

# Contents

## Part I: Circuit Theory

<b>Old and New Directions of Research in System Theory . . . . .</b>	<b>3</b>
<i>Rudolf Kalman</i>	
<b>Regular Positive-Real Functions and the Classification of Transformerless Series-Parallel Networks . . . . .</b>	<b>15</b>
<i>Jason Zheng Jiang, Malcolm C. Smith</i>	
<b>Ports and Terminals . . . . .</b>	<b>27</b>
<i>Jan C. Willems</i>	

## Part II: Control

<b>On the Sample Complexity of Probabilistic Analysis and Design Methods . . . . .</b>	<b>39</b>
<i>Teodoro Alamo, Roberto Tempo, Amalia Luque</i>	
<b>A Constant Factor Approximation Algorithm for Event-Based Sampling . . . . .</b>	<b>51</b>
<i>Randy Cogill, Sanjay Lall, João P. Hespanha</i>	
<b>A Unified Approach to Decentralized Cooperative Control for Large-Scale Networked Dynamical Systems . . . . .</b>	<b>61</b>
<i>Shinji Hara</i>	
<b>Control and Stabilization of Linear Equation Solvers . . . . .</b>	<b>73</b>
<i>Uwe Helmke, Jens Jordan</i>	
<b>Nonlinear Output Regulation: A Unified Design Philosophy . . . . .</b>	<b>83</b>
<i>Alberto Isidori</i>	

<b>An Estimated General Cross Validation Function for Periodic Control</b>	
<b>Theoretic Smoothing Splines</b>	95
<i>Maja Karasalo, Xiaoming Hu, Clyde F. Martin</i>	
<b>Stable <math>\mathcal{H}^\infty</math> Controller Design for Systems with Time Delays</b>	105
<i>Hitay Özbay</i>	
<b>Dynamic Quantization for Control</b>	115
<i>Toshiharu Sugie, Shun-ichi Azuma, Yuki Minami</i>	

### Part III: Graphs and Networks

<b>Convergence of Periodic Gossiping Algorithms</b>	127
<i>Brian D.O. Anderson, Changbin Yu, A. Stephen Morse</i>	
<b>Distributed PageRank Computation with Link Failures</b>	139
<i>Hideaki Ishii, Roberto Tempo</i>	
<b>Predicting Synchrony in a Simple Neuronal Network</b>	151
<i>Sachin S. Talathi, Pramod P. Khargonekar</i>	

### Part IV: Mathematical System Theory

<b>On the Stability and Instability of Padé Approximants</b>	165
<i>Christopher I. Byrnes, Anders Lindquist</i>	
<b>On the Use of Functional Models in Model Reduction</b>	177
<i>Paul A. Fuhrmann, Uwe Helmke</i>	
<b>Quadratic Performance Verification for Boundary Value Systems</b>	189
<i>Hisaya Fujioka</i>	
<b>Lyapunov Stability Analysis of Higher-Order 2-D Systems</b>	197
<i>Chiaki Kojima, Paolo Rapisarda, Kiyotsugu Takaba</i>	
<b>From Lifting to System Transformation</b>	207
<i>Yoshito Ohta</i>	
<b>Contractive Systems with Inputs</b>	217
<i>Eduardo D. Sontag</i>	
<b>Dissipativity and Stability Analysis Using Rational Quadratic Differential Forms</b>	229
<i>Kiyotsugu Takaba</i>	
<b>On Behavioral Equivalence of Rational Representations</b>	239
<i>Harry L. Trentelman</i>	

**Part V: Modeling**

<b>Modeling and Stability Analysis of Controlled Passive Walking . . . . .</b>	<b>253</b>
<i>Kentaro Hirata</i>	
<b>An Optimization Approach to Weak Approximation of Lévy-Driven Stochastic Differential Equations . . . . .</b>	<b>263</b>
<i>Kenji Kashima, Reiichiro Kawai</i>	
<b>Compound Control: Capturing Multivariable Nature of Biological Control . . . . .</b>	<b>273</b>
<i>Hidenori Kimura, Shingo Shimoda, Reiko J. Tanaka</i>	
<b>Law of Large Numbers, Heavy-Tailed Distributions, and the Recent Financial Crisis . . . . .</b>	<b>285</b>
<i>Mathukumalli Vidyasagar</i>	

**Part VI: Signal Processing**

<b>Markov Models for Coherent Signals: Extrapolation in the Frequency Domain . . . . .</b>	<b>299</b>
<i>Roger W. Brockett</i>	
<b>Digital Signal Processing and the YY Filter . . . . .</b>	<b>309</b>
<i>Bruce Francis</i>	
<b>Sparse Blind Source Separation via <math>\ell_1</math>-Norm Optimization . . . . .</b>	<b>321</b>
<i>Tryphon T. Georgiou, Allen Tannenbaum</i>	
<b>YY Filter—A Paradigm of Digital Signal Processing . . . . .</b>	<b>331</b>
<i>Masaaki Nagahara</i>	

**Part VII: System Identification**

<b>How to Sample Linear Mechanical Systems . . . . .</b>	<b>343</b>
<i>Mattia Bruschetta, Giorgio Picci, Alessandro Saccon</i>	
<b>A Note on LQ Decomposition in Stochastic Subspace Identification . . . . .</b>	<b>355</b>
<i>Tohru Katayama</i>	
<b>Modeling Systems Based on Noisy Frequency and Time Domain Measurements . . . . .</b>	<b>365</b>
<i>Sanda Lefteriu, Antonio C. Ionita, Athanasios C. Antoulas</i>	
<b>Blind Identification of Polynomial Matrix Fraction with Applications . . . . .</b>	<b>379</b>
<i>Kenji Sugimoto</i>	
<b>Author Index . . . . .</b>	<b>389</b>