1. Record Nr. UNINA9910254182003321

Autore	Xu Qingsong
Titolo	Advanced Control of Piezoelectric Micro-/Nano-Positioning Systems / / by Qingsong Xu, Kok Kiong Tan
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2016
ISBN	3-319-21623-6
Edizione	[1st ed. 2016.]
Descrizione fisica	1 online resource (266 p.)
Collana	Advances in Industrial Control, , 1430-9491
Disciplina	629.8
Soggetti	Control engineering Nanotechnology Industrial engineering Production engineering Mechatronics Control and Systems Theory Nanotechnology and Microengineering Industrial and Production Engineering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Introduction -- Part I Hysteresis Model-Based Feedforward Control -- Feedforward Control Based on an Inverse Hysteresis Model -- Feedforward Control without Modeling Inverse Hysteresis -- Part II Hysteresis-Model-Free, State-Observer-Based Feedback Control -- Model Predictive Discrete-Time Sliding-Mode Control -- Model Predictive Output Integral Discrete-Time Sliding-Mode Control -- Part III Hysteresis-Model-Free, State-Observer-Free Feedback Control -- Digital Sliding-Mode Control of Second-Order Systems -- Digital Sliding-Mode Control of High-Order System -- Digital Sliding-Mode Prediction Control -- Model-Reference Adaptive Control with Perturbation Estimation -- Part IV Applications to Micromanipulation -- Adaptive Impedance Control of Piezoelectric Microgripper -- Position/Force-Switching Control of a Miniature Gripper. Glossary.
Sommario/riassunto	This book explores emerging methods and algorithms that enable

precise control of micro-/nano-positioning systems. The text describes three control strategies: hysteresis-model-based feedforward control and hysteresis-model-free feedback control based on and free from state observation. Each paradigm receives dedicated attention within a particular part of the text. Readers are shown how to design, validate and apply a variety of new control approaches in micromanipulation: hysteresis modelling, discrete-time sliding-mode control and model-reference adaptive control. Experimental results are provided throughout and build up to a detailed treatment of practical applications in the fourth part of the book. The applications focus on control of piezoelectric grippers. Advanced Control of Piezoelectric Micro-/Nano-Positioning Systems will assist academic researchers and practising control and mechatronics engineers interested in suppressing sources of nonlinearity such as hysteresis and drift when combining position and force control of precision systems with piezoelectric actuation. Advances in Industrial Control aims to report and encourage the transfer of technology in control engineering. The rapid development of control technology has an impact on all areas of the control discipline. The series offers an opportunity for researchers to present an extended exposition of new work in all aspects of industrial control.