2022 American Control Conference (ACC 2022)

Atlanta, Georgia, USA
8-10 June 2022

Pages 1-741

IEEE Catalog Number: CFP22ACC-POD
ISBN: 978-1-6654-9480-9

Copyright © 2022, The American Automatic Control Council
All Rights Reserved

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP22ACC-POD
ISBN (Print-On-Demand):	978-1-6654-9480-9
ISBN (Online):	978-1-6654-5196-3
ISSN:	0743-1619

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Adaptive Flight Stabilization Framework for a Planar 4R-Foldable Quadrotor: Utilizing Morphing to Navigate in Confined Environments 1
Jawad Mehmood Butt, Xin Ma, Xiangyu Chu, K. W. Samuel Au

Prescribed-Time Seeking of a Repulsive Source by Angular Velocity Tuning 8
Velimir Todorovski, Miroslav Krstic

Adaptive Control and Parameter-Dependent Anti-windup Compensation for Inertia Varying Quadcopters 14
Benjamin E. Farber, Christopher M. Richards

A New Augmented L_1 Adaptive Control for Wheel-Legged Robots: Design and Experiments 22
Fahad Raza, Ahmed Chemori, Mitsuhiro Hayashibe

Adaptive Stabilization of Thermoacoustic Oscillations in a Rijke Tube 28
Juan Paredes, Syed Aseem Ul Islam, Dennis S. Bernstein

Filtering-Based Concurrent Learning Adaptive Control: Exponential Convergence of System Parameters and Control Coefficient 34
Vahid Azimi, Seth Hutchinson

Optimal Partial Observation for Estimating Network Connectivity 40
Hiroki Ikeuchi, Hiroshi Saito, Kotato Matsuda

Discrete-Time Control of Multiagent Systems with a Misbehaving Node 48
Emre Yildirim, Tansel Yucelen

Consensus: Optimal Coupling Gain Design 54
Pedro Trindade, Rita Cunha, Pedro Batista

Optimal Sensor Gain Control for Minimum-Information Estimation of Continuous-Time Gauss-Markov Processes 60
Vrushabh Zinage, Takashi Tanaka, Valeri Ugrinovskii

SOURCE: Towards Solar-Uncertainty-Aware E-Taxi Coordination Under Dynamic Passenger Mobility 67
Yukun Yuan, Yue Zhao, Shan Lin

Dynamic Quantizer Synthesis for Encrypted State-Feedback Control Systems with Partially Homomorphic Encryption 75
Hiroaki Kawase, Kaoru Teranishi, Kiminao Kogiso

Blending Controllers Via Multi-Objective Bandits 82
Parham Gohari, Franck Djeumou, Abraham P. Vinod, Ufuk Topcu

Distributed State Estimation for Nonlinear Systems with Unknown Parameters 90
Paulo Heredia, Eloy Garcia, Shaoshuai Mou

Optimal Strategies for the Game of Protecting a Plane in 3-D 96
Eloy Garcia, Isaac Weintraub, David W. Casbeer, Meir Pachter

Risk-Aware Model Predictive Control Enabled by Bayesian Learning 102
Yingke Li, Yifan Lin, Enlu Zhou, Fumin Zhang

Data-Driven Control of Linear-Threshold Network Dynamics 108
Xuan Wang, Jorge Cortés

Global Stabilization of Polynomial Systems Using Equilibrium-Independent Dissipativity 114
Diego De S. Madeira, Thiago Alves Lima

Resilience of Input Metering in Dynamic Flow Networks 120
Saber Jafarpour, Samuel Coogan

On the Asymptotic Stability of Proximal Algorithms for Convex Optimization Problems with Multiple Non-Smooth Regularizers 126
Ibrahim K. Ozaslan, Sepideh Hassan-Moghaddam, Mihailo R. Jovanovic

Dynamic Routing and Queuing for Mixed Autonomy with Traffic Responsive Intersection Signaling 132
Ruolin Li, Roberto Horowitz

Results on Lyapunov-Like Functions for Almost Global Convergence in Discrete-Time Systems 140
Mohammadreza Kamaldar, Jesse B. Hoagg

Set-Based Reachability and the Explicit Solution of Linear MPC Using Hybrid Zonotopes 146
Trevor J. Bird, Neera Jain, Herschel C. Pangborn, Justin P. Koeln

A Distributed Control Invariant Set Computing Algorithm for Nonlinear Cascade Systems 154
Benjamin Decardi-Nelson, Jinfeng Liu

Semi-Supervised Trajectory-Feedback Controller Synthesis for Signal Temporal Logic Specifications 160
Karen Leung, Marco Pavone

Fixed-Time Dynamical System Approach for Solving Time-Varying Convex Optimization Problems 168
Rejitha Raveendran, Arun D. Mahindrakar, Umesh Vaidya

A Distributed Second-Order Gradient Continuous-Time Algorithm for Resource Allocation 174
S. Sh. Alaviani, A. G. Kelkar, U. Vaidya

Asynchronous Algorithms for Distributed Consensus-Based Optimization and Distributed Resource Allocation Over Random Networks 180
S. Sh. Alaviani, A. G. Kelkar

Distributed Online Optimization with Byzantine Adversarial Agents 186
Sourav Sahoo, Anand Gokhale, Rachel Kalpana Kalaimani

Dynamic Regret Bounds Without Lipschitz Continuity: Online Convex Optimization with Multiple Mirror Descent Steps 192
Nima Eshraghi, Ben Liang

Blown Film Thickness Control with a Scanning Down-The-line Measurement 200
Mikko Salo, Risto Ritala

Decomposition of the Retrospective Performance Variable in Adaptive Input Estimation 206
Sneha Sanjeevini, Dennis S. Bernstein

On Distributed Sampling for Mismatched Estimation of Remote Sources 212
Yash Pandit, Amitalok J. Budkuley

Filtering of Systems with Heavy Tailed Noise: Application to 3D Target Tracking with Glint Noise 218
Stefano Battilotti, Filippo Cacace, Massimiliano D'Angelo, Emanuele Della Corte, Alfredo Germani

Minimax Adaptive Estimation for Finite Sets of Linear Systems 224
Olle Kjellqvist, Anders Rantzer

Physics-Informed Learning: Distributed Parameter Systems, Hidden Markov Models, and the Viterbi Algorithm 230
Clemens Oszkinat, Susan E. Luczak, I. G. Rosen

Fault Detection and Accommodation of Positive Real Infinite Dimensional Systems Using Adaptive RKHS-Based Functional Estimation 236
Michael A. Demetriou

Estimation of the Electron Temperature Profile in Tokamaks Using Analytical and Neural Network Models* 242
Shira Morosohk, Andres Pajares, Eugenio Schuster

Boundary Control of Semilinear Parabolic Equations with Non-Smooth Point-wise-Integral Control Constraints in Time-Space* 248
Eduardo Casas, Karl Kunisch

Optimal Control of Velocity and Nonlocal Interactions in the Mean-Field Kuramoto Model 254
Carlo Sinigaglia, Francesco Braghin, Spring Berman

Kalman Filtering for Discrete-Time Linear Systems with Infinite-Dimensional Observations 260
Maxwell M. Varley, Timothy L. Molloy, Girish N. Nair

Robust State Estimation in the Presence of Stealthy Cyberattacks 268
Shiraz Khan, Inseok Hwang, James Goppert

Performance Analysis of Event-Triggered Consensus Control for Multi-agent Systems Under Cyber-Physical Attacks 274
Farzaneh Tatari, Aquib Mustafa, Majid Mazouchi, Hamidreza Modares, Christos G. Panayiotou, Marios M. Polycarpou

On String Stability of Mixed Autonomous and Human-Driven Vehicle Platoons with Transmissibility-based Health Monitoring 280
Abdelrahman Khalil, Khaled F. Aljanaideh, Mohammad Al Janaideh

Resilient Interval Observer for Simultaneous Estimation of States, Modes and Attack Policies 286
Mohammad Khajenejad, Zeyuan Jin, Sze Zheng Yong

Cooperative Systems in Presence of Cyber-Attacks: A Unified Framework for Resilient Control and Attack Identification 294
Azwirman Gusrialdi, Zhihua Qu

Arbitrarily Fast Switched Distributed Stabilization of Partially Unknown Interconnected Multiagent Systems: A Proactive Cyber Defense Perspective 300
Vahid Rezaei, Jafar Haadi Jafarian, Douglas C. Sicker

Fusion of Machine Learning and MPC Under Uncertainty: What Advances Are on the Horizon? 306
Ali Mesbah, Kim P. Wabersich, Angela P. Schoellig, Melanie N. Zeilinger, Sergio Lucia, Thomas A. Badgwell, Joel A. Paulson

Distributed MPC with ALADIN—A Tutorial 322
Boris Houska, Jiahe Shi

Advances in Mixed-Integer Model Predictive Control 328
Robert D. McAllister, James B. Rawlings

State of Charge Estimation for Lithium-Ion Batteries in Electric Vehicles by Transformer Neural Network and L_1 Robust Observer 334
Heran Shen, Xingyu Zhou, Zejiang Wang, Junmin Wang

System Identification of Battery Single Particle Model Parameters Using New Data Optimization Approach 340
Qingzhi Lai, Jackson Blake Fogelquist, Xinfan Lin

Uncertainty-Aware Data Selection Framework for Parameter Estimation with Application to Li-ion Battery 348
Jackson Fogelquist, Xinfan Lin

Modeling of Li-Ion Batteries for Real-time Analysis and Control: A Data-driven Approach* 356
Omidreza Ahmadzadeh, Renato Rodriguez, Damoon Soudbakhsh

Integrated Optimization of Powertrain Energy Management and Vehicle Motion Control for Autonomous Hybrid Electric Vehicles 362
Mohammadali Kargar, Chen Zhang, Xingyong Song

Robust Passively Safe Spacecraft Swarming Via Closed-Form and Optimization-based Control Approaches 368
Tommaso Guffanti, Simone D'Amico

Guaranteeing Safety Via Active-Set Invariance Filters for Multi-Agent Space Systems with Coupled Dynamics* 376
Michael Hibbard, Ufuk Topcu, Kerianne Hobbs

Evaluations on Uncertainty Characterization of an SE(3) Variational Filter 383
Christopher W. Hays, Troy Henderson

A Nonlinear Predictive Control Strategy for Landing on an Asteroid 389
Steven Van Leeuwen, Terrence Skibik, Marco Nicotra, Ilya Kolmanovsky, Dominic Liao-McPherson

Understanding the Evolution of Interspecies Metabolic Interactions Using Dynamic Genome-Scale Metabolic Modeling* 396
Kiumars Badr, Q. Peter He, Jin Wang

Internal Feedback in Biological Control: Architectures and Examples 402
Anish A. Sarma, Jing Shuang Lisa Li, Josefin Stenberg, Gwyneth Card, Elizabeth S. Heckscher, Narayanan Kasthuri, Terrence Sejnowski, John C. Doyle

Internal Feedback in Biological Control: Diversity, Delays, and Standard Theory 408
Josefin Stenberg, Jing Shuang Lisa Li, Anish A. Sarma, John C. Doyle

Enhanced Social Cognitive Theory Dynamic Modeling and Simulation Towards Improving the Estimation of "Just-In-Time" States 414
Mohamed El Mistiri, Daniel E. Rivera, Predrag Klasnja, Junghwan Park, Eric Hekler

Internal Feedback in Biological Control: Locality and System Level Synthesis 420
Jing Shuang Lisa Li

Bearing-Based Formation Control with Optimal Motion Trajectory 426
Zili Wang, Sean B. Andersson, Roberto Tron

Aerial Interception of Non-Cooperative Intruder Using Model Predictive Control 434
Raunak Srivastava, Rolif Lima, Kaushik Das

Towards Contact Point and Surface Normal Estimation for Control of Flexible Tool 440
Christoffer Sloth, Aljaz Kramberger, Emil Lykke Diget, Iñigo Iturrate

Single-Leg Forward Hopping Via Nonlinear Modes 446
Davide Calzolari, Cosimo Della Santina, Alessandro M. Giordano, Alin Albu-Schäffer

Control of an Assembly of Aerial Vehicles Under Uncertainty 454
Mohamad T. Shahab, Kévin Garanger, Eric Feron

Learning to Control Robot Hopping Over Uneven Terrain 460
M. D. Lemmon, P. M. Wensing, V. Kurtz, H. Lin

Robust Walking Control Based on the Extended Variable Stiffness SLIP Model 466
Mustafa Melih Pelit, Masaki Yamakita

A Novel Lightweight Cable-Driven Integrated-Finger Robotic Hand for Dexterous Manipulation 472
Xingsheng Wei, Kuiyuan Xu, Wansong Liu, Eric Mountain, Xiao Liang, Minghui Zheng

Motion Planning of Planar Snake Robots in Viscous Environments 478
Omar Itani, Elie Shammas, Dany Abou Jaoude

A Robust Mean-Field Game of Boltzmann-Vlasov-like Traffic Flow 484
Amoolya Tirumalai, John S. Baras

EPROACH: A Population Vaccination Game for Strategic Information Design to Enable Responsible COVID Reopening 490
Shutian Liu, Quanyan Zhu

Incentive Design for Noncooperative Dynamical Systems Under Sustainable Budget Constraint for Pareto Improvement 496
Yuyue Yan, Tomohisa Hayakawa

When Shall I Estimate Your Intent? Costs and Benefits of Intent Inference in Multi-Agent Interactions 502
Sunny Amatya, Mukesh Ghimire, Yi Ren, Zhe Xu, Wenlong Zhang

Understanding the Interplay Between Herd Behaviors and Epidemic Spreading Using Federated Evolutionary Games 509
Shutian Liu, Yuhan Zhao, Quanyan Zhu

Bargaining-Based Load Control Mechanism Design for Microgrids 515
Miaomiao Hu, Zoleikha Abdollahi Biron

Common Information Belief Based Dynamic Programs for Stochastic Zero-Sum Games with Competing Teams 521
Dhruva Kartik, Ashutosh Nayyar, Urbashi Mitra

Network Inspection from Locations with Imperfect Detection Capabilities 529
Bastian Bahamondes, Mathieu Dahan

The Importance of Randomization in Resource Assignment Problems 537
Keith Paarporn, Rahul Chandan, Mahnoosh Alizadeh, Jason R. Marden

On Partial Adoption of Vehicle-To-Vehicle Communication: When Should Cars Warn Each Other of Hazards? 543
Brendan T. Gould, Philip N. Brown

Stable Interaction of Autonomous Vehicle Platoons with Human-Driven Vehicles 549
Mohammad Pirani, Yining She, Renzhi Tang, Zhihao Jiang, Yash Vardhan Pant

Robust Leader-Follower Formation Control for Human-Robot Scenarios 557
Alia Gilbert, Vishnu S. Chipade, Dimitra Panagou

Whole Body Control for Haptic Interaction with VR 563
Benjamin Beiter, Connor Herron, Alexander Leonessa

A Generalized Human-In-The-Loop Stability Analysis in the Presence of Uncertain and Redundant Actuator Dynamics 569
Seyed Shahabaldin Tohidi, Yildiray Yildiz

Individual and Team Trust Preferences for Robotic Swarm Behaviors 575
Elena M. Vella, Daniel A. Williams, Airlie Chapman, Chris Manzie

Model Personalization in Behavioral Interventions Using Model-On-Demand Estimation and Discrete Simultaneous Perturbation Stochastic Approximation 581
Rachael T. Kha, Daniel E. Rivera, Predrag Klasnja, Eric Hekler

Modeling Human-Human Collaboration: A Connection Between Inter-Personal Motor Synergy and Consensus Algorithms 587
Sara Honarvar, Jin-Oh Hahn, Tim Kiemel, Jae Kun Shim, Yancy Diaz-Mercado

Towards Modeling Human Motor Learning Dynamics in High-Dimensional Spaces 593
Ankur Kamboj, Rajiv Ranganathan, Xiaobo Tan, Vaibhav Srivastava

Applying a Deep Q-Network for Human Operator Behavioral Modeling and Decision Support in a Twin-Roll Casting Process 599
Jianqi Ruan, Michael Ponder, Ivan Parkes, Wal Blejde, George Chiu, Neera Jain

Safe Policy Design for Controlling Epidemic Spreading Under Heterogeneous Testing Capabilities 607
Pol Mestres, Jorge Cortés

Online Estimation of Bio-Mechanical Properties of a Human Driver Using Dual Adaptive Unscented Kalman Filter 613
Daniel Saraphis, Amir H. Ghasemi

Observer-Based Control Barrier Functions for Safety Critical Systems 619
Yujie Wang, Xiangru Xu

A Variable Frequency Internal Model Controller Inspired by Synchronverter Theory 625
Pietro Lorenzetti, George Weiss

L_1 Adaptive Control Barrier Functions for Nonlinear Underactuated Systems 631
Quan Nguyen, Koushil Sreenath

Spacecraft Attitude Control Using Derivative-Free Purely Adaptive Controller 639
Irene Grace Karot Polson, Dipak Kumar Giri

Fixed-Time Inflection Point Seeking 645
Mohammad Alsuwaidan, Miroslav Krstic

Estimation and Control for Collective Motion with Intermittent Locomotion 651
Anthony A. Thompson, Leela Cañuelas, Derek A. Paley

Asynchronous Approximate Byzantine Consensus Via Multi-Hop Communication 659
Liwei Yuan, Hideaki Ishii

Swarm Intelligence in Cooperative Environments: N-Step Dynamic Tree Search Algorithm Extended Analysis 665
Marc Espinós Longa, Antonios Tsourdos, Gokhan Inalhan

Data-Guided Distributed Intersection Management for Connected and Automated Vehicles 671
Darshan Gadginmath, Pavankumar Tallapragada

On a Notion of Entropy for Reachability Properties 679
Mahendra Singh Tomar, Majid Zamani

Adversarial Multi-Agent Leader-Follower Graphical Game with Local and Global Objectives 685
Yusuf Kartal, Ahmet Taha Koru, Frank L. Lewis, Atilla Dogan

Fixed-Time Seeking and Tracking of Time-Varying Nash Equilibria in Noncooperative Games 692
Jorge I. Poveda, Miroslav Krstic, Tamer Basar

Prescribed-Time Extremum Seeking with Chirpy Probing for PDEs—Part II: Heat PDE 698
Cemal Tugrul Yilmaz, Miroslav Krstic

Integral Concurrent Learning-Based Accelerated Gradient Adaptive Control of Uncertain Euler-Lagrange Systems 704
Duc M. Le, Omkar Sudhir Patil, Patrick M. Amy, Warren E. Dixon

Online Learning-Based Optimal Control of Nonlinear Systems with Finite-Time Convergence Guarantees 710
Nick-Marios T. Kokolakis, Kyriakos G. Vamvoudakis

Identifying the Dynamics of a System by Leveraging Data from Similar Systems 716
Lei Xin, Lintao Ye, George Chiu, Shreyas Sundaram

Navigation with Probabilistic Safety Constraints: A Convex Formulation 723
Joseph Moyalan, Yongxin Chen, Umesh Vaidya

On Singular Perturbation for a Class of Discrete-Time Nonlinear Systems in the Presence of Limit Cycles of Fast Dynamics 729
H. C. Liu, Y. Tan, T. Bacek, M. R. Sun, Z. X. Chen, D. Kulic, D. Oetomo, C. Manzie

Dissipativity Theory for Discrete-Time Nonlinear Stochastic Dynamical Systems, Part II: Kalman-Yakubovich-Popov Conditions and Stability of Feedback Interconnections 736
Wassim M. Haddad, Manuel Lanchares

Discretization and Stabilization of Energy-Based Controller for Period Switching Control and Flexible Scheduling 742
Seyed Amir Tafrishi, Xiaotian Dai, Yasuhisa Hirata, Alan Burns

A Lyapunov-Based Shaking Function for a Class of Non-Bilinear Quantum Systems 748
Jieqiu Shao, Marco M. Nicotra

Output Regulation of Linear Aperiodic Sampled-Data Systems 754
Himadri Basu, Francesco Ferrante, Se Young Yoon

A Class of Hybrid Geometric Controllers for Robust Global Asymptotic Stabilization on S^1 760
Adeel Akhtar, Ricardo G. Sanfelice

Safety Barrier Certificates for Stochastic Hybrid Systems 766
Abolfazl Lavaei, Sadegh Soudjani, Emilio Frazzoli

Data-Assisted Vision-Based Hybrid Control for Robust Stabilization with Obstacle Avoidance Via Learning of Perception Maps 772
Alejandro Murillo-González, Jorge I. Poveda

Stacking Integrators Without Sacrificing the Overshoot in Reset Control Systems 779
Nima Karbasizadeh, S. Hassan Hosseinnia

A Computationally Governed Log-Domain Interior-point Method for Model Predictive Control 786
Jordan Leung, Frank Permenter, Ilya V. Kolmanovsky

Adaptive Robust Model Predictive Control with Matched and Unmatched Uncertainty 792
Rohan Sinha, James Harrison, Spencer M. Richards, Marco Pavone

A Safe Control Architecture Based on Robust Model Predictive Control for Autonomous Driving 800
Maryam Nezami, Ngoc Thinh Nguyen, Georg Männel, Hossam Seddik Abbas, Georg Schildbach

A Fully Parallel Distributed Algorithm for Non-Smooth Convex Optimization with Coupled Constraints: Application to Linear Algebraic Equations 806
S. Sh. Alaviani, A. G. Kelkar, U. Vaidya

On the Noise Amplification of Primal-Dual Gradient Flow Dynamics Based on Proximal Augmented Lagrangian 812
Hesameddin Mohammadi, Mihailo R. Jovanovic

An Update-And-design Scheme for Scenario-based LQR Synthesis 818
Anna Scampicchio, Andrea Iannelli

Online Constrained Bayesian Inference and Learning of Gaussian-Process State-Space Models 826
Karl Berntorp, Marcel Menner

Differential Private Discrete Noise Adding Mechanism: Conditions and Properties 832
Shuying Qin, Jianping He, Chongrong Fang, James Lam

Deep Interacting Multiple Model Filtering 838
Ghananeel Rotithor, Ashwin P. Dani

On the Feedback Law in Stochastic Optimal Nonlinear Control 844
Mohamed Naveed Gul Mohamed, Suman Chakravorty, Raman Goyal, Ran Wang

Approximate Error Feedback Controller for Tracking and Disturbance Rejection for Linear Distributed Parameter Systems 850
E. Aulisa, J. A. Burns, D. S. Gilliam

Cooperative Filtering and Parameter Estimation for Polynomial PDEs Using a Mobile Sensor Network 856
Ziqiao Zhang, Wencen Wu, Fumin Zhang

A Finite-Dimensional Controller for Robust Output Tracking of an Euler–Bernoulli Beam 862
Thavamani Govindaraj, Jukka-Pekka Humaloja, Lassi Paunonen

Fast Nonlinear Model Predictive Control of Distributed Parameter Systems 868
Anastasia Nikolakopoulou, Richard D. Braatz

Prescribed-Time Extremum Seeking with Chirpy Probing for PDEs—Part I: Delay 874
Cemal Tugrul Yilmaz, Miroslav Krstic

Socially Compatible Control Design of Automated Vehicle in Mixed Traffic 880
Mehmet Fatih Ozkan, Yao Ma

Suggestion-Based Fuel Efficient Control of Connected and Automated Vehicles in a Multi-lane Urban Traffic 886
Tinu Vellamattathil Baby, Amir H. Ghasemi, Baisravan Homchaudhuri

A Spatial Data-Driven Vehicle Speed Prediction Framework for Energy Management of HEVs Using Multi-Horizon MPC with Non-uniform Sampling 892
Qiuhao Hu, Mohammad Reza Amini, Ashley Wiese, Mark Tascillo, Julia Buckland Seeds, Ilya Kolmanovsky, Jing Sun

Coordination of Autonomous Vehicles and Dynamic Traffic Rules in Mixed Automated/Manual Traffic 898
Roya Firoozi, Rien Quirynen, Stefano Di Cairano

On-Board Traffic Prediction for Connected Vehicles: Implementation and Experiments on Highways 904
Tamás G. Molnár, Xunbi A. Ji, Sanghoon Oh, Dénes Takács, Michael Hopka, Devesh Upadhyay, Michiel Van Nieuwstadt, Gábor Orosz

Stability Analysis of Nonlinear Inviscid Traffic Flow Models of Bidirectional Cruise Controlled Vehicles 910
Iasson Karafyllis, Dionysios Theodosis, Markos Papageorgiou

Data-Driven Control: Overview and Perspectives 916
Wentao Tang, Prodromos Daoutidis

Advancing Industrial Analytics Using Machine Learning (ML) and Mathematical Optimization 933
Sreekanth Rajagopalan, Shachit Shankaran Iyer

Pack Level State-Of-Power Prediction for Heterogeneous Cells* 934
Chitra Dangwal, Dong Zhang, Luis D. Couto, Preet Gill, Benjamin Sebastien, Wente Zeng, Scott J. Moura

Combined Cell-Level Estimation of State-of-Charge and Temperature in Battery Packs 942
B. A. C. Van De Ven, R. W. H. Sneijders, F. S. J. Hoekstra, H. J. Bergveld, M. C. F. Donkers

State-Of-Health Estimation Pipeline for Li-ion Battery Packs with Heterogeneous Cells 948
Preet Gill, Dong Zhang, Luis D. Couto, Chitra Dangwal, Sebastien Benjamin, Wente Zeng, Scott Moura

Identifiability of Lithium-Ion Battery Electrolyte Dynamics 955
Luis D. Couto, Ross Drummond, Dong Zhang, Toby Kirk, David A. Howey

Parametric Solution for Efficient Li-Ion Battery Charging with Current and SOC Constraints 962
Hamidreza Mirzaei, Qilun Zhu, Robert Prucka

A State-Dependent Riccati Equation-Based Robust Control Approach for Nonlinear Systems with Parametric Uncertainties 970
Rajnish Bhusal, Diganta Bhattacharjee, Kamesh Subbarao

Flexible Spacecraft Model and Robust Control Techniques for Attitude Maneuvers 976
Pierangela Morga, Mauro Mancini, Elisa Capello

Small-Satellite Attitude Control Using Stroke-Limited Vibrating-Mass Actuators with Piecewise Constant Control Signals 983
Roshan A. Chavan, T. M. Seigler, Jesse B. Hoagg

Exponential Stabilization of the Complete Attitude of an Underactuated Spacecraft 989
John Matthew Brewer, Panagiotis Tsiotras

Actuator Fault Recovery in Formation Control of Uncertain Multi-Agent Systems on the Lie Group SE(3) 995
Farzaneh Abdollahi, Robin Chhabra

Approximating the Fractional-Order Element for the Robust Control Framework 1001
Vlad Mihaly, Mircea Susca, Eva H. Dulf, Petru Dobra

Mean-Square Stabilizability Under Unstructured Stochastic Multiplicative Uncertainties: A Mean-Square Small-Gain Perspective 1008
Jianqi Chen, Tian Qi, Yanling Ding, Hui Peng, Jie Chen, Shinji Hara

Tracking Control of UAVs with Uncertainty and Input Constraints 1014
Shihab Ahmed, Wenjie Dong

Minimum Energy-Time Optimal Control of Wheeled Mobile Robots: Application to Parallel Parking 1020
Youngjin Kim, Tarunraj Singh

Moving Target Interception Considering Dynamic Environment 1026
Chendi Qu, Jianping He, Jialun Li, Chongrong Fang, Yilin Mo

LADFN: Learning Actions for Drift-Free Navigation in Highly Dynamic Scenes 1032
Mohd Omama, Sundar Sripada V. S., Sandeep Chinchali, K. Madhava Krishna

Planning for Package Deliveries in Risky Environments Over Multiple Epochs 1040
Blake Wilson, Jeffrey Hudack, Shreyas Sundaram

Probabilistically Safe Mobile Manipulation in an Unmodeled Environment with Automated Feedback Tuning 1046
Tyler Toner, Dawn M. Tilbury, Kira Barton

Minimum Norm Coverage Control of AUVs for Underwater Surveillance with Communication Constraints 1054
Chenggang Wang, Shanying Zhu, Wenbin Yu, Lei Song, Xinping Guan

Coordinated Path Following for a Class of Underactuated Multi-Agent System Using Nested Set Stabilization 1062
Adeel Akhtar

Invariant-EKF Design for Quadcopter Wind Estimation 1068
Hao Chen, He Bai, Clark N. Taylor

Structured Online Learning for Low-Level Control of Quadrotors 1074
Milad Farsi, Jun Liu

An Analytical Study of a Two-Sided Mobility Game 1080
Ioannis Vasileios Chremos, Andreas A. Malikopoulos

The Tension Between Anarchy and Stability in Congestion Games 1086
Rahul Chandan, Dario Paccagnan, Jason R. Marden

Sequential Decomposition of Stochastic Stackelberg Games 1092
Deepanshu Vasal

A Distributed Douglas-Rachford Based Algorithm for Stochastic GNE Seeking with Partial Information 1098
Yuanhanqing Huang, Jianghai Hu

Differential Games Based on Invariant Sets Generation 1105
Bai Xue, Qiuye Wang, Naijun Zhan, Martin Fränzle, Shenghua Feng

Distributed ϵ-Nash Equilibrium Seeking in Aggregative Games with Approximation 1113
Gehui Xu, Guanpu Chen, Hongsheng Qi, Yiguang Hong

Pursuit-Evasion Differential Games of Players with Different Speeds in Spaces of Different Dimensions 1119
Shuai Li, Chen Wang, Guangming Xie

Execution Order Matters in Greedy Algorithms with Limited Information 1125
Rohit Konda, David Grimsman, Jason R. Marden

Koopman-Based Policy Iteration for Robust Optimal Control 1131
Alexander Krolicki, Sarang Sutavani, Umesh Vaidya

Linear Quadratic Mean-Field Games with Communication Constraints 1137
Shubham Aggarwal, Muhammad Aneeq Uz Zaman, Tamer Basar

A Feedback SAIR Model for the Spread of Infectious Disease with Application to COVID-19 Pandemic 1144
Daniel March, Jeston Bond, Gentian Buzi

A High-Gain Observer for Stage-Structured Susceptible-Infectious Epidemic Model with Linear Incidence Rate 1150
D. Bouhadjra, A. Alessandri, P. Bagnerini, A. Zemouche

Threshold-Crossing Time Statistics for Size-dependent Gene Expression in Growing Cells 1155
César Nieto, Khem Raj Ghusinga, César Vargas-García, Abhyudai Singh

Data Driven Modeling and Model Predictive Control of Bioreactor for Production of Monoclonal Antibodies 1161
Samardeep Sarna, Nikesh Patel, Prashant Mhaskar, Brandon Corbett, Chris McCready

Efficient Identification for Modeling High-Dimensional Brain Dynamics 1167
Matthew F. Singh, Michael Wang, Michael W. Cole, Shinung Ching

Control-Oriented Modeling of Bend Propagation in an Octopus Arm 1173
Tixian Wang, Udit Halder, Ekaterina Gribkova, Mattia Gazzola, Prashant G. Mehta

High-Performance Uncertainty Quantification in Large-scale Virtual Clinical Trials of Closed-loop Diabetes Treatment 1181
Asbjørn Thode Reenberg, Tobias K. S. Ritschel, Bernd Dammann, John Bagterp Jørgensen

Robust Set-Point Regulation of Gene Expression Using Resource Competition Couplings in Mammalian Cells 1187
Giansimone Perrino, Guy-Bart Stan

Optimal Bayesian Biomarker Selection for Gene Regulatory Networks Under Regulatory Model Uncertainty 1193
Mahdi Imani, Mohsen Imani, Seyede Fatemeh Ghoreishi

Kinetic Constraints on Noise Reduction in Feedback Gene Regulatory Networks 1200
Tarun Mahajan, Abhyudai Singh, Roy D. Dar

Model Predictive Control Strategies for Optimized mHealth Interventions for Physical Activity 1206
Mohamed El Mistiri, Daniel E. Rivera, Predrag Klasnja, Junghwan Park, Eric Hekler

Detection of Bias Injection Attacks on the Glucose Sensor in the Artificial Pancreas Under Meal Disturbance 1212
Fatih Emre Tosun, André Teixeira, Anders Ahlén, Subhrakanti Dey

Discrete Approximate Information States in Partially Observable Environments 1220
Lujie Yang, Kaiqing Zhang, Alexandre Amice, Yunzhu Li, Russ Tedrake

Applications of System Identification with Sparse Bayesian Regression Discovery of Unmodeled Dynamics of an Airship 1228
Steven Messinger, Mathew Fehl, Simon W Miller, Michael Zugger, Michael Yukish

Determining Dissipativity for Nonlinear Systems from Noisy Data Using Taylor Polynomial Approximation 1234
Tim Martin, Frank Allgöwer

Data-Driven Model Predictive Control for Real-Time Stormwater Management 1240
Jingyun Ning, Benjamin D. Bowes, Jonathan L. Goodall, Madhur Behl

Leader Selection for Strong Structural Controllability in Networks Using Zero Forcing Sets 1246
Waseem Abbas, Mudassir Shabbir, Yasin Yazicioglu, Xenofon Koutsoukos

On the Robust Network Design for MUM-T 1252
Vahid Hamdipoor, Yoonsoo Kim

A Linear Programming Approach to the Minimum Cost Sparsest Input Selection for Structured Systems 1255
Yuan Zhang, Yuanqing Xia, Yufeng Zhan

Learning-Based Sensor Selection with Guaranteed Performance Bounds 1261
Reza Vafaee, Milad Siami

Resilient Average Consensus of Second-Order Multi-Agent Systems 1268
Wenzhe Zheng, Chongrong Fang, Jianping He, Yunfeng Peng

Distributed Partial State Estimation Via Virtual Distributed Observers 1274
Ryo Namerikawa, Toru Namerikawa

A Graph-Theoretic Security Index Based on Undetectability for Cyber-Physical Systems 1280
Lijing Zhai, Kyriakos G. Vamvoudakis, Jérôme Hugues

Learning Monotone Dynamics by Neural Networks 1286
Yu Wang, Qitong Gao, Miroslav Pajic

Fully Decentralized and Federated Low Rank Compressive Sensing 1292
Shana Moothedath, Namrata Vaswani

Chance-Constrained System Identification of Nonlinear Discrete Systems with Safety and Stability Guarantees 1298
Iman Salehi, Tyler Taplin, Ashwin P. Dani

Learning Neural Networks Under Input-Output Specifications 1304
Zain Ul Abdeen, He Yin, Vassilis Kekatos, Ming Jin

Improving Neural Network Robustness Via Persistency of Excitation 1310
Kaustubh Sridhar, Oleg Sokolsky, Insup Lee, James Weimer

Non-Euclidean Contractivity of Recurrent Neural Networks 1316
Alexander Davydov, Anton V. Proskurnikov, Francesco Bullo

Practical Convex Formulations of One-Hidden-layer Neural Network Adversarial Training 1324
Yatong Bai, Tanmay Gautam, Yu Gai, Somayeh Sojoudi

Robust Approximate Simulation for Hierarchical Control of Piecewise Affine Systems Under Bounded Disturbances 1332
Zihao Song, Vince Kurtz, Shirantha Welikala, Panos J. Antsaklis, Hai Lin

Global Asymptotic Stability of Nonlinear Systems While Exploiting Properties of Uncertified Feedback Controllers Via Opportunistic Switching 1338
Paul K. Wintz, Ricardo G. Sanfelice, João P. Hespanha

Risk-Bounded Temporal Logic Control of Continuous-Time Stochastic Systems 1344
Sleiman Safaoui, Lars Lindemann, Iman Shames, Tyler H. Summers

Practical Consensus Tracking of Homogeneous Sampled-Data Multi-agent Systems 1352
Florence Josse, Emmanuel Bernuau, Emmanuel Moulay, Patrick Coirault, Qing Hui, Josh Allen

A Set-Based Approach for Synthesizing Controllers Enforcing ω-Regular Properties Over Uncertain Linear Control Systems 1358
Bingzhuo Zhong, Majid Zamani, Marco Caccamo

Accelerated Simultaneous Perturbation Stochastic Approximation for Tracking Under Unknown-But-Bounded Disturbances 1365
Victoria Erofeeva, Oleg Granichin, Munira Tursunova, Anna Sergeenko, Yuming Jiang

Gradient-Based Optimization for Anti-Windup PID Controls 1371
Christopher T. Aksland, Christopher A. Lupp, Daniel L. Clark, Andrew G. Alleyne

Hierarchical Optimal Control with Information Aggregation for Groups Including Different Numbers of Agents 1378
Kento Fujita, Daisuke Tsubakino

JEM: Joint Entropy Minimization for Active State Estimation with Linear POMDP Costs 1384
Timothy L. Molloy, Girish N. Nair

Semi-Analytic Spacecraft Maneuver Design with Stochastic Constraints 1391
Spencer Boone, Jay McMahon

Passivity-Based Target Tracking Robust to Intermittent Measurements 1397
Michael J. McCourt, Zachary I. Bell, Scott A. Nivison

Embodied Hydrodynamic Sensing and Estimation Using Koopman Modes in an Underwater Environment 1403
Colin Rodwell, Phanindra Tallapragada

Cyber-Physical Secure Observer-Based Corrective Control Under Compromised Sensor Measurements 1409
Dan Wu, Pallavi Bharadwaj, Premila Rowles, Marija Ilic

Optimal Moving Average Estimation of Noisy Random Walks Using Allan Variance-Informed Window Length 1417
Hossein Haeri, Behrad Soleimani, Kshitij Jerath

A Multi-Parametric Method for Active Model Discrimination of Nonlinear Systems with Temporal Logic-Constrained Switching 1423
Ruochen Niu, Syed M. Hassaan, Sze Zheng Yong

A PIE Representation of Coupled Linear 2D PDEs and Stability Analysis Using LPIs 1430
Declan S. Jagt, Matthew M. Peet

Constructive Finite-Dimensional Observer-based Boundary Control of Stochastic Parabolic PDEs 1438
Pengfei Wang, Rami Katz, Emilia Fridman

Inducing Persistence of Excitation Through Sensor Motion in the Adaptive Estimation of Spatial Fields 1444
Michael A. Demetriou

Optimal Observer-Based LQ-Feedback Regulation for Hyperbolic Model of a Countercurrent Heat Exchanger 1450
J. Kadima Kazaku, D. Dochain, M. Mukepe Kahilu, J. Kalenga Kaunde Kasongo

Multi-Stage Perception-aware Chance-constrained MPC with Applications to Automated Driving 1456
Angelo D. Bonzanini, Ali Mesbah, Stefano Di Cairano

A Biquadratic-Lyapunov-Function-based Adaptive Control Methodology with Application to Automated Ground Vehicle Path Tracking 1462
Xingyu Zhou, Zejiang Wang, Heran Shen, Junmin Wang

Self-Scheduled L_1 Robust Vehicular Sideslip Angle Estimation 1468
Xingyu Zhou, Heran Shen, Zejiang Wang, Junmin Wang

Estimation of Three-Dimensional Center of Gravity Relocation for Ground Vehicles with Tire Blowout 1474
Ao Li, Yan Chen, Wen-Chiao Lin, Xinyu Du

Considerate and Cooperative Model Predictive Control for Energy-Efficient Truck Platooning of Heterogeneous Fleets 1480
Tyler Ard, Bibin Pattel, Ardalan Vahidi, Hoseinali Borhan

Event-Triggered Scheduling and Control Co-design for Networked Control Systems with Sub-schedulability 1486
Ningshi Yao, Fumin Zhang

Event-Triggered Adaptive Control of a Parabolic PDE-ODE Cascade 1492
Ji Wang, Miroslav Krstic

Event-Triggered Trajectory Tracking Control of an Underactuated Autonomous Surface Vessel 1498
Pedro Casau, Joel Reis, Carlos Silvestre

Distributed Event-Triggered Control with Local Solution-Predictor Curves for Linear Multiagent Systems..... 1504
Stefan Ristevski, Tansel Yucelen, Jonathan A. Muse

Core-Shell Enhanced Single Particle Model for $LiFePO_4$ Batteries..... 1510
Aki Takahashi, Gabriele Pozzato, Anirudh Allam, Vahid Azimi, Xueyan Li, Donghoon Lee, Johan Ko, Simona Onori

A PDE Model Simplification Framework for All-Solid-State Batteries 1516
Yang Li, Torsten Wik, Yicun Huang, Changfu Zou

Equivalent Circuit Model for High C-Rate Discharge with an External Short Circuit..... 1523
Vivian Tran, Ting Cai, Anna Stefanopoulou, Jason Siegel

Methodology for Accelerated Inter-Cycle Simulations of Li-ion Battery Degradation with Intra-Cycle Resolved Degradation Mechanisms 1529
Sravan Pannala, Valentin Sulzer, Jason B. Siegel, Anna G. Stefanopoulou

A Model Predictive Control Scheme for Fast Charging Via Accurate Quadratic Battery Models..... 1535
Alexander Bills, Mauro Salazar, Dong Zhang, Venkatasubramanian Viswanathan

Maximizing Harvested Energy in Coulomb Force Parametric Generators 1542
Masoud Roudneshin, Kamran Sayrafian, Amir G. Aghdam

Shielded Deep Reinforcement Learning for Multi-Sensor Spacecraft Imaging 1549
Islam Nazmy, Andrew Harris, Morteza Lahijanian, Hanspeter Schaub

Approximate Quantiles for Stochastic Optimal Control of LTI Systems with Arbitrary Disturbances 1555
Shawn Priore, Christopher Petersen, Meeko Oishi

Local Eigenmotion Control for Near Rectilinear Halo Orbits..... 1563
Purnanand Elango, Stefano Di Cairano, Uroš Kalabic, Avishai Weiss

Towards Stable Interstellar Flight: Levitation of a Laser-Propelled Sailcraft 1569
Afroza Shirin, Edl Schamiloglu, Rafael Fierro

Impulsive Spacecraft Formation Control on Quasi-Peroidic Orbits..... 1576
Damennick B. Henry, Daniel J. Scheeres

Distributed and Resilient Planning-Control for Optimal LEO Satellite Constellation Coverage..... 1582
Yuhan Zhao, Quanyan Zhu

Prescribed-Time Stabilization of Controllable Arbitrary Order Systems Using Switched State Feedback..... 1588
Ramón I. Verdés Kairuz, Yury Orlov, Luis T. Aguilar

Polynomial Chaos Approximation of the Quadratic Performance of Uncertain Time-Varying Linear Systems *..... 1594
Luca L. Evangelisti, Harald Pfifer

Model Reduction of Consensus Network Systems Via Selection of Optimal Edge Weights and Nodal Time-Scales 1600
Ralph Sabbagh, Dany Abou Jaoude

A Priori Error Bounds for Model Reduction of Interconnected Linear Systems Using Robust Performance Analysis 1608
Lars Janssen, Bart Besselink, Rob Fey, Mohammad Hossein Abbasi, Nathan Van De Wouw

Equivalent Linear Programming Formulations for Robust Trajectory Planning Under Input Dependent Uncertainties 1614
Oliver Sheridan, Behçet Açikmese

A Necessary Condition for Passive Dynamic Walking 1620
Yasushi Iwatani, Tetsuya Kinugasa

BPOMP: A Bilevel Path Optimization Formulation for Motion Planning 1626
Changhao Wang, Hsien-Chung Lin, Shiyu Jin, Xinghao Zhu, Liting Sun, Masayoshi Tomizuka

Distributed Fuzzy Semi-Infinite Auction Based Optimization for Cooperative Robots Tasks Allocation 1633
Abdelhafid Zenati, Nabil Aouf, Odysseas Kechagias-Stamatis

Quasi-LPV Control Design for a Class of Underactuated Mechanical Systems 1639
Bo Wang, Sergey Nersesov, Hashem Ashrafiuon

Vibration Control of an Overhead Crane with Hoisting Motion Using Input Shaping Technique 1645
Ho Duc Tho, Kazuhiko Terashima, Takanori Miyoshi

Catching Objects with a Robot Arm Using Model Predictive Control 1650
Tobias Gold, Ralf Römer, Andreas Völz, Knut Graichen

Meta Navigation Functions: Adaptive Associations for Coordination of Multi-Agent Systems 1656
Matin Macktoobian, Guillaume Ferdinand Duc

A Comparative Experimental Study of Multi-Tasking Tracking and Interaction Control on a Torque-Controlled Humanoid Robot 1662
Xuwei Wu, Christian Ott, Alexander Dietrich

Experimental and Analytical Prescribed-Time Trajectory Tracking Control of a 7-DOF Robot Manipulator 1670
Alexander Bertino, Peiman Naseradinmousavi, Miroslav Krstic

Transmissibility-Based Fault Detection in Systems with Unknown Time-Varying Parameters 1676
Abdelrahman Khalil, Khaled F. Aljanaideh, Mohammad Al Janaideh

Optimal Platoon Merging and Catch-Up Approach for Connected Electric Vehicles 1681
Zifei Su, Pingen Chen

Friction-Adaptive Stochastic Predictive Control for Trajectory Tracking of Autonomous Vehicles 1687
Sean Vaskov, Rien Quirynen, Marcel Menner, Karl Berntorp

Real-Time Nonlinear MPC Strategy with Full Vehicle Validation for Autonomous Driving 1693
Jean Pierre Allamaa, Petr Listov, Herman Van Der Auweraer, Colin Jones, Tong Duy Son

Generation of Wheel Lockup Attacks on Nonlinear Dynamics of Vehicle Traction 1699
Alireza Mohammadi, Hafiz Malik, Masoud Abbaszadeh

Real-Time On-Ramp Merging Control of Connected and Automated Vehicles Using Pseudospectral Convex Optimization 1705
Yang Shi, Zhenbo Wang, Tim J. Laclair, Chieh Ross Wang, Jinghui Yuan

Real-Time Path-tracking MPC for an Over-Actuated Autonomous Electric Vehicle 1711
Chenhui Lin, Efstathios Siampis, Efstathios Velenis

Power Control Optimization for Autonomous Hybrid Electric Vehicles with Flexible Driveline Torque Demand 1717
Mohammadali Kargar, Xingyong Song

A Numerical Approach for Solving the Inversion Problem for n-Trailer Systems 1723
Julian Dahlmann, Andreas Völz, Tomas Szabo, Knut Graichen

Corridor MPC: Towards Optimal and Safe Trajectory Tracking 1730
P. Roque, W. Shaw Cortez, L. Lindemann, D. V. Dimarogonas

Safe PDE Backstepping QP Control with High Relative Degree CBFs: Stefan Model with Actuator Dynamics 1738
Shumon Koga, Miroslav Krstic

A Mixed-Integer MPC with Polyhedral Potential Field Cost for Obstacle Avoidance 1744
Florin Stoican, Theodor-Gabriel Nicu, Ionela Prodan

Pulse-Based, Periodic MPC for Irrigation in Smart and Sustainable Agriculture 1750
G. B. Cáceres, M. Pereira, P. Millán, D. Lozano

A Real-Time GP Based MPC for Quadcopters with Unknown Disturbances 1756
Niklas Schmid, Jonas Gruner, Hossam S. Abbas, Philipp Rostalski

Sinkhorn MPC: Model Predictive Optimal Transport Over Dynamical Systems 1762
Kaito Ito, Kenji Kashima

Autonomous Wheel Loader Trajectory Tracking Control Using LPV-MPC 1768
Ruitao Song, Zhixian Ye, Liyang Wang, Tianyi He, Liangjun Zhang

A Nonlinear Real-Time Pulse-Pattern MPC Scheme for Power-Electronics Circuits Operating in the Microseconds Range 1775
Benjamin Stickan, Gianluca Frison, Bruno Burger, Moritz Diehl

Reachability-Based Control Synthesis Under Signal Temporal Logic Specifications 1783
Wei Ren, Raphaël Jungers

Sampling-Based Nonlinear MPC of Neural Network Dynamics with Application to Autonomous Vehicle Motion Planning 1789
Iman Askari, Babak Badnava, Thomas Woodruff, Shen Zeng, Huazhen Fang

Efficient Robust Global Optimization for Simulation-Based Problems Using Decomposed Gaussian Processes: Application to MPC Calibration 1796
Akshay Kudva, Farshud Sorouifar, Joel A. Paulson

Optimal Dynamic Regret for Online Convex Optimization with Squared l_2 Norm Switching Cost 1803
Qingsong Liu, Yaoyu Zhang

Reduced SARX Modeling and Control Via Regression Trees 1809
Luis Felipe Florenzan Reyes, Francesco Smarra, Alessandro D'Innocenzo

Youla-REN: Learning Nonlinear Feedback Policies with Robust Stability Guarantees 1815
Ruigang Wang, Ian R. Manchester

Quasi-Newton Iteration in Deterministic Policy Gradient 1823
Arash Bahari Kordabad, Hossein Nejatbakhsh Esfahani, Wenqi Cai, Sébastien Gros

Representation Learning for Context-Dependent Decision-Making 1829
Yuzhen Qin, Tommaso Menara, Samet Oymak, Shinung Ching, Fabio Pasqualetti

Adaptive Gradient Online Control 1835
Deepan Muthirayan, Jianjun Yuan, Pramod P. Khargonekar

Direction-Only Orientation Alignment of Leader-Follower Networks 1841
Quoc Van Tran, Hyo-Sung Ahn, Jinwhan Kim

Heterogeneous Coverage Control with Mobility-Based Operating Regions 1847
Soobum Kim, Magnus Egerstedt

Robust Learning-Based Trajectory Planning for Emerging Mobility Systems 1853
Behdad Chalaki, Andreas A. Malikopoulos

Distributed Cooperative Navigation with Communication Graph Maintenance Using Single-Agent Navigation Fields 1859
Dan P. Guralnik, Peter F. Stiller, Federico M. Zegers, Warren E. Dixon

Distributed Topology-Preserving Collaboration Algorithm Against Inference Attack 1865
Zitong Wang, Yushan Li, Chongrong Fang, Jianping He

Risk of Cascading Failures in Multi-Agent Rendezvous with Communication Time Delay 1871
Guangyi Liu, Vivek Pandey, Christoforos Somarakis, Nader Motee

Large-Scale System Identification Using a Randomized SVD 1877
Han Wang, James Anderson

Data-Driven Resilience Characterization of Control Dynamical Systems 1885
Subhrajit Sinha, Sai Pushpak Nandanoori, Thiagarajan Ramachandran, Craig Bakker, Ankit Singhal

Koopman-Based Differentiable Predictive Control for the Dynamics-Aware Economic Dispatch Problem 1893
Ethan King, Ján Drgona, Aaron Tuor, Shrirang Abhyankar, Craig Bakker, Arnab Bhattacharya, Draguna Vrabie

Distributed Transient Safety Verification Via Robust Control Invariant Sets: A Microgrid Application 1901
Jean-Baptiste Bouvier, Sai Pushpak Nandanoori, Melkior Ornik, Soumya Kundu

Secure Control Regions for Distributed Stochastic Systems with Application to Distributed Energy Resource Dispatch 1907
Joshua Comden, Ahmed S. Zamzam, Andrey Bernstein

Optimization-Based Resiliency Verification in Microgrids Via Maximal Adversarial Set Characterization 1913
Nawaf Nazir, Thiagarajan Ramachandran, Saptarshi Bhattacharya, Ankit Singhal, Soumya Kundu, Veronica Adetola

Control Barrier Functions for Systems with Multiple Control Inputs 1920
Wei Xiao, Christos G. Cassandras, Calin A. Belta, Daniela Rus

Boundary Control of the Kuramoto-Sivashinsky Equation Under Intermittent Data Availability 1926
M. Maghenem, C. Prieur, E. Witrant

High Order Robust Adaptive Control Barrier Functions and Exponentially Stabilizing Adaptive Control Lyapunov Functions 1932
Max H. Cohen, Calin Belta

Duality-Based Convex Optimization for Real-time Obstacle Avoidance Between Polytopes with Control Barrier Functions 1938
Akshay Thirugnanam, Jun Zeng, Koushil Sreenath

Radio Frequency Impedance Matching Based on Control Lyapunov Function 1946
Carlos Rodriguez, Jairo Viola, Joaquin Alvarez, Yangquan Chen

Sufficient Conditions for Robust Probabilistic Reach-Avoid-Stay Specifications Using Stochastic Lyapunov-Barrier Functions 1952
Yiming Meng, Jun Liu

Reachability Set Analysis of Closed-Loop Nonlinear Systems with Neural Network Controllers 1958
Arash Sadeghzadeh, Pierre-Loic Garoche

Flow Control of Wireless Mesh Networks Using LQR and Factor Graphs 1964
Ryan Darnley, Matthew Travers

Feasibility Guaranteed Traffic Merging Control Using Control Barrier Functions 1972
Kaiyuan Xu, Wei Xiao, Christos G. Cassandras

Rope-Assisted Docking Maneuvers for Autonomous Surface Vessels 1978
Sönke Bartels, Simon Helling, Thomas Meurer

Distance-Based Formation Control of Nonlinear Agents Over Planar Directed Graphs 1984
Reza Babazadeh, Rastko R. Selmic

Optimal Resource Scheduling and Allocation in Distributed Computing Systems 1990
Wei Ren, Eleftherios Vlahakis, Nikolaos Athanasopoulos, Raphaël Jungers

Constrained Smoothers for State Estimation of Vapor Compression Cycles 1996
Vedang M. Deshpande, Christopher R. Laughman, Yingbo Ma, Chris Rackauckas

Uncertainty Quantification for the Extended and the Deterministic-Gain Kalman Filters 2004
Shihong Wei, James C. Spall

State and Parameter Estimation in a Semitrailer for Different Loading Conditions Only Based on Trailer Signals 2010
Simon F. G. Ehlers, Zygimantas Ziaukas, Jan-Philipp Kobler, Hans-Georg Jacob

A Secure Communication Protocol with Application to Networked Kalman Filtering 2018
Camilla Fioravanti, Gabriele Oliva, Stefano Panzieri, Christoforos N. Hadjicostis

Distributed Invariant Extended Kalman Filter for 3-D Dynamic State Estimation Using Lie Groups 2024
Jie Xu, Pengxiang Zhu, Wei Ren

Neural Network Optimal Feedback Control with Enhanced Closed Loop Stability 2030
Tenavi Nakamura-Zimmerer, Qi Gong, Wei Kang

Multi-Band Modal Consensus Filters for Parabolic Partial Differential Equations 2036
Michael A. Demetriou

Spill-Free Transfer and Stabilization of Viscous Liquid 2042
Iasson Karafyllis, Miroslav Krstic

Switching Control of Semilinear Vector Reaction-Convection-diffusion PDE..... 2048
Wen Kang, Emilia Fridman, Chuan-Xin Liu

Available Energy-Based Interconnection and Entropy Assignment (ABI-EA) Boundary Control of the Heat Equation: An Irreversible Port Hamiltonian Approach..... 2054
Luis A. Mora, Yann Le Gorrec, Héctor Ramírez

Event-Based Boundary Control of One-phase Stefan Problem: A Static Triggering Approach 2060
Bhathiya Rathnayake, Mamadou Diagne

Driver Assistance Eco-Driving and Transmission Control with Deep Reinforcement Learning 2066
Lindsey Kerbel, Beshah Ayalew, Andrej Ivanco, Keith Loiselle

A Topology Based Virtual Co-Driver for Country Roads..... 2073
Daniel Adelberger, Gunda Singer, Luigi Del Re

Designing the Loss Function of Vehicle Speed Predictors to Enhance Ecological Adaptive Cruise Control Performance 2081
Eunjeong Hyeon, Tulga Ersal, Youngki Kim, Anna G. Stefanopoulou

Cautious Merging Assistant 2087
Amin Assadi, Florian Meier, Luigi Del Re

Terrain Parameter Estimation from Proprioceptive Sensing of the Suspension Dynamics in Off-Road Vehicles..... 2094
Jake Buzhardt, Phanindra Tallapragada

Koopman Model Predictive Control for Eco-Driving of Automated Vehicles 2100
Shobhit Gupta, Daliang Shen, Dominik Karbowski, Aymeric Rousseau

Sustainability and Industry 4.0: Obstacles and Opportunities* 2106
Bhavik R. Bakshi, Joel A. Paulson

Robust Feedback Controller Design Based on Bode's Integrals for General Minimum-Phase Systems..... 2118
Jie Yuan, Yiping Jiao, Zhenlong Wu, Jiali Ma, Shumin Fei, Yichen Ding

Discovery of Alarm Correlations Based on Pattern Mining and Network Analysis 2124
Harikrishna Rao Mohan Rao, Boyuan Zhou, Tongwen Chen, Sirish L. Shah

Controller Switching-Enabled Active Detection of Multiplicative Cyberattacks on Process Control Systems..... 2130
Shilpa Narasimhan, Nael H. El-Farra, Matthew J. Ellis

On-Line Process Physics Tests Via Lyapunov-based Economic Model Predictive Control and Simulation-Based Testing of Image-Based Process Control..... 2136
Henrique Oyama, Akkarakaran Francis Leonard, Minhazur Rahman, Govanni Gjonaj, Michael Williamson, Helen Durand

Application of Economic Model Predictive Control on a Lab Scale Rotomolding Process..... 2142
Aswin Chandrasekar, Abhinav Garg, Hassan A. Abdulhussain, Vladimir Gritsichine, Michael R. Thompson, Prashant Mhaskar

Model Predictive Control of Fiber Deformation in a Batch Pulp Digester 2148
Juyeong Jung, Hyun-Kyu Choi, Sang Hwan Son, Joseph Sang-Il Kwon, Jay H. Lee

Practical Generalized Relative Degree Approach to Sliding Mode Control Design 2154
Robert Jesionowski, Yuri Shtessel, Franck Plestan

Towards Prescribed Accuracy in Under-Tuned Super-Twisting Sliding Mode Control Loops - Experimental Verification 2160
Dimitrios Papageorgiou

Accuracy Improvement of Inertial Measurement Units Via Second Order Sliding Mode Observer and Dynamic Inversion 2166
Yuri Shtessel, Christian Tournes, Allen Spencer, Laddin Montgomery

Adaptive Force Control for Small Celestial Body Sampling 2172
Nima Mohseni, Dennis S. Bernstein, Marco B. Quadrelli

Nonlinear Generalized Predictive Control for Earth-Orbiting Formation-Flying Spacecraft 2178
Divya Rao Ashok Kumar, Steve Ulrich

A Physics-Based Safety Recovery Approach for Fault-Resilient Multi-Quadcopter Coordination 2184
Hamid Emadi, Harshvardhan Uppaluru, Hossein Rastgoftar

Grid-Interactive Electric Vehicle and Building Coordination Using Coupled Distributed Control 2190
Dylan Wald, Kathryn Johnson, Christopher J. Bay, Jennifer King, Rohit Chintala

Comparing Digital Implementations of Torque Control for BLDC Motors with Trapezoidal Back-Emf 2197
Edmundo Pozo Fortunic, Abdalla Swikir, Saeed Abdolsah, Sami Haddadin

Fractional Order SMC Design to Enhance the Dynamic Stability of PV Systems During Unexpected Network Events 2204
Md Nafiz Musarrat, Afef Fekih

Adaptive Model Reduction and State Estimation of Agro-Hydrological Systems 2210
Soumya Ranjan Sahoo, Jinfeng Liu

A Learning-Based Model Predictive Control Framework for Real-Time SIR Epidemic Mitigation 2216
Baike She, Shreyas Sundaram, Philip E. Paré

Data-Driven Learning Control for Building Energy Management 2222
Avisek Naug, Marcos Quinones-Grueiro, Gautam Biswas

Koopman Methods for Estimation of Motion Over Unknown, Regularly Embedded Submanifolds 2229
Nathan Powell, Bowei Liu, Andrew J. Kurdila

Improving Linear Separability of Pulse Wave Laser Additive Manufacturing Classifiers with Rational Feature Engineering and Selection 2237
Alexander J. Summers, Houshang Yin, Ralf D. Fischer, Barton C. Prorok, Xiaoyuan Lou, Q. Peter He

Learning from Demonstrations Under Stochastic Temporal Logic Constraints 2243
Panagiotis Kyriakis, Jyotirmoy V. Deshmukh, Paul Bogdan

Competitive Control with Delayed Imperfect Information 2249
Chenkai Yu, Guanya Shi, Soon-Jo Chung, Yisong Yue, Adam Wierman

Soft Actor-Critic with Integer Actions 2256
Ting-Han Fan, Yubo Wang

Probabilistic Modeling Using Tree Linear Cascades 2262
Nicholas C. Landolfi, Sanjay Lall

Learning-Based Initialization Strategy for Safety of Multi-Vehicle Systems 2268
Jennifer C. Shih, Akshara Rai, Laurent El Ghaoui

Safe Exploration Learning Supported Model Predictive Control of Repetitive Processes 2276
Bruno Morabito, Hoang Hai Nguyen, Janine Matschek, Rolf Findeisen

Optimal Operation and Control of Towing Kites Using Online and Offline Gaussian Process Learning Supported Model Predictive Control 2282
Christina Eckel, Michael Maiworm, Rolf Findeisen

Localized Motion Dynamics Modeling of a Soft Robot: A Data-Driven Adaptive Learning Approach 2289
Xiaotian Chen, Paolo Stegagno, Wei Zeng, Chengzhi Yuan

A Novel Reinforcement Learning-Based Unsupervised Fault Detection for Industrial Manufacturing Systems 2295
Antonio Acernese, Amol Yerudkar, Carmen Del Vecchio

Active Fault-Tolerant Control Integrated with Reinforcement Learning Application to Robotic Manipulator 2301
Zichen Yan, Junbo Tan, Bin Liang, Houde Liu, Jun Yang

Hysteresis-Based RL: Robustifying Reinforcement Learning-based Control Policies Via Hybrid Control 2308
Jan De Priester, Ricardo G. Sanfelice, Nathan Van De Wouw

Impact of Sensor and Actuator Clock Offsets on Reinforcement Learning 2314
Filippos Fotiadis, Aris Kanellopoulos, Kyriakos G. Vamvoudakis, Jérôme Hugues

Reinforcement Learning Based Online Parameter Adaptation for Model Predictive Tracking Control Under Slippery Condition 2320
Huidong Gao, Rui Zhou, Masayoshi Tomizuka, Zhuo Xu

Causal Versus Marginal Shapley Values for Robotic Lever Manipulation Controlled Using Deep Reinforcement Learning 2328
Sindre Benjamin Remman, Inga Strümke, Anastasios M. Lekkas

Reinforcement Learning Approach to Autonomous PID Tuning 2336
Oguzhan Dogru, Kirubakaran Velswamy, Fadi Ibrahim, Yuqi Wu, Arun Senthil Sundaramoorthy, Biao Huang, Shu Xu, Mark Nixon, Noel Bell

A Probabilistic Perspective on Risk-Sensitive Reinforcement Learning 2342
Erfaun Noorani, John S. Baras

Embracing Risk in Reinforcement Learning: The Connection Between Risk-Sensitive Exponential and Distributionally Robust Criteria 2348
Erfaun Noorani, John S. Baras

Intermittent Reinforcement Learning with Sparse Rewards 2354
Prachi Pratyusha Sahoo, Kyriakos G. Vamvoudakis

Stability Constrained Reinforcement Learning for Real-Time Voltage Control 2360
Yuanyuan Shi, Guannan Qu, Steven Low, Anima Anandkumar, Adam Wierman

A Reinforcement Learning-Based Adaptive Time-Delay Control and Its Application to Robot Manipulators 2367
Seungmin Baek, Jongchan Baek, Jinsuk Choi, Soohee Han

Input Influence Matrix Design for MIMO Discrete-Time Ultra-Local Model 2375
Sangli Teng, Amit K. Sanyal, Ram Vasudevan, Anthony Bloch, Maani Ghaffari

Learning the Koopman Eigendecomposition: A Diffeomorphic Approach 2381
Petar Bevanda, Johannes Kirmayr, Stefan Sosnowski, Sandra Hirche

Learning Stable Koopman Embeddings 2387
Fletcher Fan, Bowen Yi, David Rye, Guodong Shi, Ian R. Manchester

Control and Uncertainty Propagation in the Presence of Outliers by Utilizing Student-T Process Regression 2393
Dimitris Papadimitriou, Somayeh Sojoudi

Variational Message Passing for Online Polynomial NARMAX Identification 2400
Wouterm. Kouw, Albert Podusenko, Magnust. Koudahl, Maarten Schoukens

Collaborative Multi-Agent Stochastic Linear Bandits 2406
Ahmadreza Moradipari, Mohammad Ghavamzadeh, Mahnoosh Alizadeh

RCP: A Temporal Clustering Algorithm for Real-Time Controller Placement in Mobile SDN Systems 2412
Reza Soleymanifar, Carolyn Beck

Resilient Approximation-Based Distributed Nonconvex Optimization 2418
Yilin Zhang, Zhiyu He, Jianping He

Distributed Continuous-Time Optimization for Networked Lagrangian Systems with Time-Varying Cost Functions Under Fixed Graphs 2424
Yong Ding, Hanlei Wang, Wei Ren

A Modified Gradient Flow for Distributed Convex Optimization on Directed Networks 2430
Mohammad Jahvani, Martin Guay

Distributed Optimization Over Time-Varying Networks: Imperfect Information with Feedback is as Good as Perfect Information 2436
Hadi Reisizadeh, Behrouz Touri, Soheil Mohajer

Data-Driven Safe Predictive Control Using Spatial Temporal Filter-based Function Approximators 2442
Amin Vahidi-Moghaddam, Kaian Chen, Zhaojian Li, Yan Wang, Kai Wu

Machine-Learning-based Predictive Control of Nonlinear Processes with Uncertainty 2449
Zhe Wu, Aisha Alnajdi, Quanquan Gu, Panagiotis D. Christofides

Nonlinear Model Predictive Control for Thermal Management of Bio-Implants 2456
Ayca Ermis, Yen-Pang Lai, Ying Zhang

A Control Barrier Function Perspective on Lyapunov-Based Economic Model Predictive Control 2462
Helen Durand, Aaron D. Ames

Exact Multiple-Step Predictions in Gaussian Process-based Model Predictive Control: Observations, Possibilities, and Challenges 2468
Maik Pfefferkorn, Michael Maiworm, Rolf Findeisen

On the Dynamics of Interacting Agents on an Ising Lattice 2476
Arash Komaee

Balancing Detectability and Performance of Attacks on the Control Channel of Markov Decision Processes 2482
Alessio Russo, Alexandre Proutiere

Convergence and Optimality of Policy Gradient Primal-Dual Method for Constrained Markov Decision Processes 2490
Dongsheng Ding, Kaiqing Zhang, Tamer Basar, Mihailo R. Jovanovic

CVaR-Based Safety Analysis in the Infinite Time Horizon Setting 2496
Chuanning Wei, Michael Fauß, Margaret P. Chapman

Certainty Equivalent Quadratic Control for Markov Jump Systems 2504
Yahya Sattar, Zhe Du, Davoud Ataee Tarzanagh, Samet Oymak, Laura Balzano, Necmiye Ozay

Model-Free Multi-Objective Iterative Learning Control for Selective Laser Melting 2512
Uduak Inyang-Udoh, Ruixiong Hu, Sandipan Mishra, John Wen, Antoinette Maniatty

Spatial Transformation of a Layer-To-Layer Control Model for Selective Laser Melting 2519
Xin Wang, Robert G. Landers, Douglas A. Bristow

Sample Efficient Transfer in Reinforcement Learning for High Variable Cost Environments with an Inaccurate Source Reward Model 2525
Md Ferdous Alam, Max Shtein, Kira Barton, David J. Hoelzle

Learning-Based State-dependent Coefficient Form Task Space Tracking Control of Soft Robot 2532
Rounak Bhattacharya, Ghananeel Rotithor, Ashwin P. Dani

Shape Estimation of Soft Manipulators Using Piecewise Continuous Pythagorean-Hodograph Curves 2538
Harish Bezawada, Cole Woods, Vishesh Vikas

Modeling and Simulation of Soft Robots Driven by Embedded Artificial Muscles: An Example Using Twisted-And-Coiled Actuators 2544
Jiefeng Sun, Jianguo Zhao

Feature Learning for Optimal Control with B-Spline Representations 2550
Vinay Kenny, Sixiong You, Chaoying Pei, Ran Dai

Minimum Robust Invariant Sets and Kalman Filtering in Cyber Attacking and Defending 2557
Dorijan Leko, Mario Vašak

Optimization Landscape of Gradient Descent for Discrete-Time Static Output Feedback 2565
Jingliang Duan, Jie Li, Shengbo Eben Li, Lin Zhao

Minimum-Time and Minimum-Fuel Low-Thrust Trajectory Design for Satellite Formation in Low-Earth Orbits 2571
Samuel Sowell, Ehsan Taheri

Time-Optimal Paths for Simple Cars with Moving Obstacles in the Hamilton-Jacobi Formulation 2577
Christian Parkinson, Madeline Ceccia

Control-Theoretic, Recursive Smoothing Splines 2583
Magnus Egerstedt, Clyde Martin

Observer-Based Synthesis of Finite Horizon Linear Time-Varying Controllers..... 2589
Felix Biertümpfel, Julian Theis, Harald Pfifer

Networked Filtering with Feedback for Continuous-Time Observations..... 2595
Zhenyu Liu, Andrea Conti, Sanjoy K. Mitter, Moe Z. Win

Interval Observer Synthesis for Locally Lipschitz Nonlinear Dynamical Systems Via Mixed-Monotone Decompositions 2603
Mohammad Khajenejad, Fatima Shoaib, Sze Zheng Yong

Controller Confidentiality for Nonlinear Systems Under Sensor Attacks 2609
Michelle S. Chong

On the Existence of Robust Functional KKL Observers 2615
Mario Spirito, Pauline Bernard, Lorenzo Marconi

Stability Under State Estimate Feedback Using an Observer Characterized by Uniform Semi-Global Practical Asymptotic Stability 2621
Ying-Chun Chen, Craig Woolsey

Limitations of Time-Delayed Case Isolation in Heterogeneous SIR Models..... 2627
Jonas Hansson, Alain Govaert, Richard Pates, Emma Tegling, Kristian Soltesz

Estimating the Impact of Peritoneal Perfluorocarbon Perfusion on Carbon Dioxide Transport Dynamics in a Laboratory Animal 2633
Mahsa Doosthosseini, Yejin Moon, Annina Commins, Sam Wood, Warren Naselsky, Melissa J. Culligan, Kevin Aroom, Majid Aroom, Akash Shah, Gregory J. Bittle, Chandrasekhar Thamire, Nadia Zaleski, Catherine Fang, Joseph O'Leary, Grace Hopkins, Joseph S. Friedberg, Jin-Oh Hahn, Hosam K. Fathy

The Differential-Algebraic Windkessel Model with Power as Input 2639
Henry Pigot, Kristian Soltesz

Invariant Extended Kalman Filtering for Human Motion Estimation with Imperfect Sensor Placement 2645
Zenan Zhu, Seyed Mostafa Rezayat Sorkhabadi, Yan Gu, Wenlong Zhang

Concurrent Learning Control for Treadmill Walking Using a Cable-Driven Exoskeleton with FES 2652
Jonathan Casas, Chen-Hao Chang, Victor H. Duenas

A Comparison of Neural Network-Based Strategies for Diesel Engine Air Handling Control..... 2658
Qian Peng, Da Huo, Carrie M. Hall

Borderline Knock Prediction Using Machine Learned Kriging Model..... 2665
Jian Tang, Anuj Pal, Wen Dai, Chad Archer, James Yi, Guoming Zhu

A Computationally Efficient Control Allocation Method for Four-Wheel-Drive and Four-Wheel-Independent-Steering Electric Vehicles 2671
Melih Cakmakci, Muhammed Kemal Koysuren

Efficiency-Aware and Constraint-Aware Control of PEMFC Air-Path Using a Reference Governor and MIMO Internal Model Controller 2677
Eli Bacher-Chong, Mostafa Ali Ayubirad, Zeng Qiu, Hao Wang, Alireza Goshtasbi, Hamid R. Ossareh

Development of a Model Predictive Airpath Controller for a Diesel Engine on a High-Fidelity Engine Model with Transient Thermal Dynamics 2685
Jiadi Zhang, Mohammad Reza Amini, Ilya Kolmanovsky, Munechika Tsutsumi, Hayato Nakada

Drive Mode Control with a Catalyst Temperature Model for Fuel and Emissions Reduction in Plug-In Hybrid Electric Vehicles 2691
Ryunosuke Watanabe, Koju Nishimoto, Tatsuya Ibuki, Yoshihiro Sakayanagi, Riku Funada, Mitsuji Sampei

Managerial Decision Making as an Application for Control Science and Engineering 2698
Tariq Samad, Daniel Y. Abramovitch, Michael Lees, Iven Mareels, R. Russell Rhinehart, Francesco Cuzzola, Benny Grosman, Oleg Gusikhin, Esko Juuso, Bhagyesh V. Patil, Stefan Pickl

Network Control System Applications for Manager Decision-Making 2709
Michael Lees

Using Feedback Control Principles as Guiding Metaphors for Business Processes 2715
Daniel Y. Abramovitch

Bang-Bang Control of Spherical Variable-Shape Buoy Wave Energy Converters 2721
Mohamed A. Shabara, Ossama Abdelkhalik

Optimal Constrained Control of Wave Energy Converter Arrays 2727
Habeebullah Abdulkadir, Ossama Abdelkhalik

Integrated Path Planning and Tracking Control of Marine Current Turbine in Uncertain Ocean Environments 2733
Arezoo Hasankhani, Tugrul Baris Ondes, Yufei Tang, Cornel Sultan, James Van Zwieten

Sensor Fusion Observer Design and Experimental Validation for an Underwater Kite 2741
Zak Leonard, Samuel Bryant, Kartik Naik, Andrew Abney, Dillon Herbert, Hosam Fathy, Kenneth Granlund, Andre Mazzoleni, Matthew Bryant, Chris Vermillion

Initial Alignment and Position Aiding Time Delay Compensation for SDINS of Deep Sea Underwater Vehicles 2747
Ji-Hong Li, Min-Gyu Kim, Hyungjoo Kang, Mun-Jik Lee, Gun Rae Cho, Suktae Kang

Vehicle Overtaking in a Bidirectional Mixed-Traffic Setting 2753
Faizan M. Tariq, Nilesh Suriyarachchi, Christos Mavridis, John S. Baras

Design and Optimization of a Parallel Micro-Hybrid Vehicle with Lean-Burn Gasoline Engine and Passive SCR System 2761
Sachin Joshi, Pingen Chen

Congestion-Aware Routing, Rebalancing, and Charging Scheduling for Electric Autonomous Mobility-on-Demand System 2767
Heeseung Bang, Andreas A. Malikopoulos

Achieving Automated Vehicle Path Following with Blend Path Curvature Control 2773
Jimmy Z. Y. Lu, Ashraf Abualfellat, Reza Zarringhalam

Singular Perturbation Margin Assessment for LTI System with Zero Dynamics 2779
Yuanyan Chen, Jim J. Zhu

Force Curves Restoration in Atomic Force Microscopy (AFM) Resonant Modes 2787
Sergey Belikov

LPV Sequential Loop Closing for High-Precision Motion Systems 2793
Yorick Broens, Hans Butler, Roland Tóth

A Design Framework with Embedded Hierarchical Control Architecture Optimization 2799
Donald J. Docimo

Modeling Small-Target Motion Detector Neurons as Switched Systems with Dwell Time Constraints 2807
Md Arif Billah, Imraan A. Faruque

Predictive Cost Adaptive Control of Flexible Structures with Harmonic and Broadband Disturbances 2813
Nima Mohseni, Dennis S. Bernstein

Adaptive Neural Network Based Monitoring of Wastewater Treatment Plants 2819
Mohammed S. Alharbi, Pei-Ying Hong, Taous-Meriem Laleg Kirati

Learning-Based Wildfire Tracking with Unmanned Aerial Vehicles 2827
Qiong Jia, Ming Xin, Xiaolin Hu, Haiyang Chao

Physics-Based Neural Networks for Modeling & Control of Aerial Vehicles 2833
Bennett Breese, Manish Kumar, Michael Bolender, David W. Casbeer

Metrics-Only Training Neural Network for Switching Among an Array of Feedback Controllers for Bicycle Model Navigation 2839
Marco A. Carmona, Dejan Milutinovic, Aleksandra Faust

Fast Assignment in Asset-Guarding Engagements Using Function Approximation 2845
Neelay Junnarkar, Emmanuel Sin, Peter Seiler, Douglas Philbrick, Murat Arcak

Deep Joint Transfer Network for Intelligent Fault Diagnosis Under Different Working Conditions 2851
Zhiheng Su, Jiyang Zhang, Jianxiong Tang, Yang Chang, Jianxiao Zou, Shicai Fan

Approximate Bisimulation Relations for Neural Networks and Application to Assured Neural Network Compression 2857
Weiming Xiang, Zhongzhu Shao

A Model-Free Tracking Controller Based on the Newton-Raphson Method and Feedforward Neural Networks 2863
K. Niu, Y. Wardi, C. T. Abdallah, M. Hayajneh

Learning-Based Adaptive-Scenario-Tree Model Predictive Control with Probabilistic Safety Guarantees Using Bayesian Neural Networks 2869
Yajie Bao, Kimberly J. Chan, Ali Mesbah, Javad Mohammadpour Velni

Robust Data-Driven Passivity-Based Control of Underactuated Systems Via Neural Approximators and Bayesian Inference 2875
Wankun Sirichotiyakul, Nardos Ayele Ashenafi, Aykut C. Satici

Distributed Cooperative Multi-Agent Reinforcement Learning with Directed Coordination Graph 2882
Gangshan Jing, He Bai, Jemin George, Aranya Chakrabortty, Piyush. K. Sharma

Model-Free Predictive Optimal Iterative Learning Control Using Reinforcement Learning 2888
Yueqing Zhang, Bing Chu, Zhan Shu

Event-Triggered Action-Delayed Reinforcement Learning Control of a Mixed Autonomy Signalised Urban Intersection 2894
Erica Salvato, Arnob Ghosh, Gianfranco Fenu, Thomas Parisini

Deep Reinforcement Learning Based Automatic Control in Semi-Closed Greenhouse Systems 2900
Akshay Ajagekar, Fengqi You

A Multi-Agent Deep Reinforcement Learning Coordination Framework for Connected and Automated Vehicles at Merging Roadways 2906
Sai Krishna Sumanth Nakka, Behdad Chalaki, Andreas A. Malikopoulos

Computationally Efficient Safe Reinforcement Learning for Power Systems 2912
Daniel Tabas, Baosen Zhang

Provably Efficient Multi-Agent Reinforcement Learning with Fully Decentralized Communication 2920
Justin Lidard, Udari Madhushani, Naomi Ehrich Leonard

Convex Programs and Lyapunov Functions for Reinforcement Learning: A Unified Perspective on the Analysis of Value-Based Methods 2926
Xingang Guo, Bin Hu

Singular Perturbation-Based Reinforcement Learning of Two-Point Boundary Optimal Control Systems 2932
Vasanth Reddy, Hoda Eldardiry, Almuatazbellah Boker

Reinforcement Learning for Optimal Control of a District Cooling Energy Plant 2938
Zhong Guo, Austin R. Coffman, Prabir Barooah

Model-Free μ Synthesis Via Adversarial Reinforcement Learning 2944
Darioush Keivan, Aaron Havens, Peter Seiler, Geir Dullerud, Bin Hu

Reinforcement Learning-Based Event-Triggered Model Predictive Control for Autonomous Vehicle Path Following 2951
Jun Chen, Xiangyu Meng, Zhaojian Li

Networked Competitive Multi-Virus SIR Model 2957
Ciyuan Zhang, Sebin Gracy, Tamer Basar, Philip E. Paré

Robust Fault Detection and Safety Control for Physical Human-Robot Interaction 2958
Binghan He, Takashi Tanaka

Feedforward of Sampled-Data System for High-Precision Motion Control Using Basis Functions with ZOH Differentiator 2959
Masahiro Mae, Max Van Haren, Wataru Ohnishi, Tom Oomen, Hiroshi Fujimoto

Decentralized Safe Reinforcement Learning for Voltage Control 2960
Wenqi Cui, Jiayi Li, Baosen Zhang

Hemodynamic Monitoring Via Model-Based Extended Kalman Filtering: Hemorrhage Resuscitation and Sedation Case Study 2961
Weidi Yin, Ali Tivay, Jin-Oh Hahn

Experimental Results of a Disturbance Compensating Q-Learning Controller for HVAC Systems 2962
Syed Ali Asad Rizvi, Amanda J Pertzborn

Optimal Abstraction-Based Control with Local Affine Controllers 2963
Lucas N. Egidio, Thiago Alves Lima, Raphaël Jungers

Gaussian Processes for Advanced Motion Control 2964
Maurice Poot, Jim Portegies, Noud Mooren, Max Van Haren, Max Van Meer, Tom Oomen

A Non-Causal Approach for Suppressing the Estimation Delay of State Observer 2965
Kentaro Tsurumoto, Wataru Ohnishi, Takafumi Kosecki Nard Strijbosch, Tom Oomen

Perfect Tracking Control of Output Voltage Based on Noncausal Nonlnear Stable Inversion for Boost Converters 2966
Shota Miyoshi, Wataru Ohnishi, Takafumi Koseki, Motoki Sato

Robust Controller Design Based on Convex Optimization and RCBode Plots Using Frequency Response Data: Application to Hard Disk Drive Systems 2967
Xiaoke Wang, Wataru Ohnishi, Takenori Atsumi

Model-Based Non-Invasive Hemorrhage Detection: Observer-Based and Parameter Estimation-Based Approaches 2968
Yekanth Ram Chalumuru, Xin Jin, Ali Tivay, Jin-Oh Hahn

Kalman Estimation Based One-Step Look Ahead Control of Data-driven Model with Random Parameters 2969
Jie Wang, George T.-C. Chiu

Modeling and Learning-Based Control for Super-Coiled Polymer-Driven Robotic Eye 2970
Sunil Kumar Rajendran, Qi Wei, Ningshi Yao, Feitian Zhang

Communication Obfuscation for Privacy and Utility Against Obfuscation-Aware Eavesdroppers 2971
Andrew Wintenberg Stephane Lafortune Neemiye Ozay

Evaluation of Cognitive State Feedback for Accelerating Human Learning 2972
Madeleine Yuh, Sooyung Byeon, Neera Jain, Inseok Hwang

Real-Sim: A Multi-resolution X-in-the-loop Experimental Approach for Testing Connected and Automated Vehicles 2973
Yunli Shao, Adian Cook, Nolan Perry, Dean Deter, Chieh Ross Wang

Agile Locomotion and Backflip Demonstrations on Mini Cheetah 2974
Ziyi Zhou, Nathan Boyd, Vishwa Ramkumar, Max Asselmeier, Ye Zhao

System Response Experiments with a Simple, Portable Guitar String Platform 2975
A. A. Ferri, B. H. Ferri

Multi-Robot Collaboration with Heterogeneous Capabilities 2976
Yunhai Han, Nathan Boyd, Xinpei Ni, Ye Zhao

3D Printed Laboratory Equipment for Mechanical Vibrations and Control Theory Courses 2977
Zihao Song

Model-Reference Adaptive Control with High-order Parameter Tuners 2978
Ramon R. Costa

New Algorithms for Discrete-Time Parameter Estimation 2984
Yingnan Cui, Joseph E. Gaudio, Anuradha M. Annaswamy

Collaborative Persistent Excitation in RKHS Embedded Adaptive Estimation with Consensus 2990
Jia Guo, Fumin Zhang, Andrew J. Kurdila

Reduced-Order Adaptive Output Predictors for a Class of Uncertain Dynamical Systems 2996
Roghaiyeh Ansari, Nicole Abaid, Alexander Leonessa

An Adaptive Formation Control Architecture for a Team of Quadrotors with Performance and Safety Constraints..... 3002
Zhongjun Hu, Xu Jin

Multi-Agent Stochastic Control Using Path Integral Policy Improvement 3008
Peter Varnai, Dimos V. Dimarogonas

Scalable Average Consensus with Compressed Communications 3014
Mohammad Taha Toghani, César A. Uribe

Resilient Constrained Consensus Over Complete Graphs Via Feasibility Redundancy 3020
Jingxuan Zhu, Yixuan Lin, Alvaro Velasquez, Ji Liu

Decentralized Control of Two Agents with Nested Accessible Information..... 3025
Aditya Dave, Nishanth Venkatesh, Andreas A. Malikopoulos

Subframework-Based Rigidity Control in Multirobot Networks 3033
Juan F. Presenza, J. Ignacio Alvarez-Hamelin, Ignacio Mas, Juan I. Giribet

On Decentralized Minimax Control with Nested Subsystems 3039
Aditya Dave, Nishanth Venkatesh, Andreas A. Malikopoulos

Feedback Interconnected Mean-Field Density Estimation and Control 3047
Tongjia Zheng, Qing Han, Hai Lin

Adaptive NN-Based Boundary Control for Output Tracking of a Wave Equation with Matched and Unmatched Boundary Uncertainties..... 3053
Jingting Zhang, Paolo Stegagno, Wei Zeng, Chengzhi Yuan

Estimating Drill String Friction with Model-Based and Data-Driven Methods 3060
Jean Auriol, Roman Shor, Silviu-Iulian Niculescu, Nasser Kazemi

Packed Bed Reactor Output Regulation 3066
Guilherme Ozorio Cassol, Stevan Dubljevic

Setpoint Tracking of Exponentially Stable Linear Hyperbolic Systems Using Model Predictive Control..... 3072
Jukka-Pekka Humaloja, Stevan Dubljevic

Sampling Complexity of Path Integral Methods for Trajectory Optimization 3078
Hyung-Jin Yoon, Chuyuan Tao, Hunmin Kim, Naira Hovakimyan, Petros Voulgaris

Control Barrier Function Augmentation in Sampling-Based Control Algorithm for Sample Efficiency 3084
Chuyuan Tao, Hunmin Kim, Hyungjin Yoon, Naira Hovakimyan, Petros Voulgaris

Optimal Finite Time Control for Discrete-Time Stochastic Dynamical Systems..... 3090
Junsoo Lee, Wassim M. Haddad, Manuel Lanchares

Nonlinear-Nonquadratic Optimal and Inverse Optimal Control for Discrete-Time Stochastic Dynamical Systems 3096
Manuel Lanchares, Wassim M. Haddad

Economic Nonlinear Model Predictive Control of Offshore Vertical-Axis Wind Turbines∗ 3102
Yejun Lao, Mario A. Rotea, Justin P. Koeln, Mohammad S. Sakib, D. Todd Griffith

Combined Low-Bandwidth Platform Actuation and Floating Feedback Control for an Offshore Wind Turbine with an Ultraflexible Substructure 3110
Elenya Grant, Kathryn Johnson, Rick Damiani, David Stockhouse, James Dinius, Mandar Phadnis, Lucy Pao

Control of a Floating Wind Turbine on a Novel Actuated Platform 3116
David Stockhouse, Mandar Phadnis, Elenya Grant, Kathryn Johnson, Rick Damiani, Lucy Pao

On the Severity of Wind Turbine Generator Speed Peaks in Response to Particular Gusts 3122
Mandar Phadnis, Lucy Pao

Investigation on the Wind Preview Quality for Lidar-Assisted Wind Turbine Control Under Wake Conditions 3128
Feng Guo, David Schlipf, Zhaoyu Zhang, Po Wen Cheng

IRiSC: Iterative Risk Sensitive Control for Nonlinear Systems with Imperfect Observations 3134
Bilal Hammoud, Armand Jordana, Ludovic Righetti

Time-Optimal Control of Cranes Subject to Container Height Constraints 3142
Filipe Marques Barbosa, Johan Löfberg

Output-Feedback System Level Synthesis Via Dynamic Programming 3148
Lauren E. Conger, Shih-Hao Tseng

Guided Policy Search Using Sequential Convex Programming for Initialization of Trajectory Optimization Algorithms 3156
Taewan Kim, Purnanand Elango, Danylo Malyuta, Behçet Açikmese

Efficient Riccati Recursion for Optimal Control Problems with Pure-State Equality Constraints 3163
Sotaro Katayama, Toshiyuki Ohtsuka

Statistical Active-Sensing Structural Health Monitoring Via Stochastic Time-Varying Time Series Models 3171
Shabbir Ahmed, Fotis Kopsaftopoulos

A Learning Observer Approach for Fouling Detection and Localization in Direct Contact Membrane Distillation Systems 3179
Tania Camelia Touati, Yasmine Marani, Messaoud Chakir, Taous Meriem Laleg-Kirati

Computation of Minimal Detectable Fault Under Hybrid Stochastic and Deterministic Framework 3186
Junbo Tan, Huailiang Zheng, Xueqian Wang, Bin Liang, Wenming Yang

Prediction and Isolation of Process Faults Using Operable Adaptive Sparse Identification of Systems (OASIS) and Contribution Plots 3192
Bhavana Bhadriraju, Joseph Sang-Il Kwon, Faisal Khan

Multi-Stage Sparse Resource Allocation for Control of Spreading Processes Over Networks 3198
Vera L. J. Somers, Ian R. Manchester

Minimizing the Infected Peak Utilizing a Single Lockdown: A Technical Result Regarding Equal Peaks 3206
James M. Greene, Eduardo D. Sontag

Modeling Presymptomatic Spread in Epidemics Via Mean-Field Games 3214
S. Yagiz Olmez, Shubham Aggarwal, Jin Won Kim, Erik Miehling, Tamer Basar, Matthew West, Prashant G. Mehta

The Impact of Vaccine Hesitancy on Epidemic Spreading 3222
C. H. Leung, María E. Gibbs, Philip E. Paré

Epidemic Propagation Under Evolutionary Behavioral Dynamics: Stability and Bifurcation Analysis 3228
Abhisek Satapathi, Narendra Kumar Dhar, Ashish R. Hota, Vaibhav Srivastava

Stability and Robustness Analysis of Epidemic Networks with Multiple Time-Delays 3234
Atefe Darabi, Milad Siami

Coverage-Maximizing Solar-Powered Autonomous Surface Vehicle Control for Persistent Gulf Stream Observation 3241
Kavin Govindarajan, Ben Haydon, Kirti Mishra, Chris Vermillion

Resilience and Energy-Awareness in Constraint-Driven-Controlled Multi-Robot Systems 3248
Gennaro Notomista

Convex Optimization for Spring Design of Parallel Elastic Actuators 3254
Sicong Guo, Robert D. Gregg, Edgar Bolívar-Nieto

Exploration Vs. Exploitation in Airborne Wind Energy Systems Via Information-Directed Sampling Control 3261
Guillaume Goujard, Patrick Keyantuo, Mathilde Badoual, Scott J. Moura

Experiments in Robotic Self-Repair: A 3D Printer Repairs Its Own Timing Pulley 3268
Renzo Caballero, Eric Feron

Distributed Feedback Optimisation for Robotic Coordination 3276
Antonio Terpin, Sylvain Fricker, Michel Perez, Mathias Hudoba De Badyn, Florian Dörfler

Universal Hybrid Modeling of Batch Kinetics of Aerobic Carotenoid Production Using Saccharomyces Cerevisiae 3282
Mohammed Saad Faizan Bangi, Joseph Sang-Il Kwon

Robust Unit Commitment Optimization Under Volatile Wind Power Outputs Assisted by Clustering-Based Data-Driven Techniques 3288
Ning Zhao, Fengqi You

How Attacks Affect Detectability in Discrete-Event Systems? 3294
Kuize Zhang

Reduced Complexity Verification of Almost-Infinite-Step Opacity in Stochastic Discrete-Event Systems* 3300
Rongjian Liu, Jianquan Lu, Christoforos N. Hadjicostis

Secret Protections in Discrete-Event Systems with Minimum Costs 3306
Jiagang Jiang, Ziyue Ma, Kai Cai

Reliable Diagnosability for Decentralized Diagnosis of Discrete Event Systems with Single-Level Inference 3312
Takumi Hamada, Shigemasa Takai

On the Verification of Detectability for Timed Systems 3318
Weijie Dong, Xiang Yin, Kuize Zhang, Shaoyuan Li

Distribution of Real and Imaginary Zeros of Multi-DoF Undamped Flexible Systems 3325
Siddharth Rath, Arunav Maheshwari, Shorya Awtar

Velocity Constrained Time-Optimal Control of a Gantry Crane System 3332
Adrian Stein, Tarunraj Singh

Target Tracking with Frame- And Event-based Cameras Involving Delayed and Irregularly-Sampled Visual Feedback for a Robotic Air-Hockey System 3337
Hui Xiao, Xu Chen

Vibration-Based Condition Monitoring in Wind Turbine Gearbox Using Convolutional Neural Network 3343
Abdelrahman Amin, Amin Bibo, Meghashyam Panyam, Phanindra Tallapragada

Adaptive Feedforward Reference Design for Active Vibration Rejection in Multi-Actuator Hard Disk Drives 3349
Zhi Chen, Nikhil Potu Surya Prakash, Roberto Horowitz

A Heat Exchanger Simulator for Testing and Demonstrating Automation Algorithms 3355
R. Russell Rhinehart

Switched Systems with Transient Unsustainable Modes 3361
Richard Hall, Leila Bridgeman

State Dependent Switching Control of Affine Linear Systems with Dwell Time: Application to Power Converters 3367
Antonio Russo, Gian Paolo Incremona, Alberto Cavallo, Patrizio Colaneri

Control Barrier Function Meets Interval Analysis: Safety-Critical Control with Measurement and Actuation Uncertainties 3374
Yuhao Zhang, Sequoyah Walters, Xiangru Xu

Trade-Offs in Sampled-data Control: A DC-DC Buck Converter Example 3380
Aratrik Sarkar, Brent Wallace, Armando A. Rodriguez

Finite-Time Model-Based Event-Triggered Implementation of Hybrid Controllers 3386
Zhu Xuan-Zhi, Pedro Casau, Carlos Silvestre

Adaptive Image-Based Visual Servoing with Time-varying Learning Rates for Uncertain Robot Manipulators 3392
Jonathan Fried, Fernando Lizarralde, Antonio C. Leite

Distributed Cooperative Control from Position Motion to Interaction Synchronization 3398
Zhenlei Chen, Qing Guo, Yan Shi, Yao Yan

Model-Based 6D Visual Object Tracking with Impact Collision Models 3404
Maarten Jongeneel, Alexandre Bernardino, Nathan Van De Wouw, Alessandro Saccon

Closed-Form Minkowski Sum Approximations for Efficient Optimization-Based Collision Avoidance 3411
James Guthrie, Marin Kobilarov, Enrique Mallada

Robot Control for Simultaneous Impact Tasks Via Quadratic Programming-Based Reference Spreading 3419
Jari J. Van Steen, Nathan Van De Wouw, Alessandro Saccon

Prescribed-Time Stabilization Robust to Measurement Disturbances 3427
Drew Steeves, Miroslav Krstic

Workspace Control of Free-Floating Space Manipulators with Non-Zero Momentum on Lie Groups 3433
Patrick Rousso, Robin Chhabra

Robust Model Predictive Control with Data-Driven Koopman Operators 3439
Giorgos Mamakoukas, Stefano Di Cairano, Abraham P. Vinod

Integrated Guidance and Control of Driftless Control-Affine Systems with Control Constraints and State Exclusion Zones 3447
Abhijit Dongare, Amit K. Sanyal, Ilya Kolmanovsky, Sasi Prabhakaran Viswanathan

Regions of Exponential Convergence for a Coverage Controller 3453
James Kennedy, Peter M. Dower, Airlie Chapman

Adaptive Control/Identification for Hybrid Systems Part I: with Bounded Discrete Regressor 3459
Mohamed Maghenem, Adnane Saoud, Antonio Loría

Adaptive Control/Identification for Hybrid Systems, Part II: with Linear-Growth-order Discrete Regressor 3465
Mohamed Maghenem, Adnane Saoud, Antonio Loría

Bias Reduction in the Optimal Controller Identification Approach Through Optimal Filtering 3471
Eduardo Varriale Da Silva, Lucíola Campestrini

Development and Preliminary Evaluation of a RANSAC Algorithm for Dynamical Model Identification in the Presence of Unmodeled Dynamics 3477
Cora A. Dimmig, Joseph Moore, Louis L. Whitcomb

Recursive Least Squares with Variable-Rate Forgetting Based on the F-Test 3485
Nima Mohseni, Dennis S. Bernstein

Initialization of Fractional Order Systems for the Joint Estimation of Parameters and Fractional Differentiation Orders 3491
Mohamed A. Bahloul, Zehor Belkhatir, Taous-Meriem Laleg Kirati

Data-Driven Strictly Positive Real System Identification with Prior System Knowledge 3497
Nikhil Potu Surya Prakash, Zhi Chen, Roberto Horowitz

Learning the Dynamics of Autonomous Linear Systems from Multiple Trajectories 3503
Lei Xin, George Chiu, Shreyas Sundaram

Maximum Likelihood Estimation of Linear Disturbance Models for Offset-Free Model Predictive Control 3509
Steven J. Kuntz, James B. Rawlings

Fast Subspace Identification for Large Input-Output Data 3515
Vatsal Kedia, Debraj Chakraborty

Neural Ordinary Differential Equations for Nonlinear System Identification 3521
Aowabin Rahman, Ján Drgona, Aaron Tuor, Jan Strube

Component-Based Design Optimization of Multirotor Aircraft 3527
Philip M. Renkert, Andrew G. Alleyne

Constraint Handling of an Airbreathing Hypersonic Vehicle Via Predictive Reference Management 3533
Vincent Liu, Chris Manzie, Peter M. Dower

Koopman Operator Based Modeling and Control of Rigid Body Motion Represented by Dual Quaternions 3539
Vrushabh Zinage, Efstathios Bakolas

Maximum Hands-Off Attitude Control 3545
Sigrid Kjønnø Schaanning, Bjørn Andreas Kristiansen, Jan Tommy Gravdahl

A Switching-Free Control Architecture for Transition Maneuvers of a Quadrotor Biplane Tailsitter 3553
Kristoff McIntosh, Jean-Paul Reddinger, Sandipan Mishra

Closed-Form Nonlinear Impact Angle Guidance Using State-Dependent Riccati Equation Approach 3559
Shashi Ranjan Kumar, Dwaipayan Mukherjee

Comparative Analysis of Satellite Relative Dynamics and Fuel-Optimal Trajectory Planning of Satellites Using Minimum Distance Assignment 3565
Himadri Basu, Yasaman Pedari, Mads Almassalkhi, Hamid R. Ossareh

Unified Position-Attitude Control of a Nonlinear Quadrotor Swarm 3572
Boyang Zhang, Henri P. Gavin

Fast Optimal Trajectory Generation for a Tiltwing VTOL Aircraft with Application to Urban Air Mobility 3578
Martin Doff-Sotta, Mark Cannon, Marko Bacic

Constraint Management for Quadcopter Drones: Reference Governor-Based Approaches 3584
Yudan Liu, Yasaman Pedari, Hamid R. Ossareh

Filtered High-Gain Observer Design for a Class of Nonlinear Systems Subject to Delayed Measurements: Application to a Quadrotor UAV 3592
Quang Truc Dam, Rihab El Houda Thabet, Sofiane Ahmed Ali, François Guérin

Extension of Traveling Salesperson Problem with Drone for Manufacturing Digital Twin Data Collection 3598
Sarah G. Garrow, Shankar Mohan

On the Accuracy of Numerical Differentiation Using High-Gain Observers and Adaptive Input Estimation 3604
Shashank Verma, Sneha Sanjeevini, E. Dogan Sumer, Anouck Girard, Dennis S. Bernstein

Online Automatic Gain Tuning for Geometric Attitude Control 3610
Bee Vang, Roberto Tron

Further Results on Multiagent Distributed Adaptive Control Systems with Unmeasurable Coupled Dynamics 3618
K. Merve Dogan, Tansel Yucelen, Islam A. Aly, Jonathan A. Muse

Reducing Information Exchange in Distributed Control of Multiagent Systems: A Norm-Free and Adaptive Event-Triggering Approach⋆ 3624
Deniz Kurtoglu, Tansel Yucelen, Stefan Ristevski, Jonathan A. Muse

Closed Loop System Identification with Known Feedback: A Non Asymptotic Viewpoint 3630
Dalton Jones, Munther A. Dahleh

Design of Model Free Control with Tuning Method on Ultra-Local Model for Lateral Vehicle Control Purposes 3637
Tamás Hegedus, Dániel Fényes, Balázs Németh, Zoltán Szabó, Péter Gáspár

Volterra Equations for Fractional Behaviors Modeling with Application to Lithium-Ion Cells 3643
Vincent Tartaglione, Christophe Farges, Jocelyn Sabatier

Analytical Anticipative Optimal Drivability Car-Following Model 3649
Jihun Han, Dominik Karbowski, Aymeric Rousseau

Energy-Efficient UAV Trajectory Generation Based on System-Level Modeling of Multi-Physical Dynamics 3655
Nicolas Michel, Zhaodan Kong, Xinfan Lin

Input Shaped Control of a Gantry Crane with Inertial Payload 3663
Adrian Stein, Tarunraj Singh

Boundary and Taxonomy of Integrator Reach Sets 3669
Shadi Haddad, Abhishek Halder

Economic Aspects of Sensor Selection Optimization of Finite and Infinite Dimensional Dynamical Systems 3675
Michael A. Demetriou

Linear Quadratic Gaussian Synthesis for a Heated/Cooled Rod Using Point Actuation and Point Sensing 3681
Arthur J Krener

Neuron Growth Output-Feedback Control by PDE Backstepping 3689
Cenk Demir, Shumon Koga, Miroslav Krstic

A Weakly Nonlinear Analysis of Transition in a Hypersonic Flow 3695
Anubhav Dwivedi, Mihailo R. Jovanovic

Distribution Steering for Discrete-Time Linear Systems with General Disturbances Using Characteristic Functions 3701
Vignesh Sivaramakrishnan, Joshua Pilipovsky, Meeko Oishi, Panagiotis Tsiotras

Constrained Covariance Steering Based Tube-MPPI 3709
Isin M. Balci, Efstathios Bakolas, Bogdan Vlahov, Evangelos A. Theodorou

Automated EWMA Anomaly Detection Pipeline 3715
Samuel D. Gilletly, Katherine Cauthen, Joshua Mott, Nathanael Brown

Topology Control of a Periodic Time-Varying Communication Network with Stochastic Temporal Links 3723
Li Shen, Xi Yu, M. Ani Hsieh

On the Impact of the Yaw Update Frequency and Wind Direction Forecasting on Open-Loop Wake Steering Control 3730
Michael F. Howland, Hannah M. Johlas, Jesús Bas Quesada, Juan José Pena Martínez, Wei Zhong, Felipe Palou Larrañaga

A Baseline Repositioning Controller for a Floating Offshore Wind Farm 3736
Yuan Gao, Aravindh Padmanabhan, Ouyang Chen, Ali C. Kheirabadi, Ryozo Nagamune

A Switching Thrust Tracking Controller for Load Constrained Wind Turbines 3742
Jean Gonzalez Silva, Daan Van Der Hoek, Sebastiaan Paul Mulders, Riccardo Ferrari, Jan-Willem Van Wingerden

Identification of Turbine Clusters During Time Varying Wind Direction 3748
Federico Bernardoni, Umberto Ciri, Mario A. Rotea, Stefano Leonardi

Reducing Aerodynamic Load Fluctuation in Wind Turbines Using Iterative Learning Control Laws Designed Using Reduced Order Models of the Flow 3754
Weronika N. Nowicka, Bing Chu, Owen R. Tutty, Eric Rogers

Discrete-Time, Performance-Guaranteed Control of Vibratory Systems with Power Directionality Constraints 3760
Connor Ligeikis, Jeff Scruggs

Distributed K-Clustering with Exponential Convergence 3768
L. Wang, R. Tron

PrivOpt: An Intrinsically Private Distributed Optimization Algorithm 3774
Amir-Salar Esteki, Solmaz S. Kia

On Distributed Optimization Over Random Independent Networks 3780
Adel Aghajan, Behrouz Touri

Accelerated Zeroth-Order Algorithm for Stochastic Distributed Non-Convex Optimization 3786
Shengjun Zhang, Colleen P. Bailey

Power Management for Noise Aware Path Planning of Hybrid UAVs 3792
Drew Scott, Satyanarayana G. Manyam, David W. Casbeer, Manish Kumar, Michael J. Rothenberger, Isaac E. Weintraub

Stochastic Learning Rate Optimization in the Stochastic Approximation and Online Learning Settings 3798
Theodoros Mamalis, Dušan Stipanovic, Petros Voulgaris

Handling Cyclic Loops for Accurate Root Cause Diagnosis of Rare Events in Chemical Processes Using Modified Bayesian Network 3804
Pallavi Kumari, Bhavana Bhadriraju, Qingsheng Wang, Joseph Sang-Il Kwon

Active Input Design to Balance Fault Diagnosis and Tracking Control Performance 3810
Junbo Tan, Huailiang Zheng, Xueqian Wang, Bin Liang, Wenming Yang

Fault-Tolerant Model Predictive Control for Multirotor UAVs 3817
Emil Lykke Diget, Agus Hasan, Poramate Manoonpong

Integrating Failure Detection and Isolation into a Reference Governor-Based Reconfiguration Strategy for Stuck Actuators 3823
Huayi Li, Ilya Kolmanovsky, Anouck Girard

Continuous Assessment of Data Sources Quality for Improving the Resilience of Multisource Fusion Platforms 3829
Eugeniu Strelet, Zhenyu Wang, You Peng, Ivan Castillo, Ricardo Rendall, Birgit Braun, Leo Chiang, Marco S. Reis

Parametrised Function ILC with Application to FES Electrode Arrays 3835
Xiaoru Sun, Chris T. Freeman

On Learning Discrete-Time Fractional-Order Dynamical Systems 3841
Sarthak Chatterjee, Sérgio Pequito

A Switched Systems Approach for Closed-Loop Control of a Lower-Limb Cable-Driven Exoskeleton 3847
Chen-Hao Chang, Jonathan Casas, Victor H. Duenas

Control Barrier Functions for Safe Teleoperation of a Functional Electric Stimulation Enabled Rehabilitation System 3853
Kimberly J. Stubbs, Axton Isaly, Warren E. Dixon

Model-Based Switched Approximate Dynamic Programming for Functional Electrical Stimulation Cycling 3859
Wanjiku A. Makumi, Max L. Greene, Kimberly J. Stubbs, Warren E. Dixon

Physics-Based Kinematic Modeling of a Twisted String Actuator-Driven Soft Robotic Manipulator 3865
David Bombara, Revanth Konda, Ember Chow, Jun Zhang

Discrete Input-Output Sliding-Mode Control with Range Compensation: Application in High-Speed Nanopositioning 3871
William S. Nagel, Aleksandra Mitrovic, Garrett M. Clayton, Kam K. Leang

Physics-Guided Neural Networks for Feedforward Control: An Orthogonal Projection-Based Approach 3877
Johan Kon, Dennis Bruijnen, Jeroen Van De Wijdeven, Marcel Heertjes, Tom Oomen

Feedback Control Strategy for a High Speed Differential Piezo-Driven Stage by an Exclusive Use of Piezoelectric Sensors 3883
Freddy Romero Leiro, Ali Bazaei, Stéphane Régnier, Mokrane Boudaoud

Saturated Adaptive Control of Antagonistic Muscles on an Upper-Limb Hybrid Exoskeleton 3891
Jace B. Aldrich, Christian A. Cousin

Advanced Battery Management Systems: Modeling and Numerical Simulation for Control 3897
Seong Beom Lee, Raghav S. Thiagarajan, Venkat R. Subramanian, Simona Onori

Recent Progress on State and Parameter Estimation for Lithium-Sulfur Batteries 3909
Hosam K. Fathy

Balancing Asymptotic and Transient Efficiency Guarantees in Set Covering Games 3910
Rohit Konda, Rahul Chandan, David Grimsman, Jason R. Marden

Dynamic Defender-Attacker Blotto Game 3916
Daigo Shishika, Yue Guan, Michael Dorothy, Vijay Kumar

Shaping Large Population Agent Behaviors Through Entropy-Regularized Mean-Field Games 3923
Yue Guan, Mi Zhou, Ali Pakniyat, Panagiotis Tsiotras

Guarding a Translating Line with an Attached Defender 3930
Goutam Das, Daigo Shishika

Robust Multi-Robot Active Target Tracking Against Sensing and Communication Attacks 3937
Lifeng Zhou, Vijay Kumar

Distributed Filtering with Value of Information Censoring 3945
Miguel Calvo-Fullana, Jonathan P. How

Distributed Gaussian Process Mapping for Robot Teams with Time-Varying Communication 3952
James Di, Ehsan Zobeidi, Alec Koppel, Nikolay Atanasov

A Selected Interaction Swarming Algorithm for Connected Dynamic Coverage of Mobile Sensor Networks 3959
Lexing Wang, Zhiqiang Pu, Tenghai Qiu, Zhen Liu, Jianqiang Yi

Coupled Sensor Configuration and Path-Planning in Unknown Environments with Adaptive Cluster Analysis 3965
Chase St. Laurent, Raghvendra V. Cowlagi

To Transmit Or Not to Transmit: Optimal Sensor Scheduling for Remote State Estimation of Discrete-Event Systems 3971
Yingying Liu, Xiang Yin, Shaoyuan Li

Synthesizing Supervisors with a Minimum Control Base for Discrete-Event Systems 3978
Richard Hugh Moulton, Stephen H. Scott, Karen Rudie

Monte-Carlo Tree Search with Neural Networks for Petri Nets 3984
Mengsen Jia, Andreas Köhler, Raphael Fritz, Ping Zhang

Deep Reinforcement Learning Based Solution Approach for Unit Commitment Under Demand and Wind Power Uncertainty 3990
Akshay Ajagekar, Fengqi You

Flexibility Capacity of Thermostatically Controlled Loads in a Distribution Network 3996
Austin R. Coffman, Surya Chandan Dhulipala, Prabir Barooah

An Output Regulation Approach to Distributed Voltage Regulation of Multiple Coupled Distributed Generation Units in DC Microgrids 4004
Tingyang Meng, Zongli Lin, Yan Wan, Yacov A. Shamash

Interface Networks for Failure Localization in Power Systems 4010
Chen Liang, Alessandro Zocca, Steven H. Low, Adam Wierman

Hierarchical Optimal Power Flow with Improved Gradient Evaluation 4017
Heng Liang, Xinyang Zhou, Changhong Zhao

How Vintage Linear Systems Controllers Have Become Inadequate in Renewables-Heavy Power Systems: Limitations and New Solutions 4023
Sebastian A. Nugroho, Ahmad F. Taha

Adam-Based Augmented Random Search for Control Policies for Distributed Energy Resource Cyber Attack Mitigation 4029
Daniel Arnold, Sy-Toan Ngo, Ciaran Roberts, Yize Chen, Anna Scaglione, Sean Peisert

Small-Signal Stability Criterion for Inertial and Primary Frequency Droop Control of MTDC Grids Connected to Asynchronous AC Systems 4037
Sai Gopal Vennelaganti, Nilanjan Ray Chaudhuri

Developments in Robust Topology Detection Under Load Uncertainty 4044
Nicholas Piaquadio, N. Eva Wu, Ning Zhou

Primal-Dual Distributed Control of Residential Thermal Loads for Voltage Regulation of Distribution Systems with High PV Penetration 4050
Jie Cai, Zhimin Jiang

A Submodular Optimization Approach to Stable and Minimally Disruptive Controlled Islanding in Power Systems 4057
Dinuka Sahabandu, Luyao Niu, Andrew Clark, Radha Poovendran

Boosting False Data Injection Attack Detection with Structural Knowledge 4065
Qiushi Huang, Chenye Wu

Dynamic Tolling for Inducing Socially Optimal Traffic Loads 4071
Chinmay Maheshwari, Kshitij Kulkarni, Manxi Wu, S. Shankar Sastry

Distributed Game-Theoretic Control of Aggregate Building Thermal Loads Under Quadratic Generation Cost 4078
Zhimin Jiang, Jie Cai

An Optimal Control Strategy to Distribute Element Wear for Adaptive High-Rise Structures 4084
Spasena Dakova, Julia L. Heidingsfeld, Michael Böhm, Oliver Sawodny

A Genetic and a Greedy-Genetic Algorithm for Steady-State Disturbance Compensability Actuator Placement for Adaptive Structures * 4090
Amelie Zeller, Michael Böhm, Oliver Sawodny

Learning-Based Predictive Control with Gaussian Processes: An Application to Urban Drainage Networks 4097
Krisztian Mark Balla, Deividas Eringis, Mohamad Al Ahdab, Jan Dimon Bendtsen, Carsten Skovmose Kallesøe, Carlos Ocampo-Martinez

Towards Real-Time Monitoring and Control of Water Networks 4104
Ahmed Elkhashap, Daniel Rüschen, Dirk Abel

Security Resource Investment Optimization for Critical Infrastructure Systems: A Game-Theoretic Approach 4112
Joe Clanin, Sourabh Bhattacharya

An Integrated Model Predictive Control Method for the Rescheduling of Metro Traffic with Backup Trains* 4118
Yin Tong, Wei Xu, Mariagrazia Dotoli, Graziana Cavone

Stackelberg Routing of Autonomous Cars in Mixed-Autonomy Traffic Networks 4124
Maxwell Kolarich, Negar Mehr

Incentive-Aware Electric Vehicle Routing Problem: A Bi-level Model and a Joint Solution Algorithm 4132
Canqi Yao, Shibo Chen, Mauro Salazar, Zaiyue Yang

Aggregate Modeling and Non-Disruptive Control of Residential Air Conditioning Systems with Two-Zone Cooling Capacity 4138
Sebastian A. Nugroho, Ioannis M. Granitsas, Johanna L. Mathieu, Ian A. Hiskens

Hybrid Physics-Based and Data-driven Model Predictive Control for Multi-Zone Building's Thermal Comfort Under Disjunctive Uncertainty 4146
Guoqing Hu, Fengqi You

Decentralized Safety for Aggressively Maneuvering Multi-Robot Interactions 4152
Phillip M. Rivera-Ortiz, Marin Kobilarov

Adaptive Multi-Agent Control with Dynamic Obstacle Avoidance in a Limited Region 4159
Yang Bai, Yujie Wang, Xiaogang Xiong, Mikhail Svinin, Evgeni Magid

Energy Efficient and Battery SOC-Aware Coordinated Control of Connected and Autonomous Electric Vehicles 4165
Shaopan Guo, Xiangyu Meng, Mehdi Farasat

Distributed Optimal Assignment Algorithm for Collective Foraging 4171
Tatsuya Miyano, Justin Romberg, Magnus Egerstedt

On Improving the Potential Field Method for Ring Formation 4179
Dzung Tran, David W. Casbeer, Isaac E. Weintraub, Dejan Milutinovic

Robust Rendezvous Control of UAVs with Collision Avoidance and Connectivity Maintenance 4185
Esteban Restrepo, Antonio Loría, Ioannis Sarras, Julien Marzat

Data-Driven Predictive Control for Connected and Autonomous Vehicles in Mixed Traffic 4191
Jiawei Wang, Yang Zheng, Qing Xu, Keqiang Li

Platoon Formation in a Mixed Traffic Environment: A Model-Agnostic Optimal Control Approach 4198
A M Ishtiaque Mahbub, Andreas A. Malikopoulos

A Distributed Newton Algorithm for Optimal Resource Allocation in Multi-Agent Systems 4204
Judith Ogwuru, Martin Guay

Learning the Robust and Structured Control of Unknown Linear Systems 4210
Sayak Mukherjee, Thanh Long Vu

Orientation of an Optically Trapped Non-Spherical Micro-Particle Using Iterative Learning Control 4216
Connor Edlund, Rachit Shrivastava, Murti V. Salapaka

Low-Fidelity Gradient Updates for High-Fidelity Reprogrammable Iterative Learning Control 4224
Kuan-Yu Tseng, Jeff S. Shamma, Geir E. Dullerud

Position-Dependent Snap Feedforward: A Gaussian Process Framework 4230
Max Van Haren, Maurice Poot, Jim Portegies, Tom Oomen

Dynamical Graph-Based Models of Brayton Cycle Systems 4236
Reid D. Smith, Andrew G. Alleyne

Towards Context-Aware Learning for Control: Balancing Stability and Model-learning Error 4242
Nitin Shyamkumar, Serkan Gugercin, Benjamin Peherstorfer

A Framework for Guaranteed Error-Bounded Surrogate Modeling 4248
Ashfaq Iftakher, Chinmay M. Aras, Mohammed Sadaf Monjur, M. M. Faruque Hasan

An Improved Subspace Identification Method with Variance Minimization and Input Design 4254
Xiangyu Mao, Jianping He, Chengcheng Zhao

Analyzing the Passivity of the Human Decision Making Rule in a Congestion Game Experiment 4260
Norah K. Alghamdi, David A. Shamma, Jeff S. Shamma

Backstepping Mean-Field Density Control for Large-Scale Heterogeneous Nonlinear Stochastic Systems 4266
Tongjia Zheng, Qing Han, Hai Lin

Compositional Controller Synthesis for Interconnected Stochastic Systems with Markovian Switching* 4272
Abolfazl Lavaei, Emilio Frazzoli

Sparsity Promoting Fixed-Order $\mathscr{H}_2$-Conic Control 4278
Ethan J. Locicero, Leila Bridgeman

Sequential Detection of Replay Attacks with a Parsimonious Watermarking Policy 4284
Arunava Naha, André Teixeira, Anders Ahlén, Subhrakanti Dey

Routing for Fairness and Efficiency in a Queueing Model with Reentry and Continuous Customer Classes 4292
Zhiqiang Zhang, Pengyi Shi, Amy R. Ward

Time Triggered Stochastic Hybrid Systems with Nonlinear Continuous Dynamics 4298
Zahra Vahdat, Abhyudai Singh

Myopically Verifiable Probabilistic Certificate for Long-Term Safety 4304
Zhuoyuan Wang, Haoming Jing, Christian Kurniawan, Albert Chern, Yorie Nakahira

Data-Driven Control of Markov Jump Systems: Sample Complexity and Regret Bounds 4311
Zhe Du, Yahya Sattar, Davoud Ataee Tarzanagh, Laura Balzano, Necmiye Ozay, Samet Oymak

Simultaneous Controller and Lyapunov Function Design for Constrained Nonlinear Systems 4319
Reza Lavaei, Leila Bridgeman

Prescribed-Time Safety Design for a Chain of Integrators 4325
Imoleayo Abel, Drew Steeves, Miroslav Krstic, Mrdjan Jankovic

Reference Governor for Hybrid Dynamical Systems 4331
Ricardo G. Sanfelice, Stefano Di Cairano

Robust Reference Governor for Implicit Systems Using the Metric Regularity 4337
Nan Li, Anouck Girard, Ilya Kolmanovsky

Motion Planning with Homotopy Class Constraints Via the Auxiliary Energy Reduction Technique 4343
Wenbo He, Yunshen Huang, Shen Zeng

A Static Anti-Windup Synthesis for Internal Model Control 4349
R. Olusegun Alli-Oke, Kolawole S. Ogunba, Ambrose A. Adegbege

Inverse Optimal Control for Angle Stabilization in Converter-Based Generation 4355
Taouba Jouini, Anders Rantzer, Emma Tegling

Generalized Euler-Lagrange Equation: A Challenge to Schwartz's Distribution Theory 4361
Mi Zhou, Erik I Verriest

Overall Complexity Certification of a Standard Branch and Bound Method for Mixed-Integer Quadratic Programming 4367
Shamisa Shoja, Daniel Arnström, Daniel Axehill

On a Traveling Salesman Problem with Dynamic Obstacles and Integrated Motion Planning..... 4375
Anja Hellander, Daniel Axehill

The Extended Gauss-Newton Method for Nonconvex Loss Functions and Its Application to Time-Optimal Model Predictive Control..... 4383
Katrin Baumgärtner, Moritz Diehl

Nonlinear Model Predictive Control with Latent Force Models 4389
Daniel Landgraf, Andreas Völz, Knut Graichen

Universal Zero Dynamics Attacks Using Only Input-Output Data 4395
W. Steven Gray, Luis A. Duffaut Espinosa, M. Aminul Haq

Detection of Cyber Attacks in Encrypted Control Systems..... 4402
Moritz Fauser, Ping Zhang

Submodularity-Based False Data Injection Attack Scheme in Multi-agent Dynamical Systems..... 4408
Xiaoyu Luo, Chengcheng Zhao, Chongrong Fang, Jianping He

Finite-Time Stable Disturbance Observer for Unmanned Aerial Vehicles 4414
Pradhyumn Bhale, Mrinal Kumar, Amit K. Sanyal

Distributed Event-Triggered Localization for High Latency Communication 4420
Luke Barbier, Luke Morrissey, Nisar Ahmed, Eric Frew, Sonia Martinez, Kenneth Center

A Scenario Approach to Robust Simulation-Based Path Planning..... 4428
Shaunak D. Bopardikar, Vaibhav Srivastava

Switching-Based Adaptive Output Regulation for Uncertain Systems Affected by a Periodic Disturbance..... 4434
Guanqi He, Yang Wang, Gilberto Pin, Andrea Serrani, Thomas Parisini

Risk-Averse Controller Design Against Data Injection Attacks on Actuators for Uncertain Control Systems..... 4441
Sribalaji C. Anand, André M. H. Teixeira

Adaptive Estimation of Unknown Inputs with Weakly Nonlinear Dynamics 4447
Tristan D. Grifith, Vinod P. Gehlot, Mark J. Balas

The Effect of Base Flow Uncertainty on Transitional Channel Flows 4454
Dhanushki Hewawaduge, Armin Zare

Bode Analysis of Uncertain Multivariable Systems..... 4460
Paul Tacx, Tom Oomen

Active SLAM Over Continuous Trajectory and Control: A Covariance-Feedback Approach 4466
Shumon Koga, Arash Asgharivaskasi, Nikolay Atanasov

An Optimization Approach to Fully Distributed Active Joint Localization and Target Tracking in Multi-Robot Systems..... 4473
Shaoshu Su, Pengxiang Zhu, Wei Ren

Feedback Stabilization of a Permanent Magnet Levitation System 4479
M. Reza Shariatmadari, Arash Komaee

Swirling Pendulum Dynamics and Control: A Pedagogical Perspective..... 4485
Shubhankar Riswadkar, Jaydeep Kakadiya, Sujay D. Kadam, Karanbir Sidhu, Harish J. Palanthandalam-Madapusi

Strong Delay Independent Stability Condition for Commensurate Time Delay Systems 4491
Pooja Sharma, Satyanarayana Neeli

A Time-Delay Approach to Averaging for Bounded Extremum Seeking with Discontinuous Dither and Measurement Bias * 4497
Hongyu Shen, Emilia Fridman, Hongye Su, Yang Zhu

External Direct Sum Invariant Subspace and Decomposition of Coupled Differential-Difference Equations..... 4503
Keqin Gu

A Backstepping Method for Asymptotic Stabilization of a Class of Nonlinear Systems Via Delayed Static Output Feedback..... 4508
Xiaoru Niu, Wei Lin

Time-Varying Distance-Constrained Formation Maneuver Control with Guaranteed Prescribed Performance for Mobile Agents 4514
Shubham Singh, Anoop Jain

Correct-By-Construction Design of Adaptive Cruise Control with Control Barrier Functions Under Safety and Regulatory Constraints 4520
Muhammad Waqas, Muhammad Ali Murtaza, Pierluigi Nuzzo, Petros Ioannou

Collision Avoidance for Elliptical Agents with Control Barrier Function Utilizing Supporting Lines..... 4527
Koju Nishimoto, Riku Funada, Tatsuya Ibuki, Mitsuji Sampei

On the Feasibility and Continuity of Feedback Controllers Defined by Multiple Control Barrier Functions for Constrained Differential Inclusions..... 4534
Axton Isaly, Masoumeh Ghanbarpour, Ricardo G. Sanfelice, Warren E. Dixon

Barrier States Embedded Iterative Dynamic Game for Robust and Safe Trajectory Optimization..... 4540
Hassan Almubarak, Evangelos A. Theodorou, Nader Sadegh

Decentralized System Identification Method for Large-Scale Networks 4547
Xiangyu Mao, Jianping He

A New Connection Protocol for Multi-Consensus of Discrete-time Systems..... 4553
M. Mattioni, S. Monaco, D. Normand-Cyrot

Modeling and Control of Bittide Synchronization 4559
Sanjay Lall, Calin Cascaval, Martin Izzard, Tammo Spalink

Optimal Connectivity During Multi-Agent Consensus Dynamics Via Model Predictive Control..... 4567
Harikumar Kandath, Rajdeep Dutta, J. Senthilnath

Dissipativity-Based $\mathscr{L}_2$ Gain-scheduled Static Output Feedback Design for Rational LPV Systems 4573
Valessa V. Viana, Diego De S. Madeira, Thiago Alves Lima

Deceptive Trajectory Imitation Using Affine Feedback..... 4579
Melkior Ornik

Time-Variant Digital Twin Modeling Through the Kalman-Generalized Sparse Identification of Nonlinear Dynamics 4585
Jingyi Wang, Jesús Moreira, Yankai Cao, Bhushan Gopaluni

Adaptive Output Regulation for Discrete-Time Linear Systems with an Uncertain Exosystem 4591
Tao Liu, Jie Huang

Robust Performance Analysis of Source-Seeking Dynamics with Integral Quadratic Constraints 4597
Adwait Datar, Herbert Werner

Multi-Objective Offshore Wind Farm Wake Redirection Optimization for Power Maximization and Load Reduction 4603
Jili Sun, Zheng Chen, Hao Yu, Peng Qian, Dahai Zhang, Yulin Si

Toward Stochastic Dynamical Wake-Modeling for Wind Farms 4609
Aditya H. Bhatt, A. Zare

On the Feasibility of Developing Virtual Reference Electrodes for Lithium-Ion Batteries 4615
Zahra Nozarijouybari, Hosam K. Fathy

A Novel Coupled Electro-Thermal-aging Model for Simultaneous SOC, SOH, and Parameter Estimation of Lithium-ion Batteries 4621
Geetika Vennam, Avimanyu Sahoo, Samir Ahmed

Fast Charging of Lithium-Ion Batteries by Mathematical Reformulation as Mixed Continuous-Discrete Simulation 4627
Marc D. Berliner, Benben Jiang, Daniel A. Cogswell, Martin Z. Bazant, Richard D. Braatz

Periodic Load Estimation of a Wind Turbine Tower Using a Model Demodulation Transformation 4633
Atindriyo Kusumo Pamososuryo, Sebastiaan Paul Mulders, Riccardo Ferrari, Jan-Willem Van Wingerden

Detecting Synthetic Anomalies Using Median-Based Residuals in Lithium-ion Cell Groups 4639
Kiran Bhaskar, Ajith Kumar, James Bunce, Jacob Pressman, Neil Burkell, Christopher D. Rahn

Mitigation of Intra-Cycle Mechano-Chemical Degradation-based Capacity Fade in Lithium-ion Batteries: Application of a Model Predictive Controller 4644
Gyuyeong Hwang, Niranjan Sitapure, Jiyoung Moon, Sungwon Hwang, Joseph Sang-Il Kwon

VABO: Violation-Aware Bayesian Optimization for Closed-Loop Control Performance Optimization with Unmodeled Constraints 4650
Wenjie Xu, Colin N Jones, Bratislav Svetozarevic, Christopher R. Laughman, Ankush Chakrabarty

Optimal Control of Microgrid Lithium-Ion Energy Storage Using Pontryagin's Minimum Principle 4656
Kevin Moy, Simona Onori

Scheduling Battery Energy Storage Systems Under Battery Capacity Degradation Uncertainty 4662
Hannah Moring, Johanna L. Mathieu

Recursive Dynamics Interconnection Framework Applied to Angular Velocity Control of Drilling Systems 4670
Jeanne Redaud, Jean Auriol, Silviu-Iulian Niculescu

Model-Based Irrigation Control Using Model Predictive Control and DSSAT Crop Simulator 4676
Jisung Jang, Di Tian, Q. Peter He

Control Co-Design of Actively Controlled Lightweight Structures for High-acceleration Precision Motion Systems 4682
Jingjie Wu, Lei Zhou

A RL-Based Vertical Stabilization System for the EAST Tokamak 4690
G. De Tommasi, S. Dubbioso, Y. Huang, Z. P. Luo, A. Mele, B. J. Xiao

Model Predictive Control of Spray Coating of Perovskite Quantum Dots for Application in Perovskite Solar Cells 4696
Niranjan Sitapure, Joseph Sang-Il Kwon

Receding Horizon Linear Quadratic Tracking Design and Implementation: A Practical Study on a Dual-Stage Piezoactuator 4702
Yuhe Chang, Sean B. Andersson

Regulation of the Linear Accelerator ELBE Exploiting Continuous Wave Mode of a Superconducting RF Cavity 4708
Andrei Maalberg, Michael Kuntzsch, Eduard Petlenkov

Feedback Control of In-Target Rate for Probabilistic Frequency Cap in Online Advertising 4716
Qian Sang, Ravi Kant, Niklas Karlsson

Nonlinear Model Predictive Control Based Cooperative Stereo-Visual Coverage of an Asteroid 4722
Vignesh Kottayam Viswanathan, Sumeet Satpute, Avijit Banerjee, George Nikolakopoulos

Target Tracking by Model Predictive Control Design for a Pipeline System 4730
Lu Zhang, Stevan Dubljevic

Simultaneous Advertiser Profit and Ad Platform Revenue Maximization in Programmatic Advertising Via Feedback Control 4736
Niklas Karlsson

Rudder Roll Stabilization and Energy Minimization Using Factorized Nonlinear Generalized Minimum Variance Control for Underactuated Ships 4744
Zhiquan Liu, Michael J. Grimble, Reza Katebi

Author Index