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Autore	Ueda Jun
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Nota di contenuto	Front Cover -- Cellular Actuators -- Copyright -- Contents -- List of gures -- List of tables -- Introduction -- About this book -- Motivation for biologically inspired actuation -- Biological muscles and arti cial muscle-type actuators -- Cellular architecture -- Outline of this book -- Acknowledgment -- Historical overview -- Soft robots for unstructured environments -- Robot actuators -- Redundant actuators -- Generation of natural movements -- Cellular actuator concept -- Inspiration from biological muscles -- Binary control of an actuator array -- Broadcast feedback with stochastic recruitment -- Discussion -- 1 Structure of cellular actuators -- 1.1 Strain ampli ed piezoelectric actuators -- 1.1.1 Piezoelectric materials -- 1.1.2 Strain ampli cation mechanisms -- 1.1.3 MEMS-PZT cellular actuator -- 1.1.4 Discussion -- 1.2 Nested rhombus exponential strain ampli cation -- 1.2.1 Large effective strain piezoelectric actuators -- 1.2.2 Rhombus strain ampli cation mechanisms -- 1.2.3 Nested rhombus structure -- 1.2.4 Properties of ideal nested rhombus PZT actuators -- 1.2.5 Feasibility check for 20% effective strain -- 1.2.6 Discussion -- 1.3 Design of nested-rhombus cellular actuators -- 1.3.1 Nested rhombus

mechanisms with structural flexibility -- 1.3.2 Verification and calibration of 3-spring lumped parameter model -- 1.3.3 Prototype two-layer actuator unit -- 1.3.4 Contractile two-layer mechanism design -- 1.3.5 Tweezer-style piezoelectric end-effector -- 1.3.6 Three-layer rhomboidal mechanism design and its application to a camera positioning mechanism -- 1.3.7 Discussion -- 2 Modeling of cellular actuators -- 2.1 Two-port networks for single cell modeling -- 2.1.1 Why a more involved model is necessary -- 2.1.2 Two-port models of strain amplifying compliant mechanisms. 2.1.3 Finding expressions for the immittance parameters using Castigliano's theorem -- 2.1.4 Connecting strain amplifiers and amplified stacks together -- 2.1.5 Effectiveness of multiple layers and figures of merit -- 2.1.6 Amplifying still further with additional strain amplifying mechanisms -- 2.1.7 Discussion -- 2.2 Calibration of two-port network models -- 2.2.1 Model validation by finite element methods -- 2.2.2 Experimental results -- 2.2.3 Discussion -- 2.3 Modeling of actuator arrays: the nesting theorem: three-layer structure -- 2.3.1 Actuator compliance for nested amplified piezoelectric actuators -- 2.3.2 Antagonist pairs of compliant actuators -- 2.3.3 The first and second nesting theorem: evaluating the perceived stiffness based on the stiffness of each layer -- 2.3.4 The three-layer structure -- 2.3.5 Discussion -- 2.4 Representation and characterization of complex actuator arrays -- 2.4.1 Graph-theoretic modeling -- 2.4.2 Cell -- 2.4.3 Connecting structures -- 2.4.4 Incidence matrices -- 2.4.5 Fingerprint method basics -- 2.4.6 Fingerprint-to-incidence matrix relationship -- 2.4.7 Automatic generation of actuator array topologies -- 2.4.8 Incidence matrix identity and similarity transforms -- 2.4.9 Robustness analysis -- 2.4.10 Discussion -- 3 Control of cellular actuators -- 3.1 Minimum switching discrete switching vibration suppression -- 3.1.1 Control strategies for flexible mechatronic systems -- 3.1.2 Open-loop switching control methods -- 3.1.3 Redundantly actuated two-layer flexible cellular actuator -- 3.1.4 Determination of switching pattern -- 3.1.5 Illustrative example of switching algorithm -- 3.1.6 Experimental setup -- 3.1.7 Experimental results -- 3.1.8 Non-ideal effects and command robustness -- 3.1.9 Discussion -- 3.2 Broadcast control for cellular actuator arrays -- 3.2.1 Cellular control system. 3.2.2 Broadcast feedback for cellular control system -- 3.2.3 Stability analysis of broadcast feedback -- 3.2.4 Simulation: uniform cellular array -- 3.2.5 Simulation: non-uniform cellular array -- 3.2.6 Discussion -- 3.3 Hysteresis loop control of hysteretic actuator arrays -- 3.3.1 Segmented binary control for hysteretic cellular actuator units -- 3.3.2 Implementation of hysteresis loop control of an SMA unit -- 3.3.3 Transition probability distribution and hysteresis loop -- 3.3.4 Localized stochastic transition -- 3.3.5 Broadcast control approach to the coordination of hysteretic cellular actuator array -- 3.3.6 Centralized cell coordination -- 3.3.7 Simulation environment -- 3.3.8 Simulation results -- 3.3.9 Discussion -- 3.4 Supermartingale theory for broadcast control of distributed hysteretic systems -- 3.4.1 Anonymous control and stochastic recruitment -- 3.4.2 System representation -- 3.4.3 Aggregate state, internal dynamics, and observability -- 3.4.4 Control -- 3.4.5 Simulation -- 3.4.6 Robustness against cell failures -- 3.4.7 Contribution of preloading and refraction rule -- 3.4.8 Discussion -- 3.5 Signal-dependent variability of actuator arrays with floating-point quantization -- 3.5.1 Motor noise and cellular actuation -- 3.5.2 Floating-point quantization of cellular actuator arrays -- 3.5.3 Numerical example -- 3.5.4 Discussion -- 4 Application of cellular actuators -- 4.1 Variable stiffness cellular actuators -- 4.1.1 Variable

stiffness actuators -- 4.1.2 Design of variable stiffness cellular architecture -- 4.1.3 Tunable resonant frequencies -- 4.1.4 Implementation of a PZT-based VSCA -- 4.1.5 Experimental results -- 4.1.6 Discussion -- 4.2 Bipolar buckling actuators -- 4.2.1 Strain amplification by structural buckling -- 4.2.2 Buckling for large displacement amplification -- 4.2.3 Redirecting stiffness. 4.2.4 Dual buckling unit mechanism -- 4.2.5 Force-displacement analysis -- 4.2.6 Dynamic bipolar motion -- 4.2.7 Prototyping buckling actuators -- 4.2.8 Static performance -- 4.2.9 Dynamic performance -- 4.2.10 Discussion -- 4.3 Self-sensing piezoelectric grasper -- 4.3.1 Self-sensing of amplified PZT actuators -- 4.3.2 Force magnification for tweezer-style piezoelectric end-effector -- 4.3.3 Mechanical modeling -- 4.3.4 Combined electromechanical model of the tweezer device -- 4.3.5 On-site calibration procedure -- 4.3.6 Electrical circuit -- 4.3.7 Results -- 4.3.8 Discussion -- 4.4 Biologically inspired robotic camera orientation system -- 4.4.1 Robotic realization of saccades and smooth-pursuit -- 4.4.2 Dynamics-based oculomotor-visual coordination in rapid camera movements -- 4.4.3 Switching control of camera positioner -- 4.4.4 Dynamics-based blur kernel estimation for motion de-blurring -- 4.4.5 Dynamics-based fast panoramic image stitching -- 4.4.6 Discussion -- 5 Conclusion -- 5.1 Summary and future directions -- 5.1.1 Brief summary -- 5.1.2 Future work -- Nomenclature -- Appendix -- A.1 Modeling of hysteresis -- A.1.1 Hysteresis in piezoelectric actuators -- A.1.2 Hysteresis modeling -- A.2 Structural parameters of tweezer-style end-effector -- A.3 Piezoelectric driving circuit and control system -- A.3.1 Cédrat charge amplifiers -- A.3.2 Discrete switching piezoelectric drive circuit -- A.3.3 Hardware configuration of real-time controller -- A.4 Compliance matrix elements in Section 2.2 -- A.5 SMA cellular actuators -- A.5.1 SMA cellular actuator design -- A.5.2 Damped SMA array -- A.5.3 Dynamic SMA array -- A.5.4 Implementation of coating-point quantization into dynamic SMA actuator array -- A.5.5 Robotic arm with SMA cellular actuators -- A.6 Deterministic analysis and stability of expectation -- A.7 Proof of Lemma 2 in Section 3.4. A.8 Recursive computation of probability $\Pr(X_t|X_0)$ -- A.9 Proof of Lemma 2 in Section 4.1 -- Bibliography -- Index -- Back Cover.

Sommario/riassunto

Cellular Actuators: Modularity and Variability in Muscle-Inspired Actuation describes the roles actuators play in robotics and their insufficiency in emerging new robotic applications, such as wearable devices and human co-working robots where compactness and compliance are important. Piezoelectric actuators, the topic of this book, provide advantages like displacement scale, force, reliability, and compactness, and rely on material properties to provide displacement and force as reactions to electric stimulation. The authors, renowned researchers in the area, present the fundamentals of muscle-like movement and a system-wide study that includes the design, analysis, and control of biologically inspired actuators. This book is the perfect guide for researchers and practitioners who would like to deploy this technology into their research and products.- Introduces Piezoelectric Actuators concepts in a system wide integrated approach- Acts as a single source for the design, analysis, and control of actuator arrays- Presents applications to illustrate concepts and the potential of the technology- Details the physical assembly possibilities of Piezo actuators- Presents fundamentals of bio inspired actuation- Introduces the concept of cellular actuators