



# Advanced Control of Piezoelectric Micro-/Nano-Positioning Systems (Advances in Industrial Control)

By Qingsong Xu, Kok Kiong Tan

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**Advanced Control of Piezoelectric Micro-/Nano-Positioning Systems (Advances in Industrial Control)** By Qingsong Xu, Kok Kiong Tan

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.

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### Editorial Review

#### From the Back Cover

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**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.

#### About the Author

Prof. Qingsong Xu has been working in the area of micro-/nano-mechatronics and robotics including design and precision control of micro/nano-positioning systems for about 10 years. He has published over 130 peer-reviewed papers in journals and conferences in related domains.

Prof. Kok Kiong Tan has been working in the area of precision motion control and instrumentation, advanced process control and autotuning, and general industrial automation for over 20 years. He has published over 10 books and 400 scientific papers in related fields.

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