

IEEE

# CONTROL SYSTEMS LETTERS

A PUBLICATION OF THE IEEE CONTROL SYSTEMS SOCIETY



APRIL 2019

VOLUME 3

NUMBER 2

ICSLBO

(ISSN 2475-1456)

---

## GUEST EDITORIAL

Editorial to the Special Issue of L-CSS on Control and Network Theory for Biological Systems .....	
..... <i>M. Arcak, F. Blanchini, and M. Vidyasagar</i>	228

---

## SPECIAL ISSUE PAPERS

Postprandial Glucose Regulation via KNN Meal Classification in Type 1 Diabetes .....	
..... <i>E. M. Aiello, C. Toffanin, M. Messori, C. Cobelli, and L. Magni</i>	230
A Singular Singular Perturbation Problem Arising From a Class of Biomolecular Feedback Controllers .....	
..... <i>Y. Qian and D. Del Vecchio</i>	236
Dynamic Density Estimation in Heterogeneous Cell Populations .....	<i>A. Küper, R. Dürr, and S. Waldherr</i> 242
Modeling Enzyme Controlled Metabolic Networks in Rapidly Changing Environments by Robust Optimization .....	<i>H. Lindhorst, S. Lucia, R. Findeisen, and S. Waldherr</i> 248
Evolutionary Dynamics of Two Communities Under Environmental Feedback .....	
..... <i>Y. Kawano, L. Gong, B. D. O. Anderson, and M. Cao</i>	254
BDC-Decomposition for Global Influence Analysis .....	<i>F. Blanchini and G. Giordano</i> 260
Robustness Analysis of a Synthetic Translational Resource Allocation Controller .....	
..... <i>A. P. S. Darlington, J. Kim, and D. G. Bates</i>	266
Input-Dependent Structural Identifiability of Nonlinear Systems .....	
..... <i>A. F. Villaverde, N. D. Evans, M. J. Chappell, and J. R. Banga</i>	272
Analysis and Control of Genetic Toggle Switches Subject to Periodic Multi-Input Stimulation .....	
..... <i>D. Fiore, A. Guarino, and M. di Bernardo</i>	278
A Linear Formulation of Asynchronous Boolean Networks .....	<i>H. Das, A. Deshpande, and R. K. Layek</i> 284
Bounding Transient Moments of Stochastic Chemical Reactions .....	<i>Y. Sakurai and Y. Hori</i> 290
Ensemble Controllability of Cellular Oscillators .....	<i>K. Kuritz, S. Zeng, and F. Allgöwer</i> 296
Analysis of a Minimal Gene Regulatory Network for Cell Differentiation .....	
..... <i>I. Zorzan, S. Del Favero, B. Di Camillo, and L. Schenato</i>	302
Sharing Resources Can Lead to Monostability in a Network of Bistable Toggle Switches .....	<i>A. Gyorgy</i> 308

(Contents Continued on Page ii)



---

Control of Generalized Discrete-Time SIS Epidemics via Submodular Function Minimization .....	<i>N. J. Watkins and G. J. Pappas</i>	314
A Dynamic Neural Network Designed Using Analytical Methods Produces Dynamic Control Properties Similar to an Analogous Classical Controller .....	<i>W. W. Hilts, N. S. Szczecinski, R. D. Quinn, and A. J. Hunt</i>	320
Improving Orthogonality in Two-Component Biological Signalling Systems Using Feedback Control .....	<i>H. Steel, A. Sootla, B. Smart, N. Delalez, and A. Papachristodoulou</i>	326
Identifying Disease Network Dysregulation Through Expression Mean, Variance, and Distribution Changes .....	<i>K. R. Dean and F. J. Doyle, III</i>	332

---

**REGULAR ISSUE PAPERS**

A New Design of Asynchronous Observer-Based Output-Feedback Control for Piecewise-Affine Systems ..	<i>Y. Wei, X. Jing, W. X. Zheng, J. Qiu, and H. R. Karimi</i>	338
Consensus of Multi-Agent Systems With Nonholonomic Restrictions via Lyapunov's Direct Method .....	<i>M. Maghenem, A. Bautista, E. Nuño, A. Loría, and E. Panteley</i>	344
Passivity-Based Bilateral Tele-Driving System With Parametric Uncertainty and Communication Delays ....	<i>Y. Dong and N. Chopra</i>	350
High-Gain Dead-Zone Observers for Linear and Nonlinear Plants .....	<i>M. Cocetti, S. Tarbouriech, and L. Zaccarian</i>	356
Stability Analysis for Switched Uncertain Nonlinear Systems With Dwell Time and Delay in the Active Mode Detection .....	<i>L. Etienne, K. M. D. Motchon, and S. Lecoeuche</i>	362
Scattering-Based Stabilization of Complex Interconnections of (Q,S,R)-Dissipative Systems With Time Delays .....	<i>A. A. Usova, I. G. Polushin, and R. V. Patel</i>	368
Bifurcation-Based Control Law for Pattern Generation .....	<i>A. Parayil and A. Ratnoo</i>	374
Differential Linear Matrix Inequalities Optimization .....	<i>T. R. Gonçalves, G. W. Gabriel, and J. C. Geromel</i>	380
Hybrid Zero Dynamics of Bipedal Robots Under Nonholonomic Virtual Constraints .....	<i>J. C. Horn, A. Mohammadi, K. A. Hamed, and R. D. Gregg, IV</i>	386
Nonlinear Observer on SO(3) for Attitude Estimation on Rotating Earth Using Single Vector Measurements .....	<i>J. Reis, P. Batista, P. Oliveira, and C. Silvestre</i>	392
Efficient Data-Driven Estimation of Passivity Properties .....	<i>M. Tanemura and S.-i. Azuma</i>	398
A Distributed Method for Linear Programming Problems With Box Constraints and Time-Varying Inequalities .....	<i>M. Hosseinzadeh, E. Garone, and L. Schenato</i>	404
A Class of $L_1$ -to- $L_1$ and $L_\infty$ -to- $L_\infty$ Interval Observers for (Delayed) Markov Jump Linear Systems .....	<i>C. Briat</i>	410
Backstepping for Partially Unknown Nonlinear Systems Using Gaussian Processes .....	<i>A. Capone and S. Hirche</i>	416
Classical Formation Patterns and Flanking Strategies as a Result of Utility Maximization .....	<i>E. Scutkins and P. Ögren</i>	422
Stabilization and Robustness Analysis for a Chain of Saturating Integrators With Imprecise Measurements .....	<i>F. Mazenc, L. Burlion, and M. Malisoff</i>	428
Consensus of Heterogeneous Multi-Agent Systems With Diffusive Couplings via Passivity Indices .....	<i>M. Li, L. Su, and G. Chesi</i>	434
"Weak" Control for Human-in-the-Loop Systems .....	<i>M. Inoue and V. Gupta</i>	440
Positive Definiteness in Linear Matrix Inequality Problem for $H$ -Infinity Output Feedback Control Problem ..	<i>H. Waki</i>	446
Almost Every Single-Input LQR Optimal Control Problem Admits a PD Feedback Solution .....	<i>C. Bhawal and D. Pal</i>	452
On the Relation Between Detectability and Strict Dissipativity for Nonlinear Discrete Time Systems .....	<i>M. Höger and L. Grüne</i>	458
DeGroot–Friedkin Map in Opinion Dynamics Is Mirror Descent .....	<i>A. Halder</i>	463
A Simple Architecture for Arbitrary Interpolation of State Feedback .....	<i>S. R. Friedrich and M. Buss</i>	469
A New Continuous-Time Stability Perspective of Time-Delay Control: Introducing a State-Dependent Upper Bound Structure .....	<i>S. Roy, J. Lee, and S. Baldi</i>	475
Distributed Consensus Control for a Network of Incommensurate Fractional-Order Systems .....	<i>M. Shahvali, M.-B. Naghibi-Sistani, and H. Modares</i>	481

---