuators 2.6.1 Operational characteristics 2.6.2 Scaling of piezoelectric actuators 2.7 Applications 2.7.1 Applications of resonant piezoelectric actuators 2.7.2 Applications of nonresonant piezoelectric actuators 3 Shape Memory Actuators (SMAs) 3.1 Shape memory alloys 3.1.1 The shape memory effect 3.1.2 Pseudoelasticity in SMAs 3.2 Design of shape memory actuators 3.2.1 Design concepts for actuation with SMAs 3.2.2 Material considerations 3.2.3 Thermal considerations 3.3 Control of SMAs 3.3.1 Electrical heating 3.3.2 Concomitant sensing and actuation with SMAs 3.3.3 Integration in control loops 3.4 Figures of merit of shape memory actuators 3.4.1 Operational ranges 3.4.2 Scaling laws for SMA actuators 3.5 Applications 4 Electroactive polymer actuators (EAPs) 4.1 Principles 4.1.1 Wet EAP actuators 4.1.2 Dry EAP actuators 4.2 Design issues 4.3 Control of EAPs 4.4 Figures of merit of EAPs 4.4.1 Operational characteristics 4.4.2 Scaling laws for EAPs 4.5 Applications 5 Magnetostrictive actuators (MSs) 5.1 Principles of magnetostriction 5.1.1 Historical perspective 5.1.2 Basics of magnetic properties of materials 5.1.3 Magnetostriction: constitutive equations 5.2 Magnetostrictive materials: giant magnetostriction 5.2.1 Positive versus negative magnetostriction: effect of the load 5.2.2 A Y-Effect in magnetostrictive materials 5.3 Design of magnetostrictive actuators 5.3.1 Design for improved stroke 5.3.2 Design for linearized, push-pull operation 5.3.3 Design of electric and magnetic circuits 5.3.4 Design for selected resonance characteristics 5.4 Control of magnetostrictive actuators: vibration absorption 5.4.1 Active vibration suppression 5.4.2 Smart actuators and smart structures 5.4.3 Combined sensing and actuation 5.5 Figures of merit of MS actuators 5.5.1 Operational range 5.5.2 Scaling laws for magnetostriction 5.6 Applications 6 Electro- and magnetorheological actuators (ERFs, MRFs) 6.1 Active rheology: transducing materials 6.1.1 Basics of rheology: 6.1.2 Field-responsive fluids 6.1.3 Electro- and magnetorheology 6.2 Mechatronic design concepts 6.2.1 Shear, flow and squeeze modes 6.2.2 Device dimensions according to specifications 6.2.3 Driving electronics for ER and MR devices 6.2.4 Design of magnetic circuits in MR devices 6.3 Control of ERF and MRF 6.3.1 Sky-hook vibration isolation 6.3.2 Relative vibration isolation 6.4 Figures of merit of ER and MR devices... 6.4.1 Material aspects 6.4.2 Size and weight of ER and MR devices 6.4.3 Available dissipative force and power 6.4.4 Scaling of active rheology concepts 6.5 Applications 7 Summary, conclusions and outlook 7.1 Brief summary 7.1.1 Piezoelectric actuators 7.1.2 Shape memory alloy actuators 7.1.3 Electroactive polymer actuators 7.1.4 Magnetostrictive actuators 7.1.5 Electro- and Magnetorheological fluid actuators 7.1.6 Example applications: case studies 7.2 Comparative position of emerging actuators 7.2.1 Comparative analysis in terms of force 7.2.2 Comparative analysis in terms of force density 7.2.3 Comparative analysis in terms of stroke 7.2.4 Comparative analysis in terms of work density per cycle 7.2.5 Comparative analysis in

<<执行器技术>>

terms of power density 7.2.6 Comparative analysis in terms of bandwidth 7.2.7 Relative position in the static and dynamic plane 7.2.8 Comparison in terms of scaling trends 7.2.9 Concluding remarks 7.3 Research trends and application trends 7.3.1 Piezoelectric actuators 7.3.2 Shape memory alloy actuators 7.3.3 Electroactive polymer actuators 7.3.4 Magnetostrictive actuators 7.3.5 Electro- and Magnetorheological fluid actuators Bibliography Index

<<执行器技术>>

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>