

A. Astolfi
L. Marconi
Editors

Analysis and Design of Nonlinear Control Systems

In Honor of Alberto Isidori



Springer

Contents

Part I System Analysis

Smooth Distributions Are Globally Finitely Spanned	
<i>Hector J. Sussmann</i>	3
Uniformly Universal Inputs	
<i>Eduardo D. Sontag, Yuan Wang</i>	9
System Interconnection	
<i>Jan C. Willems</i>	25
Reduced Order Modeling of Nonlinear Control Systems	
<i>Arthur J. Krener</i>	41

Part II Optimization Methods

Nonholonomic Trajectory Optimization and the Existence of Twisted Matrix Logarithms	
<i>Roger W. Brockett</i>	65
The Hamilton-Jacobi Type Equations for Nonlinear Target Control and Their Approximation	
<i>Alexander B. Kurzhanski, Pravin Varaiya</i>	77
Causal Coding of Markov Sources with Continuous Alphabets	
<i>Serdar Yüksel, Tamer Başar</i>	91
Pseudospectral Optimal Control and Its Convergence Theorems	
<i>Wei Kang, I. Michael Ross, Qi Gong</i>	109

Part III Feedback Design

Event Based Control

Karl J. Åström 127

Zero Dynamics and Tracking Performance Limits in Nonlinear Feedback Systems

A. Pedro Aguiar, João P. Hespanha, Petar V. Kokotović 149

A Nonlinear Model for Combustion Instability:**Analysis and Quenching of the Oscillations**

Ioan D. Landau, Fethi Bouziani, Robert R. Bitmead 161

Convexification of the Range-Only Station Keeping Problem

Ming Cao, A. Stephen Morse 183

Control of Hydraulic Devices, an Internal Model Approach

Kurt Schlacher, Kurt Zehetleitner 207

Hybrid Zero Dynamics of Planar Bipedal Walking

Jessy W. Grizzle, Eric R. Westervelt 223

Part IV Regulation

Hybrid Systems: Limit Sets and Zero Dynamics with a View Toward Output Regulation

Chaohong Cai, Rafal Goebel, Ricardo G. Sanfelice, Andrew R. Teel 241

Essential and Redundant Internal Models in Nonlinear Output Regulation

Lorenzo Marconi, Laurent Praly 263

Two Global Regulators for Systems with Measurable Nonlinearities and Unknown Sinusoidal Disturbances

Riccardo Marino, Giovanni L. Santosuosso, Patrizio Tomei 285

A Taxonomy for Time-Varying Immersions in Periodic Internal-Model Control

Andrea Serrani 303

Paving the Way Towards the Control of Wireless Telecommunication Networks

Francesco Delli Priscoli, Antonio Pietrabissa 319

Nonlinear Synchronization of Coupled Oscillators: The Polynomial Case	
<i>Jung-Su Kim, Frank Allgöwer</i>	339

Part V Geometric Methods

Disturbance Decoupling for Open Quantum Systems: Quantum Internal Model Principle	
<i>Narayan Ganesan, Tzyh-Jong Tarn</i>	355
Controller and Observer Normal Forms in Discrete-Time	
<i>Salvatore Monaco, Dorothée Normand-Cyrot</i>	377
A Geometric Approach to Dynamic Feedback Linearization	
<i>Stefano Battilotti, Claudia Califano</i>	397

Part VI Asymptotic Analysis

The Steady-State Response of a Nonlinear Control System, Lyapunov Stable Attractors, and Forced Oscillations	
<i>Chris I. Byrnes, David S. Gilliam</i>	415
Model Reduction by Moment Matching for Linear and Nonlinear Systems	
<i>Alessandro Astolfi</i>	429
Adaptive Control of Nonlinear Systems with Unknown Parameters by Output Feedback: A Non-Identifier-Based Method	
<i>Hao Lei, Wei Lin</i>	445
Hybrid Feedback Stabilization of Nonlinear Systems with Quantization Noise and Large Delays	
<i>Claudio De Persis</i>	465