E-Letter on Systems, Control, & Signal Processing
Issue 381, May 2020

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Welcome to Issue 381 of the CSS E-letter available here.

- To submit new articles, visit article submissions on the E-Letter website.
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The next E-Letter will be mailed out at the beginning of June 2020.

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6.10 PhD: University of Groningen, The Netherlands
6.11 PhD/Postdoc: Technical University of Cluj-Napoca, Romania
6.12 Postdoc: French Aerospace Lab (ONERA), France
6.13 Postdoc: Ecole Centrale Nantes, France
6.14 Postdoc: Westlake University, China
6.15 Postdoc: University of Georgia, USA
6.16 Postdoc: Universidad Técnica Federico Santa Maria, Chile
6.17 Postdoc: University of Michigan, USA
6.18 Postdoc: Colorado School of Mines and Univ. of Colorado Boulder, USA
6.19 Postdoc: Delft University of Technology, The Netherlands
6.20 Faculty: KU Leuven, Belgium
6.21 Faculty: KTH Royal Institute of Technology, Sweden
6.22 Research Fellow: UNSW Canberra, Australia
6.23 Research Engineer: Verus Research, USA

1 IEEE CSS Headlines

1.1. CSS-IFAC Joint Initiative: Online COVID-19 Research Repository

Contributed by: Anu Annaswamy, aanna@mit.edu

Dear all,

We are pleased to report that the CSS-IFAC joint initiative, the Corona Control Community Project (C3P) has now taken shape! We have launched the website, http://covid.ieeecss.org, a hub for showcasing C3P.

Please start advertising this resource among your research networks, so that our community's efforts can be made easily available both inside and outside CSS. Please do not hesitate to contact us with any questions and suggestions for improving this resource.

Stay well, stay healthy, and stay in touch!

João Hespanha, Ahmad F. Taha, and Anu Annaswamy

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1.2. CSS Technically Cosponsored Events

Contributed by: Luca Zaccarian, CSS AE Conferences, zaccarian@laas.fr

The following items have been recently included in the list of events technically cosponsored by the IEEE Control Systems Society:

- 24th International Conference on System Theory, Control and Computing (ICSTCC 2020). Sinaia, Romania. October 8-10, 2020. http://ace.ucv.ro/icstcc2020/

- 25th International Conference on Methods and Models in Automation and Robotics (MMAR 2020). Miedzyzdroje, Poland. August 24-27, 2020. http://www.mmar.edu.pl

- 39th Chinese Control Conference (CCC2020). Shenyang, China. July 27-29, 2020. http://www.ccc2019.cn/en/index.html

- 28th Mediterranean Conference on Control and Automation (MED 2020). St Raphaël, France. June 16-19, 2020. http://med2020.cran.univ-lorraine.fr/

For a full listing of CSS technically cosponsored conferences, please visit
http://ieeecss.org/conferences/technically-co-sponsored
and for a list of the upcoming and past CSS main conferences please visit
http://ieeecss.org/conferences/financially-sponsored

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1.3. CSS Publications Content Digest

Contributed by: Kaiwen Chen, kaiwen.chen16@imperial.ac.uk

The IEEE Control Systems Society Publications Content Digest is a novel and convenient guide that helps readers keep track of the latest published articles.

The CSS Publications Content Digest, available at
http://ieeecss.org/publications-content-digest
provides lists of current tables of contents of the periodicals sponsored by the Control Systems Society. Each issue offers readers a rapid means to survey and access the latest peer-reviewed papers of the IEEE Control Systems Society. We also include links to the Society's sponsored Conferences to give readers a preview of upcoming meetings.

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1.4. IEEE Transactions on Automatic Control

Contributed by: Alessandro Astolfi, ieeetac@imperial.ac.uk

IEEE Transactions on Automatic Control
Volume 65 (2020), Issue 4 (April)

Papers:

- Performance Recovery of Dynamic Feedback-Linearization Methods for Multivariable Nonlinear Systems YuanQing Wu, Alberto Isidori, Renquan Lu, Hassan K. Khalil, p. 1365
- Variational Integrators for Dissipative Systems David Limebeer, Sina Ober-Bloebaum, Farhang Haddad Farshi, p. 1381
- Linear quadratic mean field games: Asymptotic solvability and relation to the fixed point approach Minyi Huang, Mengjie Zhou, p. 1397
- A New Method for Control Allocation of Aircraft Flight Control System Yuanchao Yang, Zichen Gao, p. 1413
- Synthesis of Dynamic Masks for Infinite-Step Opacity Xiang Yin, Shaoyuan Li, p. 1429
- Notions of Centralized and Decentralized Opacity in Linear Systems Bhaskar Ramasubramanian, Walter Rance Cleaveland, Steven Marcus, p. 1442
- Distributed Mixed-Integer Linear Programming via Cut Generation and Constraint Exchange Andrea Testa, Alessandro Rucco, Giuseppe Notarstefano, p. 1456
- Inner-Approximating Reachable Sets for Polynomial Systems with Time-Varying Uncertainties Bai Xue, Martin Fränzle, Naijun Zhan, p. 1468
- Output Feedback Energy Control of the Sine-Gordon PDE Model Using Collocated Spatially Sampled Sensing and Actuation Yury Orlov, Alexander Fradkov, Boris Andrievsky, p. 1484
- Scheduling Multiple Agents in a Persistent Monitoring Task Using Reachability Analysis Xi Yu, Sean B. Andersson, Nan Zhou, Christos G. Cassandras, p. 1499
- Extending the Best Linear Approximation Framework to the Process Noise Case Maarten Schoukens, Rik M. Pintelon, Tadeusz Dobrowiecki, Johan Schoukens, p. 1514
- Analysis of the existence of equilibrium profiles in nonisothermal axial dispersion tubular reactors Anthony Hastir, Francois Lamoline, Joseph J. Winkin, Denis Dochain, p. 1525

- Competitive Statistical Estimation with Strategic Data Sources Tyler Westenbroek, Roy Dong, Lillian J. Ratliff, Shankar Sastry, p. 1537
- Entropy Maximization for Markov Decision Processes Under Temporal Logic Constraints Yagiz Savas, Melkior Ornik, Murat Cubuktepe, Mustafa O. Karabag, Ufuk Topcu, p. 1552
- Continuous-time and sampled data stabilizers for nonlinear systems with input and measurement delays Stefano Battilotti, p. 1568
- Distributed GNE seeking under partial-decision information over networks via a doubly-augmented operator splitting approach Lacra Pavel, p. 1584
- Necessary and sufficient bit rate conditions to stabilize a scalar continuous-time LTI system based on event triggering Qiang Ling, p. 1598
- Proper orthogonal decomposition method to nonlinear filtering problems in medium-high dimension Zhongjian Wang, Xue Luo, Stephen S.-T. Yau, Zhiwen Zhang, p. 1613
- Structuring Multilevel Discrete-Event Systems with Dependency Structure Matrices Martijn Goorden, Joanna van de Mortel-Fronczak, Michel Reniers, Wan Fokkink, J.E. Rooda, p. 1625

Technical Notes and Correspondences:

- Stability and Stabilisation Through Envelopes for Retarded and Neutral Time-Delay Systems Caetano Cardeliquio, Andre, R Fioravanti, Catherine Bonnet, Silviu-Iulian Niculescu, p. 1640
- A note on uniform exponential stability of linear periodic time-varying systems Robert Vrabel, p. 1647
- Towards a comprehensive impossibility result for string stability Arash Farnam, Alain Sarlette, p. 1652
- Analysis of Systems with Slope Restricted Nonlinearities Using Externally Positive Zames-Falb Multipliers Matthew C. Turner, Ross Drummond, p. 1660
- Event-Triggered Design with Guaranteed Minimum Inter-Event Times and Lp Performance Mohsen Ghodrat, Horacio J. Marquez, p. 1668
- Input-to-State Stability of Time-Delay Systems with Delay-Dependent Impulses Xinzhi Liu, Kexue Zhang, p. 1676
- Event-triggered Control for Semi-global Robust Consensus of a Class of Nonlinear Uncertain Multi-agent Systems Haofei Meng, Hai-Tao Zhang, Zhen Wang, Guanrong Chen, p. 1683
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- Transforming opacity verification to nonblocking verification in modular systems Sahar Mohajerani, Stephane Lafortune, p. 1739

- A Novel Method to Compute the Structured Distance to Instability for Combined Uncertainties on Delays and System Matrices Francesco Borgioli, Wim Michiels, p. 1747
- Resilient Leader-Follower Consensus to Arbitrary Reference Values in Time-Varying Graphs James Usevitch, Dimitra Panagou, p. 1755
- Distributed Optimal Coordination for Heterogeneous Linear Multi-Agent Systems with Event-Triggered Mechanisms Zhenhong Li, Zizhen Wu, Zhongkui Li, Zhengtao Ding, p. 1763
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- A Set-Membership Approach to Event-Triggered Filtering for General Nonlinear Systems over Sensor Networks Derui Ding, Zidong Wang, Qing-Long Han, p. 1792
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1.5. IEEE Transactions on Control Systems Technology

Contributed by: Michelle Colasanti, ieeetcst@osu.edu

IEEE Transactions on Control Systems Technology
Volume 28 (2020), Issue 3 (May)

Regular Papers:

- Robust Cooperative Manipulation Without Force/Torque Measurements: Control Design and Experiments, C. K. Verginis, M. Mastellaro, and D. V. Dimarogonas, page 713
- Data-Efficient Autotuning With Bayesian Optimization: An Industrial Control Study, M. Neumann-Brosig, A. Marco, D. Schwarzmann, and S. Trimpe, page 730
- Secure Cooperative Event-Triggered Control of Linear Multiagent Systems Under DoS Attacks, Z. Feng and G. Hu, page 741
- Robust Estimation of Battery System Temperature Distribution Under Sparse Sensing and Uncertainty, X. Lin, H. E. Perez, J. B. Siegel, and A. G. Stefanopoulou, page 753
- Antiwindup Input–Output Linearization Strategy for the Control of a Multistage Continuous Fermenter With Input Constraints, C. Casenave, M. Perez, D. Dochain, J. Harmand, A. Rapaport, and J.-M. Sablayrolles, page 766
- Fast Adaptive Observers for Battery Management Systems, B. Jenkins, A. Krupadanam, and A. M. Annaswamy, page 776

- Combined Longitudinal and Lateral Control of Car-Like Vehicle Platooning With Extended Look-Ahead, A. Bayuwindra, J. Ploeg, E. Lefeber, and H. Nijmeijer, page 790
- Mode Shift Schedule and Control Strategy Design of Multimode Hybrid Powertrain, W. Zhuang, X. Zhang, G. Yin, H. Peng, and L. Wang, page 804
- Derivative-Free Online Learning of Inverse Dynamics Models, D. Romeres, M. Zorzi, R. Camoriano, S. Traversaro, and A. Chiuso, page 816
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- Active-Passive Dynamic Consensus Filters With Reduced Information Exchange and Time-Varying Agent Roles, J. D. Peterson, T. Yucelen, J. Sarangapani, and E. L. Pasiliao, page 844
- Reconfiguration Control of Dynamic Reconfigurable Discrete Event Systems Based on NCESs, J. Zhang, H. Li, G. Frey, and Z. Li, page 857
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- Speed Control for Doubly Fed Induction Motors With and Without Current Feedback, M. Bodson, page 898
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- Collision Avoidance for Underactuated Marine Vehicles Using the Constant Avoidance Angle Algorithm, M. S. Wiig, K. Y. Pettersen, and T. R. Krogstad, page 951
- Control-Induced Time-Scale Separation for Multiterminal High-Voltage Direct Current Systems Using Droop Control, Y. Chen, M. Jiménez Carrizosa, G. Damm, F. Lamnabhi-Lagarrigue, M. Li, and Y. Li, page 967

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- Reference Spreading: Tracking Performance for Impact Trajectories of a 1DoF Setup, M. Rijnen, A. Saccon, and H. Nijmeijer, page 1124
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- Nonlinear Control of Two-Wheeled Robot Based on Novel Analysis and Design of SDRE Scheme, L.-G. Lin and M. Xin, page 1140
- State-Observer Design of a PDE-Modeled Mining Cable Elevator With Time-Varying Sensor Delays, J. Wang, Y. Pi, Y. Hu, and Z. Zhu, page 1149
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- False Data Injection Attacks in Bilateral Teleoperation Systems, Y. Dong, N. Gupta, and N. Chopra, page 1168

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1.6. Stay Connected to IEEE Xplore

Contributed by: Allison Fleisher, a.fleisher@ieee.org

Stay Connected to IEEE Xplore When Working Remotely: If your organization has an institutional subscription to IEEE Xplore(R) and you need to work remotely due to school and workplace closures, you can still access IEEE Xplore and continue your work and research while offsite.

Try these tips https://bit.ly/2UNGLxq for remote access or contact IEEE for help. IEEE is here to support you, making certain that your IEEE subscription continues to be accessible to all users so they can continue to work regardless of location.

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1.7. CSS Award Nominations

Contributed by: Tryphon T. Georgiou, tryphon@uci.edu

The IEEE Control Systems Society (CSS) presents several awards annually for technical achievements in the areas of interest to the society, as well as awards for service. General information and links are provided at http://ieeecss.org/awards/awards-program

Nominations and reference letters are due by May 15 and must be submitted using the CSS Awards Nomination system at css.paperplaza.net.

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1.8. IEEE CSS Outreach Fund

Contributed by: Antonella Ferrara, antonella.ferrara@unipv.it

IEEE Control Systems Society (CSS) Outreach Fund: Spring solicitation

The IEEE Control Systems Society (CSS) Outreach Fund provides grants for projects that will benefit CSS members and the control community in general. Since its inception in 2011, the Fund has funded 78 grants on behalf of a diverse group of CSS member-led activities.

The CSS Outreach Task Force is pleased to announce that the window for proposal submission for its 2020 spring solicitation will be held from **May 1 to 22, 2020**.

The maximum amount that can be requested for an Outreach project has recently been **increased to $20K.**

Because of the time needed for grant approval and processing, any CSS member interested in pursuing an Outreach-funded project starting in 2021 needs to apply during this solicitation.

Information regarding the program, which includes proposal requirements descriptions, a list of current and past funded projects, and an informative 10-minute video overview can be found in: IEEE Control Systems Society Outreach Fund.

The CSS Outreach Fund is also featured in an article appearing in the August 2019 issue of the Control Systems Magazine: The CSS Outreach Fund - August 2019 issue of the Control Systems Magazine.

Inquiries, notices of intent, and requests for application materials must be made directly to Antonella Ferrara, Outreach Task Force Chair, at antonella.ferrara@unipv.it.

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2 Miscellaneous

2.1. Online FoRCE Seminar: Hamsa Balakrishnan

Contributed by: Tansel Yucelen, yucelen@usf.edu

Online FoRCE Seminar: Hamsa Balakrishnan (May 8, Friday, 12pm Eastern Time)

We are pleased to let you know that Dr. Hamsa Balakrishnan from MIT will give an online FoRCE seminar on May 8, Friday, 12pm Eastern Time. Her talk title is: Delays, Disruptions, and Dynamics: Challenges in Networked Systems (see below for the abstract and the bio of Dr. Balakrishnan).

To connect Dr. Balakrishnan's online seminar, use the following WebEx link:
https://force.my.webex.com/force.my/j.php?MTID=m7e43f814b6ce4a0c559fd30214adb419
- Meeting number (access code): 620 137 308
- Meeting password: xPqHBdP3P49 (97742373 from phones and video systems)

Note that the above link will be activated 15 minutes before the online seminar.

Dr. Tansel Yucelen
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Abstract: The networked nature of most infrastructure systems results in the systemwide propagation of the impacts of local disruptions. At the same time, network models present powerful abstractions that allow us to model, analyze, and control the behavior of these systems. In this talk, I will present a few examples in the context of air transportation to illustrate the potential of such abstractions to model and control networked systems. These examples will include queuing network models of airport surface delays, graph signal processing techniques that characterize different types of disruptive events, and Markov Jump Linear System models of delay dynamics in air traffic networks. (Joint work with Sandeep Badrinath, Joao Cavalcanti, Karthik Gopalakrishnan, and Max Li.)

Bio: Hamsa Balakrishnan is a Professor and the Associate Department Head of Aeronautics and Astronautics at the Massachusetts Institute of Technology (MIT). She received her PhD from Stanford University, and a B.Tech. from the Indian Institute of Technology Madras. Her research is in the design, analysis, and implementation of control and optimization algorithms for cyber-physical infrastructures, with an emphasis on air transportation. She is the co-founder and chief scientist of Lumo, a Boston-based travel startup. Prof. Balakrishnan is the recipient of an NSF CAREER Award in 2008, the inaugural CNA Award for Operational Analysis in 2012, the AIAA Lawrence Sperry Award in 2012, the American Automatic Control Council's Donald P. Eckman Award in 2014, and multiple best paper awards. She is an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA).

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2.2. Online FoRCE Seminar: Necmiye Ozay

Contributed by: Tansel Yucelen, yucelen@usf.edu

Online FoRCE Seminar: Necmiye Ozay (May 4, Monday, 12pm Eastern Time)

We are pleased to let you know that Dr. Necmiye Ozay from University of Michigan will give an online FoRCE seminar on May 4, Monday, 12pm Eastern Time. Her talk title is: Coordination of for large collections of dynamical systems with constraint satisfaction guarantees (see below for the abstract and the bio of Dr. Ozay).

To connect Dr. Ozay's online seminar, use the following WebEx link:
https://force.my.webex.com/force.my/j.php?MTID=md4a4d903de17e42b975a8e03a20242b6
- Meeting number (access code): 626 551 127 - Meeting password: QHxEzpJr337 (74939757 from phones and video systems)
Note that the above link will be activated 15 minutes before the online seminar.

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Abstract: Can we control a swarm of systems and give guarantees on their collective behavior? In this talk I will discuss an instance of this problem: given a large almost homogeneous collection of dynamical systems and a novel class of safety constraints, called counting constraints, how to synthesize a controller that guarantees the satisfaction of these constraints. Counting constraints impose restrictions on the number of systems that are in a particular mode or in a given region of the state-space over time. I will present an approach for synthesizing correct-by-construction controllers to enforce such constraints. Our approach exploits the structure of the problem, the permutation invariance of dynamics due to homogeneity and the permutation invariance of counting constraints, to achieve massive scalability. I will discuss several potential applications of this approach and illustrate it on the problem of coordinating a large collection of thermostatically controlled loads while ensuring a bound on the number of loads that are extracting power from the electricity grid at any given time.

Bio: Necmiye Ozay received the B.S. degree from Bogazici University, Istanbul in 2004, the M.S. degree from the Pennsylvania State University, University Park in 2006 and the Ph.D. degree from Northeastern University, Boston in 2010, all in electrical engineering. She was a postdoctoral scholar at California Institute of Technology, Pasadena between 2010 and 2013. She joined the University of Michigan, Ann Arbor in 2013, where she is currently an associate professor of Electrical Engineering and Computer Science. Dr. Ozay's research interests include hybrid dynamical systems, control, optimization and formal methods with applications in cyber-physical systems, system identification, verification & validation, autonomy and dynamic data analysis. Her papers received several awards including a Nonlinear analysis: Hybrid Systems Prize Paper Award for years 2014-2016. She has received the 1938E Award and a Henry Russel Award from the University of Michigan for her contributions to teaching and research, and five young investigator awards, including NSF CAREER.

2.3. International Graduate School on Control

Contributed by: Francoise Lamnabhi-Lagarrigue, francoise.lamnabhi-lagarrigue@centralesupelec.fr

New programme of the 2020 International Graduate School on Control (IGSC2020) The new programme of the 2020 International Graduate School on Control (IGSC2020) is now online here:
http://www.eeci-igsc.eu/igsc-program-2020/

Online Modules:

- M20 – 02/06/2020-09/06/2020 Decentralized and Distributed Control by Giancarlo Ferrari-Trecate, Marcello Farina
- M10 – 08/06/2020-12/06/2020 Model Predictive Control Eduardo F. Camacho
- M22 – 15/06/2020-19/06/2020 Introduction to Optimal and Stochastic Control Alessandro Astolfi, Giordano Scarciotti
- M18 – 15/06/2020-19/06/2020 Hybrid Control Design Ricardo G. Sanfelice
- M13 – 22/06/2020-26/06/2020 Distributed Computation and Control A. Stephen Morse
- M25 – 06/07/2020-10/07/2020 Robust and Adaptive Output Regulation of Multivariable and Hybrid Systems Alberto Isidori, Lorenzo Marconi
- M14 – 20/07/2020-24/07/2020 Computational Issues in Nonlinear Control and Estimation Arthur Krener
- M12 – 31/08/2020-04/09/2020 An Introduction to Financial Markets for the Uninitiated: New Research Directions for Engineers B. Ross Barmish

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- M17 – TOULOUSE - 31/08/2020-04/09/2020 Sparsity and Big Data in Control, Systems Identification and Machine Learning Mario Sznaier
- M19 – PARIS-SACLAY - 07/09/2020-11/09/2020 Time-Delay and Sampled-Data Systems Emilia Fridman, Pierdomenico Pepe
- M09 – MONTERREY - 07/09/2020-11/09/2020 Energy-Based Control Design to Face the Challenges of Future Power Systems Romeo Ortega, Johannes Schiffer
- M15 – PARIS-SACLAY - 21/09/2020-25/09/2020 Stability and Stabilisation of Nonlinear Time-Varying Systems: Applications to Multi-Agent systems Elena Panteley, Antonio Loria
- M16 – MUMBAI - 28/09/2020-02/10/2020 Homogeneity Based Design of Sliding Mode Controllers Leonid Fridman, Jaime Alberto Moreno Pérez, Bijnan Bandyopadhyay
- M11 – STOCKHOLM - 28/09/2020-02/10/2020 Control and Optimization of Autonomous Power Systems Florian Dörfler, Saverio Bolognani
- M24 – PRAGUE - 05/10/2020-09/10/2020 LMIs for Optimization and Control Didier Henrion

Note: depending on the evolution of the situation, the ONSITE modules (that is M09, M11, M15, M16, M17, M19, and M24) might be changed to fully ONLINE. Hybrid ONSITE/ONLINE for these modules is also under study. Further details will be posted on the website on due time. www.eeci-igsc.eu
- M21 in MARSEILLE, Introduction to Discrete Event Systems by Stephane Lafortune and Christos Cassandras, and M23 in ROME, Dynamic Control Allocation by Andrea Serrani, Sergio Galeani, Mario Sassano, are postponed to IGSC2021.

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3 Books

3.1. Image-Based and Fractional-Order Control for Mechatronic Systems

Contributed by: Laura Burgess, laura.burgess@springer.com

Image-Based and Fractional-Order Control for Mechatronic Systems by Cosmin Copot, Clara Mihaela Ionescu, and Cristina I. Muresan
ISBN: 978-3-030-42005-5
April 2020, Springer
Hardcover, 206 pages, $159.99/€135,19
https://www.springer.com/gb/book/9783030420055

This book unites two fast-developing forms of control—vision-based control and fractional-order control—and applies them in mechatronic systems.
Image-Based and Fractional-Order Control for Mechatronic Systems is presented in two parts covering the theory and applications of the subject matter. The theoretical material presents the concepts of visual servoing and image-based feature extraction for feedback loops and fractional-order control. It discusses a range of systems from the classic monocular camera to new RGB-D sensors. The applications part of the book first discusses practical issues with the implementation of fractional-order control, comparing them with more traditional integer-order PID systems. The authors then introduce real-life examples such as a manipulator robot and a Stewart platform and results generated from such systems.

MATLAB® functions and source codes are included wherever relevant to help readers develop simulations based on the theoretical ideas and practical examples in the text. Suggestions for the use of other pertinent open-source software are also indicated with the places where such may be obtained.

With its combination of theoretical ideas and practical examples, Image-Based and Fractional-Order Control for Mechatronic Systems will be of interest to academic researchers looking to develop the fields of vision-based and fractional-order control and to engineers who are looking for developments that will help them provide closer control of their plants than can be achieved with integer-order PID.

Table of Contents:

1. Introduction
2. Visual Servoing Systems
3. Image Feature Extraction and Evaluation
4. Fractional-Order Control: General Aspects
5. Fractional-Order Control for TITO Systems
6. Simulators for Image-Based Control Architecture
7. Application of Fractional-Order Control on Real-Time Targets
8. Fractional-Order Controller for Visual Servoing Systems
9. Sliding-Mode Control for a Class of Robotic Arms
10. Conclusions

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3.2. Powered Prostheses: Design, Control, and Clinical Applications

Contributed by: Sonnini Yura, s.yura@elsevier.com

Powered Prostheses: Design, Control, and Clinical Applications edited by Houman Dallali, Emel Demircan, and Mo Rastgaar
ISBN: 9780128174500
17th April 2020; Academic Press
Paperback, 280 pages, $130.00
https://www.elsevier.com/books/powered-prostheses/dallali/978-0-12-817450-0

Description: Powered Prostheses: Design, Control, and Clinical Applications presents the state-of-the-art in design, control and application of assistive technologies used in rehabilitation, including powered prostheses used in lower and upper extremity amputees and orthosis used in the rehabilitation of various joint disorders. The progress made in this field over the last decade is so vast that any new researcher in this field will have to spend years digesting the main achievements and challenges that remain. This book provides a comprehensive vision of advances, along with the challenges that remain on the path to the development of true bionic technology.

Key Features:
- Describes the latest assistive technologies that can help individuals deal with joint pain or limb loss
- Presents a tangible and intuitive description of scientific achievements made
- Highlights the existing technologies and devices that are available and used by amputees or patients with mobility limitations
- Suggests solutions and new results that can further enhance assistive technologies

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Chapter 1. Control of transhumeral prostheses based on electromyography pattern recognition: from amputees to deep learning
Chapter 2. The 2-DOF mechanical impedance of the human ankle during poses of the stance phase
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Chapter 4. Kriging for prosthesis control
Chapter 5. Disturbance observer applications in rehabilitation robotics: an overview
Chapter 6. Reduction in the metabolic cost of human walking gaits using quasi-passive upper-body exoskeleton
Chapter 7. Neural control in prostheses and exoskeletons
Chapter 8. Stair negotiation made easier using low-energy interactive stairs
Chapter 9. Semi-active prostheses for low-power gait adaptation

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3.3. Cooperative Control of Multi-Agent Systems

Contributed by: Sonnini Yura, s.yura@elsevier.com

Cooperative Control of Multi-Agent Systems: An Optimal and Robust Perspective by Jianan Wang, Chunyan Wang, Ming Xin, Zhengtao Ding, and Jiayuan Shan
ISBN: 9780128201183
26th March 2020; Academic Press
Paperback, 258 pages, $180
https://www.elsevier.com/books/cooperative-control-of-multi-agent-systems/wang/978-0-12-820118-3

Description: Cooperative Control of Multi-Agent Systems: An Optimal and Robust Perspective reports and encourages technology transfer in the field of cooperative control of multi-agent systems. The book deals with UGVs, UAVs, UUVs and spacecraft, and more. It presents an extended exposition of the authors' recent work on all aspects of multi-agent technology. Modelling and cooperative control of multi-agent systems are topics of great interest, across both academia (research and education) and industry (for real applications and end-users). Graduate students and researchers from a wide spectrum of specialties in electrical, mechanical or aerospace engineering fields will use this book as a key resource.

Key Features:
- Helps shape the reader's understanding of optimal and robust cooperative control design techniques for multi-agent systems
- Presents new theoretical control challenges and investigates unresolved/open problems
- Explores future research trends in multi-agent systems
- Offers a certain amount of analytical mathematics, practical numerical procedures, and actual implementations of some proposed approaches

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Chapter 2. Preliminaries
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Chapter 10. Robust cooperative control of networked negative-imaginary systems

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4 Journals

4.1. Evolution Equations and Control Theory

Contributed by: Irena Lasiecka, lasiecka@memphis.edu

Evolution Equations and Control Theory
Volume 9, Issue 2, 2020

Papers:

- On the three dimensional Kelvin-Voigt fluids: global solvability, exponential stability and exact controllability of Galerkin approximations, Manil T. Mohan
- Regularized solution for a biharmonic equation with discrete data, Tran Ngoc Thach, Nguyen Huy Tuan and Donal O'Regan
- Decay rates for second order evolution equations in Hilbert spaces with nonlinear time-dependent damping, Jun-Ren Luo and Ti-Jun Xiao
- Stochastic porous media equations with divergence Ito noise, Ioana Ciotir
- Null-controllability properties of a fractional wave equation with a memory term, Umberto Biccari and Mahamadi Warma
- Existence of mass-conserving weak solutions to the singular coagulation equation with multiple fragmentation, Prasanta Kumar Barik
- Moving and oblique observations of beams and plates, Philippe Jaming and Vilmos Komornik
- Robust attractors for a Kirchhoff-Boussinesq type equation, Zhijian Yang, Na Feng and Yanan Li
- On a Kirchhoff wave model with nonlocal nonlinear damping, Vando Narciso
- Uniform stabilization of a wave equation with partial Dirichlet delayed control, Xiaorui Wang and Genqi Xu
- Null controllability for a heat equation with dynamic boundary conditions and drift terms, Abdelaziz Khoutaibi and Lahcen Maniar
- On a backward problem for two-dimensional time fractional wave equation with discrete random data, Nguyen Huy Tuan, Tran Ngoc Thach and Yong Zhou

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4.2. Systems & Control Letters

Contributed by: Lusia Veksler, lveksler@ucsd.edu

Systems & Control Letters
Volume 138, April 2020

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- Cooperative output regulation of singular multi-agent systems under adaptive distributed protocol and general entirety method, Xiaofan Liu, Yongfang Xie, Fanbiao Li, Weihua Gui, Article 104628
- Fault-tolerant control in presence of disturbances based on fault estimation, Jovan Stefanovski, Dani Juričić, Article 104646

- Synchronization of Lur'e-type nonlinear systems in linear dynamical networks having fast convergence rate and large DC gain, Jisu Kim, Hongkeun Kim, Article 104641
- Control of discrete-time nonlinear systems via finite-step control Lyapunov functions, Navid Noroozi, Roman Geiselhart, Lars Grüne, Fabian R. Wirth, Article 104631
- Optimality of constant arrival rate for a linear system with a bottleneck entrance, Guy Katriel, Article 104649
- Distributed algorithm design for optimal resource allocation problems via incremental passivity theory, Ranran Li, Article 104650
- Distributed simultaneous estimation of states and unknown inputs, Alireza Emami, Rui Araújo, Alireza Asvadi, Article 104660
- On computing critical delay for fixed mode radius: Centralized and decentralized control, Pradosh Ranjan Sahoo, Sandip Ghosh, Article 104647
- Normal forms and singularities of non-holonomic robotic systems: A study of free-floating space robots, Joanna Ratajczak, Krzysztof Tchoń, Article 104661
- Variational dynamic interpolation for kinematic systems on trivial principal bundles, Sudin Kadam, Ravi N. Banavar, Article 104648
- A linear framework on the distributed model predictive control of positive systems, Junfeng Zhang, Langwen Zhang, Tarek Raïssi, Article 104665
- Stability of an interconnected system of Euler–Bernoulli beam and wave equation through boundary coupling, Fei Wang, Jun-Min Wang, Article 104664
- Fractional smoothness of derivative of self-intersection local times with respect to bi-fractional Brownian motion, Qun Shi, Article 104627
- An energy-optimal framework for assignment and trajectory generation in teams of autonomous agents, Logan Beaver, Andreas A. Malikopoulos, Article 104670
- Observer-based event-triggered boundary control of a linear 2×2 hyperbolic systems, Nicolás Espitia, Article 104668
- Event-triggered integral sliding mode control for linear systems with disturbance, Xiaofei Fan, Zhanshan Wang. Article 104669

Special Issue on Recent Advances on Infinite Dimensional Systems — Dedicated to Ruth F. Curtain

- Stability analysis of perturbed infinite-dimensional sampled-data systems, Masashi Wakaiki, Yutaka Yamamoto, Article 104652
- Exponential input-to-state stabilization of a class of diagonal boundary control systems with delay boundary control, Hugo Lhachemi, Robert Shorten, Christophe Prieur, Article 104651
- Stability radius for infinite-dimensional interconnected systems, Birgit Jacob, Sebastian Möller, Christian Wyss, Article 104662

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4.3. IET Control Theory & Applications

Contributed by: Faraz Alam, farazalam@theiet.org

IET Control Theory & Applications
Volume 14, April 2020, Issues 6 and 7
http://digital-library.theiet.org/content/journals/iet-cta/13/6

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-Feng Mei ; He Wang ; Yiyang Yao ; Junjie Fu ; Xiang Yuan ; Wenwu Yu , Robust second-order finite-time formation control of heterogeneous multi-agent systems on directed communication graphs, Issue 6, p. 816 –823

-Feng Shu and Junyong Zhai, Event-triggered practical finite-time output feedback stabilisation for switched non-linear time-delay systems, Issue 6, p. 824 –833

- Shenghao Yao and Xiaofeng Zong, Delay-dependent stability of a class of stochastic delay systems driven by G-Brownian motion, Issue 6, p. 834 –842

- Yanjiu Zhou and Baotong Cui, Boundary dynamic feedback control for a class of semi-linear distributed parameter systems, Issue 6, p. 843 –854

- Huawen Ye ; Meng Li ; Neng Wan, Landing control design for a VTOL aircraft, Issue 6, p. 855 –864

- Oscar Julian Gonzalez Villarreal and Anthony Rossiter, Shifting strategy for efficient block-based non-linear model predictive control using real-time iterations, Issue 6, p. 865 –877

- Hui Wang and Quanxin Zhu, Adaptive state feedback stabilisation for more general switched stochastic non-linear systems under arbitrary switchings, Issue 6, p. 878 –886

- N. Durga and P. Muthukumar, Optimal control of Sobolev-type stochastic Hilfer fractional non-instantaneous impulsive differential inclusion involving Poisson jumps and Clarke subdifferential, Issue 6, p. 887 –899

- Hongjiu Yang ; Shizhan Wang ; Zhiqiang Zuo ; Peng Li, Trajectory tracking for a wheeled mobile robot with an omnidirectional wheel on uneven ground, Issue 7, p. 921 –929

- Xiuyu He ; Shuang Zhang ; Yuncheng Ouyang ; Qiang Fu, Vibration control for a flexible single-link manipulator and its application, Issue 7, p. 930 –938

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- Xiaoxiao Lyu ; Qilong Ai ; Zhiguo Yan ; Shuping He ; Xiaoli Luan ; Fei Liu, Finite-time asynchronous resilient observer design of a class of non-linear switched systems with time-delays and uncertainties, Issue 7, p. 952 –963

- Huafeng Xia ; Yan Ji ; Yongqing Yang ; Feng Ding ; Tasawar Hayat, Improved least-squares identification for multiple-output non-linear stochastic systems, Issue 7,p. 964 –971

- Achille Nicoletti ; Michele Martino ; Davide Aguglia, Data-driven approach to iterative learning control via convex optimisation, Issue 7,p. 972 –981

Brief Papers:

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- Ran Dong ; Xuerong Mao ; Stewart A Birrell, Exponential stabilisation of continuous-time periodic stochastic systems by feedback control based on periodic discrete-time observations, Issue 6, p. 909 –919

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Chao Huang and Hailong Huang, Observer-based robust preview tracking control for a class of non-linear systems, Issue 7, p. 991 –998

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4.4. Automatica

Contributed by: John Coca, j.coca@elsevier.com

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- Egidio L.N., Daiha H.R., Deaecto G.S., Global asymptotic stability of limit cycle and H2/H-Infinity performance of discrete-time switched affine systems
- Saadaoui I., Li Z., Wu N., Current-state opacity modelling and verification in partially observed Petri nets
- Showkatbakhsh M., Shoukry Y., Diggavi S.N., Tabuada P., Securing state reconstruction under sensor and actuator attacks: Theory and design
- Zhu Y., Fridman E., Predictor methods for decentralized control of large-scale systems with input delays
- Liu J., Wang L., Bai Y., New estimates of upper bounds for the solutions of the continuous algebraic Riccati equation and the redundant control inputs problems
- Li X., Tang Y., Karimi H.R., Consensus of multi-agent systems via fully distributed event-triggered control
- Dutra D.A.A., Uncertainty estimation in equality-constrained MAP and maximum likelihood estimation with applications to system identification and state estimation
- Zhu Y., Krstic M., Su H., Delay-adaptive control for linear systems with distributed input delays
- Dong F., You K., Song S., Target encirclement with any smooth pattern using range-based measurements
- Yerudkar A., Del Vecchio C., Glielmo L., Feedback stabilization control design for switched Boolean control networks
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- Seeber R., Reichhartinger M., Conditioned Super-Twisting Algorithm for systems with saturated control action
- Wang H., Han Q.-L., Liu J., He D., Discrete-time filter proportional–integral–derivative controller design for linear time-invariant systems
- Lhachemi H., Shorten R., Boundary feedback stabilization of a reaction–diffusion equation with Robin boundary conditions and state-delay
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- Xue M., Tang Y., Ren W., Qian F., Practical output synchronization for asynchronously switched multi-agent systems with adaption to fast-switching perturbations
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- Efimov D., Aleksandrov A., On estimation of rates of convergence in Lyapunov–Razumikhin approach
- Anfinsen H., Aamo O.M., Stabilization and tracking control of a time-variant linear hyperbolic PIDE using backstepping
- Balandin D.V., Biryukov R.S., Kogan M.M., Ellipsoidal reachable sets of linear time-varying continuous and discrete systems in control and estimation problems
- Xu J., Tao Q., Li Z., Xi X., Suykens J.A.K., Wang S., Efficient hinging hyperplanes neural network and its application in nonlinear system identification

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4.5. Control Engineering Practice

Contributed by: John Coca, j.coca@elsevier.com

Control Engineering Practice
Vol. 98
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- Dai W., Zhang L., Fu J., Chai T., Ma X., Model-data-based switching adaptive control for dense medium separation in coal beneficiation
- Wang J., Zhao C., Mode-cloud data analytics based transfer learning for soft sensor of manufacturing industry with incremental learning ability
- Shin J., Kwak D., Lee T., Robust path control for an autonomous ground vehicle in rough terrain
- Tho H.D., Kaneshige A., Terashima K., Minimum-time S-curve commands for vibration-free transportation of an overhead crane with actuator limits
- Alonge F., Collura S.M., D'Ippolito F., Guilbert D., Luna M., Vitale G., Design of a robust controller for DC/DC converter–electrolyzer systems supplied by μWECSs subject to highly fluctuating wind speed
- Gaber K., El Mashade M.B., Aziz G.A.A., Real-time implementation of a robust simplified intelligent proportional–integral control for CubeSat attitude determination system
- Lucke M., Chioua M., Grimholt C., Hollender M., Thornhill N.F., Integration of alarm design in fault detection and diagnosis through alarm-range normalization
- Castañeda L.Á., Guzman-Vargas L., Chairez I., Luviano-Juárez A., Output based bilateral adaptive control of partially known robotic systems
- Ge X., Ahmed F.W., Rezvani A., Aljojo N., Samad S., Foong L.K., Implementation of a novel hybrid BAT-Fuzzy controller based MPPT for grid-connected PV-battery system
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- Huang K., Wu Y., Wen H., Liu Y., Yang C., Gui W., Distributed dictionary learning for high-dimensional process monitoring
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- Straś A., Ufnalski B., Michalczuk M., Gałecki A., Grzesiak L., Design of fractional delay repetitive control with a dead-beat compensator for a grid-tied converter under distorted grid voltage conditions
- Shen D., Lim C.-C., Shi P., Robust fuzzy model predictive control for energy management systems in fuel cell vehicles
- Zhang J., Tang Z., Xie Y., Chen Q., Ai M., Gui W., Timed key-value memory network for flotation reagent control
- Yang J., Xie G., Yang Y., An improved ensemble fusion autoencoder model for fault diagnosis from imbalanced and incomplete data
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4.6. Journal of Process Control

Contributed by: John Coca, j.coca@elsevier.com

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- Suwartadi E., Kungurtsev V., Jäschke J., Fast sensitivity-based economic model predictive control for degenerate systems, pg. 54 - 62
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4.8. Journal of the Franklin Institute

Contributed by: John Coca, j.coca@elsevier.com

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Contributed by: John Coca, j.coca@elsevier.com

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- E.P. van Horseen, B.J. Janssen, A. Kumar, D. Antunes, W.P.M.H. Heemels, Image-based feedback control for drift compensation in an electron microscope
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4.10. International Journal of Control, Automation, and Systems

Contributed by: Keum-Shik Hong, journal@ijcas.com

International Journal of Control, Automation, and Systems (IJCAS)
ISSN: 1598-6446
http://www.springer.com/engineering/robotics/journal/12555
Vol. 18, No.5, May 2020

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4.11. CFP: PLoS One — Cities as Complex Systems

Contributed by: Sergio Pequito, goncas@rpi.edu

Cities as Complex Systems Scope: Cities are centres of human interactions and the innovations that arise from them. Urbanization has led to many positive developments for society, but also contributes to many of our most pressing challenges, from sustainability and climate change to poverty and inequality. Concepts from complex systems and network theory provide valuable approaches to further our understanding of the processes which drive how cities form, grow, and operate as environments which are more than the sum of their parts.

With its commitment to open access, and rigorous, reproducible research, PLOS ONE is the ideal venue for interdisciplinary complexity science. We are therefore excited to announce a Call for Papers on Cities as Complex Systems, bringing together researchers across scientific disciplines to build a collection of complex

systems and networks research applied to questions in urban science. Our Guest Editors Marta González and Diego Rybski are particularly interested in reading research on urban mobility and energy infrastructures, the morphology and efficiency of cities, and applications to sustainable development goals.

Example topics include:
- Urban mobility, migration, and community distribution
- Global networks of cities, both ancient and modern
- Urban scaling laws
- Social networks within cities
- Urban resilience
- Financial and economic networks within and between cities
- New methods for analysis of urban and spatial networks
- Smart cities and Internet-of-Things
- Applications to urban and environmental planning
- Agent-based models of urban phenomena

Sergio Pequito on behalf of
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4.12. CFP: Asian Journal of Control — Three Special Issues

Contributed by: Li-Chen Fu, lichen@ntu.edu.tw

Asian Journal of Control
Special Issue on "TP Model Transformation based Control Design Theories and Applications"

The topic of the special issue belongs to multi-objective control design based on quasi Linear Parameter Varying (qLPV) models and Linear Matrix Inequality (LMI) based optimization. The special issue focuses on advanced theories and design solutions based on Tensor Product (TP) model transformation.

Recent research shows that by varying the antecedents and consequents in Takagi-Sugeno fuzzy models as well as in other polytopic models, one can strongly influence how the further control design steps will proceed and also how good the resulting control performance will be. The TP model transformation is capable of deriving alternative antecedents and consequents, and of varying and combining the inputs of multiple TS fuzzy and polytopic models. The aim of this special issue is to investigate how better controllers can be obtained by using the best variant of TS fuzzy or polytopic models, and how such variants can be found by TP model transformation. Papers about further developments on the TP model transformation are also highly welcome.

Guest Editors:

Prof. Péter Baranyi

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Important Dates:

April 30, 2020 Deadline for Submissions
July 31, 2020 Completion of First Review
September 30, 2020 Completion of Final Review
December 31, 2020 Receipt of Final Manuscript
March 31, 2021 (Tentatively Vol. 23, No. 2) Publication

CFP: Special Issue on "Emerging Control Techniques for Mechatronic and Transportation Systems"

It is extremely important in the contemporary global society to develop reliable control techniques for mechatronic and transportation systems that can be easily implemented using modern digital and wireless technologies to force engineering systems to behave like skilled workers who work quickly, accurately, and cheaply, despite parametric variations, nonlinearities, and persistent disturbances. Many engineering control problems still remain unsolved, especially for mechatronic and transportation systems, under the following realistic hypotheses: parametric and/or structural uncertainties, fast-varying references, measurement noises, real amplifiers and actuators, and/or finite online computation time of the control signal. Furthermore, to reduce the gap between theory and practical feasibility, the designed control laws should be easy to design and implement with smart sensors, power supplies, and intelligent actuators.

The objective of this Special Issue is to present emerging control techniques for mechatronic and transportation systems that can be successfully applied to numerous engineering applications (e.g., control of rolling mills, conveyor belts, unicycles, bicycles, cars, trains, ships, airplanes, drones, missiles, satellites, platoons, manufacturing robots, such as welding, painting, assembly, pick and place for printed circuit boards, packaging and labeling, palletizing, product inspection, and testing ones, and surgical robots).

The topics include but are not limited to:
• Unmanned systems
• Industrial robots
• Remote servomechanisms
• Transportation systems
• Vehicle platoons
• Networked autonomous agents
• Smart sensors and actuators
• Human-machine interaction and human-machine cooperation
• IoT control design

• From research to industry

Guest Editors:

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Important Dates:

May 15, 2020 Deadline for Submissions
August 15, 2020 Completion of First Review
October 15, 2020 Completion of Final Review
December 15, 2020 Receipt of Final Manuscript
March 31, 2021 (Tentatively Vol. 23, No. 2) Publication

CFP: Special Issue on "Analysis and Control of Complex Cyber-Physical Networks"

A large number of coupled systems in nature and society can be modeled by complex cyber-physical networks, whose normal functioning significantly relies on the tight interactions between its physical and cyber components. Many modern critical infrastructures can be appropriately modelled as complex cyber-physical networks. Typical examples of such infrastructures are power grids, the Internet, WWW, and public transportation systems. The ubiquity of such networked systems leads to many important and fascinating scientific problems concerning how network topologies and parameters affect collective dynamics, and how to control them. Analysis and control of complex cyber-physical networks have received a lot of attention recently, from various scientific and engineering communities. Furthermore, revealing the fundamental properties and controlling the collective behaviors of networked systems not only can provide a better understanding of the emergence mechanisms for cooperative behaviors, but also can provide benefits to various applications of cyber-physical networked systems, such as smart grids, Internet of Things and unmanned aircraft systems.

The focus of this special issue is on new approaches to analysis and synthesis of complex cyber-physical networks as well as their potential practical applications. The special issue aims to establish a forum for international researchers from different fields of electrical engineering, bioinformatics, systems and control theory, and applied mathematics, to present and evaluate the most recent developments and new ideas on

analysis and synthesis of complex cyber-physical networks, regarding both fundamental theory and practical applications.

The topics to be covered include, but are not limited to:
• Analysis and coordination control of complex cyber-physical networks
• Bio-inspired control techniques for networked systems
• Big-data mining and analysis over complex cyber-physical networks
• Controllability and observability of complex cyber-physical networks
• Distributed cognitive architectures in robotic networks
• Distributed control and estimation of multi-agent networks
• Distributed optimization of multi-agent networks
• Deep learning and intelligent control of complex cyber-physical networks
• Distributed machine learning in complex cyber-physical networks
• Distributed reinforcement learning techniques for networked systems
• Energy management and distributed intelligent control of smart grids
• Efficient privacy protection and security of complex cyber-physical networks
• Efficient privacy protection and security of complex cyber-physical networks
• Finite-time and fixed-time control of complex cyber-physical networks
• Game analysis and control over complex cyber-physical networks

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Important Dates:

November 30, 2020 Deadline for Submissions
February 28, 2021 Completion of First Review
May 31, 2021 Completion of Final Review
August 31, 2021 Receipt of Final Manuscript
January 31, 2021 (Tentatively Vol. 24, No. 1) Publication

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4.13. CFP: Annual Reviews in Control — COVID19 and Pandemics
Contributed by: Francoise Lamnabhi-Lagarrigue, francoise.lamnabhi-lagarrigue@centralesupelec.fr

Annual Reviews in Control COVID-19 and Pandemics Special Sections Call for Papers

ARC Call for Papers: 2 Special Sections on Systems & Control Research Efforts Against COVID-19 and Future Pandemics

Guest Editors: Esteban A. Hernandez-Vargas, Giulia Giordano, Eduardo Sontag, Geoff Chase, Victor M. Preciado, Hyeygjeon Chang, Alessandro Astolfi.

https://www.journals.elsevier.com/annual-reviews-in-control/call-for-papers/systems-control-research-efforts-against-covid-19-and-future

- COVID-19: first Special Section to appear in the ARC October 2020 issue. Deadline 30 June 2020 – in this first deadline it is requested "Fast Solutions" into how control systems methods and practice can impact our response to COVID-19.

- PANDEMICS: second Special Section to appear in the ARC April 2021 issue. Deadline 31 December 2020 – in the second deadline it is requested medium/long term solutions for the COVID-19 pandemic as well as control theoretical approaches that can help us in future pandemics.

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4.14. CFP: Electronics — Control of Autonomous Systems
Contributed by: Erkan Kayacan, e.kayacan@uq.edu.au

We invite contributions to the Electronics Special Issue on "Control of Autonomous Systems".

Special Issue Information: In the past few decades, autonomous systems have been widely applied in the area of ground, aerospace, marine, and underwaters. There is a wide range of applications of autonomous systems in agriculture, military, industry, and so on. While traditional control algorithms enable autonomous systems to operate robustly and efficiently under diverse and challenging environmental conditions, we are faced with an ever-increasing need for advanced control algorithms with enhanced performance in the harsh environment. Therefore, the control of autonomous systems has become an urgent issue.

Electronics is inviting manuscripts for a Special Issue on "Control of Autonomous Systems" to report the latest theoretical and application-oriented results. The Special Issue will also welcome contributions addressing the state-of-the-art in associated developments and methodologies, and the perspectives on future

developments and applications.

Topics include, but are not limited to the followings:
- Control of unmanned ground, air, surface, and underwater vehicles
- Optimization-based control and estimation algorithms for autonomous systems
- Adaptive/learning control algorithms for autonomous systems
- Estimation methods for autonomous systems
- Novel control structures for autonomous systems
- Distributed architectures for learning, control, and adaptation
- Control of multi autonomous systems
- Real-time and embedded algorithms for autonomous systems
- GNSS or perception-based motion-control
- Trajectory tracking with advanced control and estimation methods
- Applications of autonomous systems in agriculture, military, and industry.

For further reading, please follow the journal Electronics (ISSN 2079-9292, IF 1.764) link to the Special Issue Website at:

https://bit.ly/2y54EHY

Manuscript Submission Information: Manuscripts should be submitted online at www.mdpi.com by registering and logging in to this website. Once you are registered, click here to go to the submission form. Manuscripts can be submitted until the deadline. All papers will be peer-reviewed. Accepted papers will be published continuously in the journal (as soon as accepted) and will be listed together on the special issue website. Research articles, review articles, as well as short communications, are invited. For planned papers, a title and short abstract (about 100 words) can be sent to the Editorial Office for announcement on this website.

Submitted manuscripts should not have been published previously, nor be under consideration for publication elsewhere (except conference proceedings papers). All manuscripts are thoroughly refereed through a single-blind peer-review process. A guide for authors and other relevant information for submission of manuscripts is available on the Instructions for Authors page. Electronics is an international peer-reviewed open access monthly journal published by MDPI.

Please visit the Instructions for Authors page before submitting a manuscript. The Article Processing Charge (APC) for publication in this open-access journal is 1400 CHF (Swiss Francs). Submitted papers should be well formatted and use good English. Authors may use MDPI's English editing service prior to publication or during author revisions.

Best Regards,
Dr. Erkan Kayacan
Special Issue Editor
School of Mechanical & Mining Engineering
University of Queensland, Australia

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4.15. CFP: International Journal of Robust and Nonlinear Control — PID Control

Contributed by: Dan Ma, madan@mail.neu.edu.cn

CFP: International Journal of Robust and Nonlinear Control
Special Issue on PID Control in the Information Age: Theoretical Advances and Applications

The PID (proportional-integral-derivative) control has been long well-known for its unparalleled simplicity and unsurpassed effectiveness and indeed has been an enduring legacy of feedback control. Even in a post-modern and information-centric era of our present time, PID control remains to stand out as a most favored control technology and dominates industrial control systems design; to wit, by documented statistics, more than 95% of the physical-layer control loops are enabled by PID controllers. Accordingly, for its recognized advantages, there has been sustained interest in PID control, ranging from fundamental theoretical research to practical design and implementation. Recent studies on PID control have led to new findings, improved design and tuning rules, as well as extensions and expansions into new problem areas and application domains, which in the meanwhile call for a reexamination and further development of the PID control theory and applications.

This special issue seeks to respond to the recent trends of PID control and aims to report recent analytical studies and practical applications, with a focus on the robustness, performance, optimization and analytical design. All theoretical and practical aspects central to this theme will be of interest. Particularly welcomed is the latest progress of PID control to emerging problem areas such as hybrid, event-triggered control, networked and multi-agent control, to new control design methods such as data-driven design, model predictive control, and machine learning design, for new technological advances such as cyber-physical systems, cloud-based control, and to broad application areas such as biological systems, smart grid, and micro/nano-scale networks on chip.

Potential topics include, but are not limited to the following:
- Robustness and fragility of PID control
- Performance and optimization of PID controllers
- Structural and improved PID control
- PID control for nonlinear systems
- PID control for distributed parameter systems
- PID control for discrete-event, switched, and hybrid systems
- Sampled-data/event-triggered PID control
- Distributed PID control over networks
- PID control design by data-driven methods
- PID control design by machine learning methods
- Applications of PID control

Submission Details: All the submitted papers will be subject to peer review in accordance with the standard review procedures of the International Journal of Robust and Nonlinear Control.

The key dates are
- First Submission Deadline: December 1, 2020
- Notification of First Round Decision: April 1, 2021

- Revised Paper Submission Deadline: July 1, 2021
- Notification of Final Decision: October 1, 2021
- Final Paper Submission Deadline: December 1, 2021
- Publication of Issue: Early 2022

Prospective authors are invited to submit manuscripts prepared as per the International Journal of Robust and Nonlinear Control guidelines, no later than December 1, 2020. Manuscripts should be submitted electronically online at: https://mc.manuscriptcentral.com/rnc-wiley.

For inquiries, authors may contact one of the four guest editors below.

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5 Conferences and Workshops

5.1. Math Problems in Engineering, Aerospace, and Sciences, Czech Republic

Contributed by: Seenith Sivasundaram, seenithi@gmail.com

World Congress: Mathematical Problems in Engineering, Aerospace, and Sciences
When: Date: June 22-25, 2021
Where: Location: Czech Technical University in Prague, Prague, Czech Republic
Website: http://www.icnpaa.com
http://www.icnpaa.com/index.php/icnpaa/ICNPAA2020

ICNPAA's AIM: Mathematical Problems in Engineering, Aerospace, and Science have stimulated cooperation among scientists from a variety of disciplines. Developments in computer technology have additionally allowed for solutions to mathematical problems. This international forum will extend scholarly cooperation and collaboration, encouraging the dissemination of ideas and information.

The conference will have a pool of active researchers, with a proper balance between academia and industry, as well as between senior and junior researchers, including graduate students and post-doctoral fellows. It is anticipated that such a balance will provide both senior and junior researchers an opportunity to interact and to have a wider picture of recent advances in their respective fields. The conference, especially, enables the setting up of new interdisciplinary research directions among its participants by establishing links with world-renowned researchers, making possible joint international projects that will no doubt bring about fresh and innovative ideas and technologies in engineering, aerospace, and sciences.

Co-Sponsored by: AIAA: American Institute of Aeronautics and Astronautics
IFIP: International Federation of Information Processing
CTU: Czech Technical University in Prague, Prague, Czech Republic
The proceedings will be published by the American Institute of Physics. AIP Conference Proceedings are indexed in:

- Astrophysics Data System(ADS)
- Chemical Abstracts Service (CAS)
- Crossref
- EBSCO Publishing
- Electronic Library Information Navigator (ELIN), Sweden
- Elsevier – SCOPUS
- International Atomic Energy Agency (IAEA)
- Thomson Reuters (ISI)

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5.2. Workshop: SmartGridComm 2020, USA

Contributed by: Guido Cavraro, guido.cavraro@nrel.gov

SmartGridComm 2020 Workshop. Autonomous Energy Grids: from Data to Actions

This workshop welcomes contributions that tackle challenges in real-time monitoring and control of complex energy systems. The goal of this workshop is to push forward the Autonomous Energy Grid paradigm that rely on prudent use of data to accurately monitor and optimally operate energy systems. Further, novel disruptive approaches, both technically and from a market perspective, for adopting data-driven approaches are welcome.

The workshop therefore covers the following research topics with applications in power systems, transportation, and buildings:
- Autonomous grid operation
- Distributed optimization of energy systems
- Stochastic and/or nonlinear control
- State estimation for energy systems
- Real-time optimization of large-scale systems
- Data-driven control for energy systems
- Physics-informed machine learning for energy applications

The contributed papers need to be submitted according to the general submission rules (https://sgc2020.ieee-smartgridcomm.org/authors) by May 28, 2020. More information on the workshop can be accessed at: http://aes-2020.info/.

For questions, please contact the organizers:
- Guido Cavraro - guido.cavraro@nrel.gov
- Ahmed Zamzam - ahmed.zamzam@nrel.gov.

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5.3. Postponed: Allerton Conference 2020, USA

Contributed by: Peggy Wells, pwells@illinois.edu

The 2020 Allerton Conference scheduled for September 30-October 2, 2020 has been postponed to Fall 2021. While this is not an easy decision to make, as the Allerton Conference is an intellectual highlight of the Fall semester for many, the University of Illinois Allerton Conference Co-Chairs feel that this is a prudent course of action in the face of uncertainty surrounding the COVID-19 pandemic.

Sincerely,

Alejandro Dominguez-Garcia and Max Raginsky
Allerton Conference Co-Chairs

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5.4. International Conference on Control, Automation and Systems, South Korea

Contributed by: Sehoon Oh, sehoon@dgist.ac.kr

20th International Conference on Control, Automation and Systems (ICCAS 2020)
October 13–16, 2020, Busan, Korea
http://2020.iccas.org/

ICCAS 2020 will be held on October 13 16, 2020 at BEXCO, Busan, Korea. The aim of ICCAS 2020 is to bring together professors, researchers, engineers, and students from worldwide to present their recent works and discuss the state-of-the-art technologies related to control, automation, robotics, and systems.

As of April 24, the organizing committee of ICCAS 2020 decided to have the regular conference format for ICCAS 2020. However, if the spread of COVID-19/travel restriction continues, then we may have hybrid conference (on-site + on-line) or may go to fully virtual conference. In any case, all accepted and registered papers will be published in the conference proceedings and distributed via IEEE Xplore, Ei Compendex, and SCOPUS.

ICCAS 2020 consists of ICCAS Classic, which has the same format as before, and ICCAS Focused, which is newly introduced. Attendees of ICCAS 2020 can now enjoy both formats. ICCAS Focused is a kind of single track workshop where many leading researchers get together and share their recent works. ICCAS Focused 2020 consists of three topics:

Focused Track 1: Network and Multi-agent System
Focused Track 2: Walking Robots
Focused Track 3: Automotive Control
Call for Papers for individual tracks can be found by following link http://2020.iccas.org/.

ICCAS Classic 2020 calls for papers regarding the following topics:

- Control Theory
- Robotics and Mechatronics
- Industrial Applications of Control
- Civil and Urban Control Systems
- Smart Manufacturing System
- Human-Robot Interactions
- Cyber Physical Systems
- Guidance, Navigation, and Control
- Process Control Systems
- Bio & Ecological Systems
- Sensors and Actuators
- Machine Vision and Perception
- Control Devices and Instruments

The paper can be submitted to ICCAS Classic, or one of the Focused Track depending on the topics. Please follow the submission instruction. During the conference, all the sessions are open to attendees.

Note: Due to the pandemic of COVID-19, we have extended the deadline as follows. This is the firm deadline and no more extension is possible for the proper operation of the review process.

June 14, 2020: Submission due for Organized Session Proposal
June 20, 2020: Submission due for Regular Paper, Invited Paper, and Talk Summary
July 10, 2020: Submission open for Late-breaking Results
July 25, 2020: Submission due for Late-breaking Results
July 31, 2020: Notification of acceptance
August 31, 2020: Submission of final camera-ready papers

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5.5. International Conference on Control, Modeling and Computing, Canada

Contributed by: Janelle Zara, cmc@icaita2020.org

6th International Conference on Control, Modeling and Computing (CMC 2020)
https://icaita2020.org/cmc/index.html
July 11–12, 2020, Toronto, Canada

Scope: The 6th International Conference on Control, Modeling and Computing (CMC 2020) will provide an excellent international forum for sharing knowledge and results in theory, methodology and applications of Control Engineering, Modeling, Computing and Applications. The goal of this Conference is to bring together researchers and practitioners from academia and industry to focus on understanding modern control engineering, Modeling and Computing concepts and establishing new collaborations in these areas.

Authors are solicited to contribute to the conference by submitting articles that illustrate research results, projects, surveying works and industrial experiences that describe significant advances in the areas of control engineering, modeling and computing.

Topics of Interest
- Adaptive Control
- Applications of Modeling in Science and Engineering
- Automation Systems
- Computer Controlled Systems
- Computer Vision
- Computational Science
- Control Devices and Instruments
- Control Theory
- Data Mining
- Design System and Algorithms
- Embedded Systems
- Fault Detection and Isolation
- Flight Control and Surveillance Systems
- Genetic Algorithms and Evolutionary Computing
- Guidance Control Systems

- Industry, Military and Space Applications
- Information Systems
- Intelligent Control Systems
- Linear and Nonlinear Control Systems
- Mathematical Modeling and Control
- Measurement Systems
- Multimedia Systems
- Networks and Communication
- Neural Networks and Fuzzy Logic
- Optimization and Optimal Control
- Process Control and Instrumentation
- Robotics
- Robust Control
- Scientific Computing
- Signal and Image Processing
- Simulation Techniques
- Soft Computing Techniques
- Stochastic Control and Filtering
- Systems and Automation
- System Identification and Control

Paper Submission: Authors are invited to submit papers through the Submission System . Submissions must be original and should not have been published previously or be under consideration for publication while being evaluated for this conference. The proceedings of the conference will be published by Computer Science Conference Proceedings in Computer Science & Information Technology (CS&IT) series. Important Date: Registration & Camera-Ready Paper Due : June 28,2020. Here's where you can reach us : cmcconf@yahoo.com or cmc@icaita2020.org

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5.6. Annual Conference on Learning for Dynamics and Control, Online

Contributed by: Claire Tomlin, tomlin@berkeley.edu

L4DC 2020: Call for Participation—Call for Participation
2nd Annual Conference on Learning for Dynamics and Control (L4DC 2020)
June 10-11, 2020
l4dc.org

Over the next decade, the biggest generator of data is expected to be devices which sense and control the physical world. This explosion of real-time data that is emerging from the physical world requires a rapprochement of areas such as machine learning, control theory, and optimization. While control theory has been firmly rooted in the tradition of model-based design, the availability and scale of data (both temporal and spatial) will require rethinking of the foundations of this discipline. From a machine learning perspective, one of the main challenges going forward is to go beyond pattern recognition and address problems in data-driven control and optimization of dynamical processes.

Our overall goal is to create a new community of people that think rigorously across the disciplines, ask new questions, and develop the foundations of this new scientific area.

Following the success of the inaugural L4DC 2019 at MIT, the 2nd Annual Conference on Learning for Dynamics and Control (L4DC 2020) will take place on June 10-11, 2020, online.

The program will consist of invited talks, talks from contributed papers, and poster sessions. This year, 135 papers were received and reviewed by the L4DC program committee, and 14 have been accepted for presentation and 85 for posters.

Invited speakers include:
- Professor Chelsea Finn, CS and EE, Stanford
- Leslie Pack Kaelbling, EECS, MIT
- John Lygeros, Automatic Control Laboratory, ETH Zurich
- Karen Willcox, Oden Institute for Computational Engineering and Sciences, UT Austin
- Catherine Wolfram, Haas School of Business, UC Berkeley

Please refer to l4dc.org for program and schedule details.

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6 Positions

6.1. PhD: Chalmers University of Technology, Sweden

Contributed by: Changfu Zou, changfu@chalmers.se

Two PhD student positions with the Automatic Control group in the division of Systems and Control, Chalmers University of Technology.

1 - First Position: Thermal control and fault prognosis for Li-ion batteries

The interest and use of battery based electric and plug-in hybrid electric vehicles, are steadily increasing and they are gradually replacing the traditional combustion engine based vehicles due to environmental concern and legislation. However, the power batteries are plagued by potential risks of thermal runaway, which is often associated with fire and even explosion. The traffic accidents induced by thermal runaway have turned out to be catastrophic to the vehicle, passengers, and surrounding life and property. Meanwhile, thermal dynamics heavily impact battery performance and degradation. Accordingly, there is a global urgency to develop battery management technologies that regulate battery temperature for the best performance and long lifetime, without triggering thermal safety issues. Current research has been focused on studies of the heat propagation after initiating the runaway by external abuse or delibrately adding deficiency into the cell. However, the former represents a poor emulation of internal short circuits, while the latter has not build-up of a changed thermal behaviour.

This project aims at addressing thermal failure and mitigation strategies by on road monitoring and active manipulation of the actual behaviours inside the battery, and by exploring the use of cloud and fleet data for reference, rather than post-mortem analysis of thermal behaviours. This will involve the development of physical models to predict distributed temperature and electrochemical behaviour in each battery cell, module and pack. The other aim of the project is to derive a method to optimize the cooling system design in combination with optimized control, potentially leading to significant performance improvements of the batteries.

The position will be fully funded by the Swedish Electromobility Centre and Swedish Energy Agency for four years of PhD studies extended up to five years to accommodate teaching performed at the department. The project is a collaboration with the companies VOLVO GROUP and SCANIA.

Our offer to you: Chalmers offers a cultivating and inspiring working environment in the dynamic city of Gothenburg. Read more about working at Chalmers and our benefits for employees.

Application: https://bit.ly/3ea0Gy5

Deadline: 15th of May - 2020

2 - Second position: Dynamic reconfiguration control of Li-ion batteries

Information about the research/the project/the division: The position is with the Automatic Control group in the division of Systems and Control. Aiming for sustainable solutions, the group is involved in many

research projects on energy savings using automatic control methods. In general the projects are carried out in collaboration with other research groups, institutes and industry.

The interest and use of battery based electric and plug-in hybrid electric vehicles, are steadily increasing and they are gradually replacing the traditional combustion engine based vehicles due to environmental concern and legislation. Since vehicle batteries often are the most expensive components in a vehicle, since they can rapidly degrade if used unwisely, and since the total battery market is astronomic, it is of outmost importance that the produced battery cells are used to their full potential. Today this is far from the case, and one of the most important reasons is that there are variations in the individual cell's performances, differences that generally increase as the cells age. In battery packs the cells are connected to each other mainly fixed in series with the consequence that the weakest cells dictate the performance of the entire pack, leading to significantly reduced performance and shortened lifetime.

In this project a novel concept, where the cell's connections can be reconfigured online using built-in power electronics, will be exploited. This adds many degrees of freedom such that the energy and power capacities of the battery can be better utilized; charging can be made faster; their lifetime be increased and also that the output voltage can be controlled. The latter, in turn, has other advantages. For example that the battery can easily be used in 2nd life applications as one can mix new, old and different cell technologies.

The position will be a full-time temporary employment with funding from Mistra Innovation. It is for four years of PhD studies extended up to five years to accomodate teaching performed at the department. The project is a collaboration with the companies SEM and SCANIA, and also Linköping University.

Our offer to you: Chalmers offers a cultivating and inspiring working environment in the dynamic city of Gothenburg. Read more about working at Chalmers and our benefits for employees.

Application: https://bit.ly/3c9iNCt

Deadline: 10th of May - 2020

For questions, please contact: Prof. Changfu Zou (changfu@chalmers.se) and Prof Torsten Wik (tw@chalmers.se), E2 Department, Chalmers.

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6.2. PhD: University of Georgia, USA

Contributed by: Javad M. Velni, javadm@uga.edu

Several funded PhD positions in Univ. of Georgia

Several fully funded positions are available for PhD students at Velni's Lab in the School of ECE at Univ. of Georgia. The positions are available as early as August 2020. The topics and desired student background are as follows:

1. Learning-based and Uncertainty-aware Control for Complex Systems (Strong background in machine

learning theory and model predictive control (MPC) is required. Prior knowledge of LPV systems modeling and/or control is desired.)

2. Stochastic Hybrid Control Design for Mass Deployment of Autonomous Vehicles (Strong background in hybrid control systems is required. Prior knowledge of statistical machine learning is desired.)

To apply, please send an application package to javadm@uga.edu. The application should be submitted as a single PDF and include a cover letter (explicitly describing the candidate background and how they fit the open positions), a detailed CV (including the list of publications), and unofficial copies of their BS (and, if applicable, MS) transcripts.

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6.3. PhD: Univ. Poly. Hauts-de-France & Tech. Univ. of Cluj, France/Romania

Contributed by: Anh-Tu Nguyen, nguyen.trananhtu@gmail.com

We open a joint PhD position between the Université Polytechnique Hauts-de-France (France) and the Technical University of Cluj-Napoca (Romania). The topic is about "Event-Triggered Control for Quasi-LPV Systems: Theory and Application", see the link below.

https://drive.google.com/open?id=1IOOz5ZU-dx9Tpmd26sxmPT3MJd0PXG2S

If you are interested in this opportunity, feel free to contact us for more details.

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6.4. PhD: Université Paris-Saclay, France

Contributed by: Nina H. Amini, nina.amini@centralesupelec.fr

PhD Position: Feedback stabilization of open quantum systems.

A Ph.D. student position is available in the Laboratory of Signals and Systems (L2S), Université Paris-Saclay, CentraleSupélec, Gif-sur-Yvette, France.

Quantum control is a multidisciplinary field which has an immense ability to be applied in different fields. Controlling quantum systems is an important step to advance further quantum technologies. This PhD thesis will focus on feedback stabilization of open quantum systems by applying stochastic control theory, stochastic stability and non-linear control tools. We will also study applications of stabilizing feedback control strategies in different contexts. To study various aspects of this thesis project, different collaborations and missions are envisaged for the hired PhD student.

We are looking for a talented candidate who is passionate about research on such an interdisciplinary field, with a very good english skill and a master (or equivalent) degree in applied mathematics, mathematics, control theory/engineering, mathematical physics.

More information can be found in

https://drive.google.com/file/d/1a5xcMPEbufBnHfd1Fk0yu8HKsMlE4pAi/view?usp=sharing.

Practical information for the application:
- We will receive the applications until the end of May.
- The start date is flexible, but not earlier than October 1st 2020.
- Please send a detailed CV including the list of master courses and projects you have worked on with brief descriptions of your contributions, academic record if available, a motivation letter and contact details of two or three references, to Nina H. Amini (nina.amini@centralesupelec.fr).
- The academic excellence is the only criterion for selection.

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6.5. PhD: New York University, USA

Contributed by: Zhong-Ping Jiang, zjiang@nyu.edu

PhD Position in Learning and Control at NYU

Outstanding applications are solicited for a full-time PhD position in learning-based control with applications to autonomous vehicles, in the Department of Electrical and Computer Engineering at New York University. The PhD position is available immediately. The selected student will be offered a PhD Fellowship which covers full-time tuition and stipend. The total package is around $70,000 per year. The ideal candidate should have a passion for research and have a solid background in control systems or applied mathematics. Preference will be given to students with working knowledge of AI/machine learning and dynamic programming, or are familiar with connected and autonomous vehicles.

All interested applicants must apply directly through NYU Tandon School of Engineering's online application system, and are strongly suggested to send a copy of his/her application materials including resume, academic transcript and/or research publications to Prof. Zhong-Ping Jiang at zjiang@nyu.edu

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6.6. PhD: University of Poitiers and Politecnico di Torino, Italy/France

Contributed by: Guillaume Mercère and Diego Regruto, guillaume.mercere@univ-poitiers.fr

Gray box model learning with convex relaxation

A fully funded Ph.D. position is available at Poitiers University, France and Politecnico di Torino, Italy (cotutelle). The appointment will be for 3 years. See https://bit.ly/2KHiWBt for more details.

Summary: Model learning (or system identification) consists in accurately estimate the parameters of dynamical models (used, e.g., to mimic the behavior of complex systems) from experimentally collected data and some prior information. Model structures encountered in system identification are often divided into three classes: white (model structure entirely based on physical equations), black (mathematical model structure with no relation with the physical equations) and gray-box models. In this project, a specific attention is paid to gray-box models, i.e., models whose structure is partially governed by some prior physical knowledge and/or first principles. Accurately estimating the parameters of a gray-box linear time-invariant state-space representation is a challenging problem especially if the number of unknowns

exceeds ten, due to the fact that the model equations typically depend nonlinearly on physical parameters to be estimated.

Standard nonlinear (local) optimization-based procedures often fail because the initial guesses are not in the domain of attraction of the user-defined cost function global minimum. The main goal of this project is to overcome such issues by combining linear algebra and convex-relaxation based set membership solutions which have proved their efficiency in several applied data driven modeling problems in the recent years. The activity will be developed in the context of a collaboration between the Department of Control and Computer Engineering of Politecnico di Torino and the Laboratory of Computer Science and Automatic Control for Systems of Poitiers University. In a nutshell, the proposed research project is focused on combining the theoretical results and numerical algorithms developed by both research groups for proposing novel effective approaches for gray-box model learning able to overcome limitation of the methods already available in the literature.

The possibly involved industries/companies are Fiat Chrysler Automobile and Fiat Research Center, which have collaborated with the Department of Control and Computer Engineering of Politecnico di Torino continuously in the last decade, which will be involved in the application of the derived algorithms to different modeling, identification and control problems arising in the automotive fields.

Candidate requirements: applicants should have a MSc degree in engineering from a good-quality engineering school. They should possess a strong background and interest in mathematics and, ideally, in system identification and advanced control. They should have excellent analytical and problem solving skills and, preferably, well-developed programming skills. Applicants should have a good knowledge of Matlab. The candidate should have excellent oral and written communication skills in English.

Application procedure: if you are interested by this challenging project, please contact G. Mercère (guillaume.mercere@univ-poitiers.fr) and D. Regruto (diego.regruto@polito.it) by email with subject "gray box model learning with convex relaxation", attaching an academic CV, a cover letter, a pdf of your diplomas and transcript of course work and grades, a recommendation letter from your MSc thesis' supervisor, a certificate of proficiency in English, as well as any other document which can enrich the application.

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6.7. PhD: University of Lille, France

Contributed by: Thierry Floquet, thierry.floquet@ec-lille.fr

Three PhD positions starting October 2020 in nonlinear control and observation are available at CRIStAL Laboratory at University of Lille, France. Application closing date is 9 May 2020.

Further information can be found at:
https://bit.ly/2KNsz1m

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6.8. PhD: TU Delft, The Netherlands

Contributed by: Javier Alonso-Mora, j.alonsomora@tudelft.nl

PhD position "Learning of socially compliant motion planning for autonomous vehicles"

We have a fully funded PhD vacancy on "Learning of socially compliant motion planning for autonomous vehicles" within the Autonomous Multi-robots Lab of the Department Cognitive Robotics at TU Delft.

We are looking for an ambitious PhD candidate who would like to develop novel methods for safe and socially compliant autonomous navigation in crowded urban canals, with a combination of machine learning (learning from historical data, reinforcement learning) and trajectory optimization approaches. The main challenge to ensure safe and efficient navigation of autonomous vessels in urban waters is that of generating safe trajectories that (i) take into account the complex dynamics of the vessel, (ii) coordinate with other traffic participants and (iii) show socially-compliant behavior based on past experience and historical data.

For detailed information on the position and how to apply see:

https://www.academictransfer.com/en/291497/phd-learning-of-socially-compliant-motion-planning-for-autonomous-vehicles/

If you have specific questions about this position, please contact Assist. Prof. J. Alonso-Mora (j.alonsomora@tudelft.nl, +31 152785489) Always specify the vacancy number in the email subject. Please do not send application emails to this email address but use the specified address (application-3mE@tudelft.nl).

Regards,

Dr. Javier Alonso-Mora, Assistant Professor
Autonomous Multi-Robots Lab, Cognitive Robotics, 3mE
Delft University of Technology
Mekelweg 2, Room F-2-320, 2628 CD Delft, Netherlands
Phone: +31 152 785 489,
Web: www.alonsomora.com

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6.9. PhD: Stevens Institute of Technology, USA

Contributed by: Yi Guo, yguo1@stevens.edu

A Ph.D. student position is available in Department of Electrical and Computer Engineering at Stevens Institute of Technology, USA. The anticipated starting date is in Sept. 2020 or Jan. 2021. We're looking for a Ph.D. student to join the Robotics and Automation Laboratory to work on research projects in mobile robotics and machine learning. Information of research projects are available at the web site https://bit.ly/2YhIIEh

If you're interested, please email your CV to "yguo1@stevens.edu". Prospective students please provide details about your knowledge and research experience in any of the areas including robotics, controls,

and/or machine learning. Serious applicants should submit their graduate admission packages through Stevens Graduate Admissions web site.

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6.10. PhD: University of Groningen, The Netherlands

Contributed by: Claudio De Persis, c.de.persis@rug.nl

PhD Position Learning and Control in Digital Twins - University of Groningen

A PhD position financed by the Netherlands Organisation for Scientific Research Perspectief programme on Digital Twins is available at the University of Groningen, the Netherlands, under the supervision of Prof. Claudio De Persis.

The development of reliable and agile digital twins of high-tech systems and materials is key to enabling shorter time-to-market, zero-defect and flexible manufacturing systems with accurate predictive maintenance. This crucial development is currently hampered by the lack of synergy between model-based engineering and data-driven/machine learning approaches. The Digital Twins program will develop key-enabling technologies by the integration of data-driven learning approaches and model-based engineering methods. These technologies will be tested on real-world problems proposed by industrial partners.

Interested candidates are invited to send a complete application to c.de.persis@rug.nl, n.monshizadeh@rug.nl and p.tesi@rug.nl, including the following items in a single PDF file: 1. A Curriculum Vitae with contact information of two academic references. 2. A statement of motivation/purpose, listing down relevant research experience (maximum 1 page). 3. Grade transcripts of obtained degrees/diplomas in English. Candidates with a background in Applied Math, Electronic/Computer Engineering and research experience in control, reinforcement learning, system identification are particularly encouraged to apply.

Please use "SMS-DT Application" as the subject of the email. For full consideration, apply by May 30, 2020.

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6.11. PhD/Postdoc: Technical University of Cluj-Napoca, Romania

Contributed by: Lucian Busoniu, lucian@busoniu.net

PhD/Postdoc: Learning for mapping of sea litter at the Technical University of Cluj-Napoca, Romania

At the Robotics and Nonlinear Control group of the Technical University of Cluj-Napoca (http://rocon.utcluj.ro), we are looking for one postdoctoral researcher and one more PhD student – one PhD position has already been filled – on mapping of sea litter using a mixed team of aerial (quadcopter), surface, and underwater robots; in the framework of the European project SeaClear, http://seaclear-project.eu. We will exploit machine learning and active sensing techniques to map litter both on the sea bottom and at the surface. Depending on common interest, the candidates selected will work on developing novel mapping algorithms for individual UAV and UUV robots; coordinating mapping of the entire multirobot team; or applying the methods in real demonstrations in Dubrovnik and Hamburg.

We offer the opportunity to work with top AI and robotics researchers in our group, as well as to travel and collaborate in the SeaClear consortium (the Netherlands, Germany, France, Croatia). Highly compet-

itive salaries are estimated at 2250EUR gross per month for the postdoc (2 years starting autumn-winter 2020), and 1890EUR for the PhD (3 years starting Oct 2020). We are looking for candidates with a strong background in systems and control, computer science, or related fields. Expertise in robotics and machine learning is a plus.

For details, including required application documents, see
http://rocon.utcluj.ro/files/seaclear-pos.pdf.

Questions and applications at lucian@busoniu.net.

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6.12. Postdoc: French Aerospace Lab (ONERA), France

Contributed by: Thach Dinh, ngoc-thach.dinh@lecnam.fr

Postdoc: French Aerospace Lab (ONERA), France

The French Aerospace Lab (ONERA) offers a postdoc for a duration of 1 year (may be renewed for an additional year). Eligibility conditions: citizenship in an EU Member State, proficiency in English and/or French and no more than 2 years of experience after PhD. The postdoc is about Model-based prognostics and degradation tolerant control for aerospace vehicles. All candidates who satisfy the eligibility conditions and have background on automatic control, control theory, control systems or related fields are welcome to apply. Expected starting date is Fall 2020 but it is flexible and can be arranged to suit your availability.

For more details, please follow the link: https://bit.ly/2JGq9kG

Contact emails: ngoc-thach.dinh@lecnam.net and julien.marzat@onera.fr

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6.13. Postdoc: Ecole Centrale Nantes, France

Contributed by: Bogdan Marinescu, bogdan.marinescu@ec-nantes.fr

Postdoctoral researcher in Advanced Centralized and Decentralized Control of Future Power Systems in H2020 RIA POSYTYF project

Key words: advanced/robust control, centralized/decentralized/structured implementations, power converters, renewable energy, inter-area oscillations, small-signal/transient stability

Context: Ecole Centrale Nantes (ECN) is fully involved in Renewable Energies (RE) technologies such offshore and onshore wind, wave and solar. Dynamics of Smart Grids team of LS2N-ECN tackles some important thematics of control of modern power systems. In particular, this team has, from 2020 to 2023, the lead of the H2020 POSYTYF project. This project is a Research and Innovation action of the EC focused on the development of an innovatory concept of Dynamic Virtual Power Plant (DVPP). The latter is supposed to allow an optimal portfolio of dispatchable and non dispatchable RE sources. Dynamics in the sense of stability assessment and control for RE sources participation to ancillary services are in the center of the project.

Research subjects: DVPP are a collection of heterogeneous power generation sources (including solar, wind, bio, etc.) in a power park all with their own individual constraints (variable or dispatchable, limited in energy or power). One should investigate how to control and coordinate the individual devices in a DVPP and several DVPPs at the transmission grid level (so-called secondary level) subject to their individual constraints and so that their aggregated output to the grid provides ancillary services all temporal and spatial scales: from fast frequency response to voltage support, and from high-voltage transmission grids to low-voltage distribution systems. At this stage, we envision solutions that trade-off between optimality - when centralized approaches are taken - and resilience (i.e., maintaining a good level of performance in case of failure of one or more units of the DVPP) for decentralized approaches.

The candidate will:
• Develop and compare control methodologies
• Validate these controls in simulation
• Help power system researchers and engineers to implement and test the new controls in hardware-in-the loop (HIL) benchmark
• Present and publish the main findings at peer-reviewed conferences and in top journals

Competences needed: The candidate should have background and experience in advanced (robust) automatic control, in particular in decentralized/structured control. Ideally, the candidate should have (up to 3 years) postoctoral research experience. Please provide the names and contacts of 2 or 3 referees (if possible, not exclusively the PhD advisors).

Schedule: Recruitement: asap
Duration : 12months with possibility of 2 years extension
Work will take place in ECN, Nantes-France.

Contact: B. Marinescu, Ecole Centrale Nantes, head of the Dynamics of Smart Grids team of LS2N-ECN, Project Coordinator of the H2020 POSYTYF project, Bogdan.Marinescu@ec-nantes.fr, (33) 2 40 37 69 46

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6.14. Postdoc: Westlake University, China

Contributed by: Shiyu Zhao, zhaoshiyu@westlake.edu.cn

Postdoc position on network systems

The Intelligent Unmanned Systems Laboratory at Westlake University invites applications for one postdoctoral research position in the area of multi-agent or network systems. Specific research topics include, but are not limited to, formation control, network localization, flocking, cooperative path planning, and obstacle avoidance. We will provide internationally highly competitive salary and research facilities.

Applicants should have extensive research experience and high-quality research articles in related research areas. The position could start as soon as possible. Applications should be sent to zhaoshiyu@westlake.edu.cn. In the email, please include a cover letter, a detailed CV, and representative research papers. Only short-listed candidates will be notified for interview.

Westlake University is a brand new research intensive university located in the beautiful and vigorous city of Hangzhou in China. For more information, please see the website: https://www.westlake.edu.cn . The Intelligent Unmanned Systems Lab at Westlake University focuses on high-impact research on intelligent and networked unmanned aerial vehicles. Our research group website is
https://shiyuzhao.westlake.edu.cn.

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6.15. Postdoc: University of Georgia, USA

Contributed by: Javad M. Velni, javadm@uga.edu

Postdoc fellow position at Univ. of Georgia

A postdoc opportunity (funded by NSF) is available in Velni's lab at the School of ECE at the Univ. of Georgia. The postdoc is expected to work on a project aiming at developing coverage control tools for heterogeneous swarm of agents (ground, aerial or mixed) in partially unknown environments and over graph.

Essential qualifications are: (1) A PhD in Robotics, CS, EE, ME or a closely related field; (2) Proven publication record in multi-robot perception and systems coordination; (3) Strong background in Optimization and Machine Learning theory. Essential skills required are: (1) Strong programming skills (particularly, Python or C/C++); (2) Proficiency in Matlab/Simulink and ROS; (3) Working knowledge of Linux/Ubuntu, and Gazebo.

To apply, please send to javadm@uga.edu a complete application package including a cover letter, CV (with list of publications), name and contact info of minimum three references, as well as three publications best representative of the applicant's past work.

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6.16. Postdoc: Universidad Técnica Federico Santa Maria, Chile

Contributed by: Juan I. Yuz, juan.yuz@usm.cl

The Advanced Center for Electrical and Electronic Engineering (www.AC3E.cl) is offering postdoctoral fellowships, in any of the following lines of research of the Center: Control and Automation, Renewable Energy and Power Conversion, Robotics, Electrical Systems, Data Analytics and Computational Intelligence, and Biomedical Systems.

The AC3E is part of Universidad Técnica Federico Santa María (USM), one of the most prestigious universities in Chile and Latin America, being ranked #1 in Latin America in Electronic & Electrical Engineering and in Automation & Control, according to the ARWU Shanghai Ranking by Subject 2019. Created in 2014, AC3E groups individual research efforts into multi- and inter-disciplinary teams and focus research towards industry related problems to spark innovation.

Required Documents
1. Cover letter stating your motivation to join AC3E.
2. Curriculum Vitae, including a list of publications.
3. Documentation providing evidence of the possession of a PhD.

4. Contact details of at least two referees (recent supervisor is encouraged), that may be contacted for a reference letter.

Important Information
· The postdoctoral fellowships are initially for two years (evaluated on a yearly basis).
· Required documents should be provided in English in a single PDF file.
· AC3E is located at UTFSM main campus in Valparaiso, Chile.
· Selected candidates are expected to join AC3E no later than December 2020.
· AC3E is committed to gender diversity and inclusion.
· English proficiency accreditation is welcomed.
· Deadline for application submissions is May 31, 2020, but the call will remain open until fulfilling available positions.
· Applications should be sent to ac3e@usm.cl with subject POSTDOC POSITIONS 2020-1
· Additional information can be found at www.ac3e.usm.cl
· Further inquiries can be addressed to ac3e@usm.cl or to juan.yuz@usm.cl

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6.17. Postdoc: University of Michigan, USA

Contributed by: Hossein Rastgoftar, hosseinr@umich.edu

Post-doctoral Position in UAS Traffic Management

One postdoctoral position is available in the area of UAS traffic management in the Aerospace Department at the University of Michigan. This multi-disciplinary project will develop mathematical foundations to safely and efficiently coordinate the Unmanned Aircraft Systems (UAS) traffic envisioned to routinely fly above urban centers. The project aims to apply principles of continuum mechanics to route UAS as coordinated flow through high-density airspace transit channels.

It is preferred that the postdoc has a PhD in one of the following majors: Mechanical Engineering, Aerospace Engineering, Electrical Engineering, Computer Science, or a related field. The ideal candidate should have a solid background in modeling, control, optimization, and formal methods. The postdoc fellow will closely work with Dr. Hossein Rastgoftar and Dr. Veera Sundararaghavan in the Aerospace Engineering Department.

Interested Applicants can send the CV, two sample publications, and the names of three references to Dr. Hossein Rastgoftar at hosseinr@umich.edu. The evaluation process will start immediately and will continue until the position is filled.

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6.18. Postdoc: Colorado School of Mines and Univ. of Colorado Boulder, USA

Contributed by: Lucy Pao, pao@colorado.edu

Post-doctoral position opening in control co-design and optimization of floating wind turbines

We are seeking an outstanding post-doctoral researcher for the development and co-optimization of controllers along with the design of a novel floating wind turbine. This post-doctoral position is available

immediately for an expected duration of 12 months. Candidates should have a strong background in aerospace, mechanical, and/or electrical engineering with a specialization in control systems.

Familiarity with issues related to the control, design, and simulation of wind turbines and/or floating structures and NREL-developed software tools for evaluating wind turbine control algorithms will be beneficial, as will leadership and mentoring skills.

The candidate will work as part of a collaborative, creative, interdisciplinary team and should have excellent written and oral communication skills. The position will be jointly appointed at both Colorado School of Mines (Golden, CO) and University of Colorado Boulder (Boulder, CO), and the applicant must meet requirements to gain site access at the US National Renewable Energy Laboratory.

To apply for the position, please send the following all in one PDF file to both email addresses below: (1) a cover letter summarizing your interest, (2) CV, and (3) contact information for at least three references. Applications received before May 25, 2020 will receive full consideration.

Professor Kathryn E. Johnson
Electrical Engineering Department
Colorado School of Mines
1610 Illinois St.
Golden, CO 80401 USA
Email: kjohnson@mines.edu
http://inside.mines.edu/∼kjohnson/

Professor Lucy Y. Pao
Electrical, Computer, & Energy Engr. Dept.
425 UCB
University of Colorado Boulder
Boulder, CO 80309 USA
Email: pao@colorado.edu
https://www.colorado.edu/faculty/pao/

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6.19. Postdoc: Delft University of Technology, The Netherlands

Contributed by: Bart De Schutter, b.deschutter@tudelft.nl

Postdoc position on machine-learning-based classification and control at the Delft Center for Systems and Control (Delft University of Technology) The Delft Center for Systems and Control (DCSC) of Delft University of Technology, The Netherlands has a vacancy for a 2-year postdoc position on "Machine-learning-based classification and control for safe cleaning of coastal waters using autonomous vehicles".

In this postdoc project we will develop novel machine-learning-based approaches for classification and control in the context of autonomous unmanned underwater, surface, and aerial vehicles for locating, detecting, and collecting unwanted objects from coastal waters and seabeds, while safeguarding marine life.

The postdoc project is part of the European H2020 project SeaClear (SEarch, identificAtion and Collection of marine Litter with Autonomous Robots). The goal of SeaClear is to develop a collaborative, heterogeneous multi-robot solution engaged in collecting marine waste using autonomous underwater, surface, and aerial vehicles for cost-effective marine litter detection and collection. This goal will be reached by bringing together state-of-the-art technologies from the fields of machine learning, sensing, manipulation, aerial and marine technologies and by building a stable and reliable system capable of tackling a highly relevant social, economic and environmental issue: ocean pollution.

In the postdoc project we will primarily focus on the development of novel identification and classification methods for both debris and marine life using the various sensors on-board of the underwater, surface, and aerial vehicles. In addition, we will also explore the integration with control tasks such as moving to the debris object and grasping it while avoiding any harm to marine life. To address these topics we will use deep learning as well as a combination of cooperative and distributed control, model-based control, and reinforcement learning.

We are looking for a candidate with an PhD degree in systems and control, computer science, applied mathematics, or a related field, and with a strong background or interest in machine learning, in particular deep learning and reinforcement learning. Additional experience in model-based and optimization-based control is an asset. The candidate is expected to work on the boundary of several research domains. A good command of the English language is required.

We offer the opportunity to do scientifically challenging research in a multi-disciplinary research group. The appointment will be for up to 2 years. As an employee of the university you will receive a competitive salary, as well as excellent secondary benefits in accordance with the Collective Agreement (CAO) of the Association of Universities in the Netherlands (VSNU). Assistance with accommodation can be arranged.

More information on this position and on how to apply can be found at https://bit.ly/2yWpHMX or by contacting Bart De Schutter (b.deschutter at tudelft.nl).

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6.20. Faculty: KU Leuven, Belgium

Contributed by: Jan Swevers, jan.swevers@kuleuven.be

Professor in Embodied Learning Machines

In the Science, Engineering and Technology Group of KU Leuven, Faculty of Engineering Science, Department of Electrical Engineering (ESAT), Research Unit Processing of Speech and Images (PSI) and Department of Mechanical Engineering, Research Unit Robotics Automation and Mechatronics (RAM), there is a full-time academic vacancy.

We are looking for internationally oriented candidates with an excellent interdisciplinary research track record and with educational competence within the cross-section of Artificial Intelligence, Robotics, Vision and Audio Processing. The Research Groups PSI and RAM are embedded within the Faculty of Engineering Science. In the past, this faculty has systematically been given a high ranking for research and education quality by independent accreditation committees.

The faculty has an extensive national and international network, both in the academic and business world. The research centres can build upon a solid research infrastructure, an extensive international network, connections with companies and non-profit organisations, a stable offer of highly talented PhD students and a supportive work environment.

Background: Since their beginnings some 50 years ago, computer vision, speech and natural language processing, and robotics have made progress by integrating various forms and levels of so-called 'model-based' and 'model-free' approaches. Primary examples of the former are system identification (or white box, explainable learning) and constrained-based task specifications (white box, explainable programming). Primary examples of the latter are (black box) reinforcement and deep learning. For each of the sensory modalities that are relevant for embodied machines (sound, vision, touch, force, motion), impressive progress has been made. However, important challenges remain at the system and application level, where all of these modalities must be integrated, to reach application-driven and system level performance goals. It is still a mostly unsolved scientific and technical question how to integrate synergistically the mentioned progress into the perception and control of an engineered body that is equipped with all of the mentioned sensory modalities.

It remains unclear when and which particular combination of sensor modalities is needed to serve a particular application expectation, and what are the appropriate reasoning, control and learning algorithms to (de)activate. It also remains unclear how such a robot system can engage in a dialogue with the human "co-workers" around it, and how and why to select the most appropriate sensor and control modality: will it speak and listen? Will it use body language? Will it see and show? how will it be able to receive reinforcement feedback from the humans around it? Will that learning happen at the raw data level, pre-processed feature level, or semantic symbol level? It remains unclear how a robot with embodied intelligence will be able to gain trust from its human co-workers, and how it can provide effective and efficient services while guaranteeing to stay within the boundaries of safety, liability and ethical behaviour.

The ideal candidate wants to find answers to these questions. (S)he has a proven expertise in one or more of the above-mentioned aspects of the "embodied learning" challenges, and combines that with a passion to guide and coach a very multi-disciplinary team of PhD and postdoc researchers, in a research context with intensive inter-departmental and international collaborations.

The candidate is motivated by real-world problems, provided by the technology and application "pulls" from society and industry that come from the large and established eco-systems of KU Leuven's Departments of Electrical and Mechanical Engineering as well as the internationally renowned Leuven-based strategic basic research centres imec and Flanders Make, and the Gasthuisberg university hospital.
More information and link to application: https://bit.ly/2xLZDEl

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6.21. Faculty: KTH Royal Institute of Technology, Sweden

Contributed by: Johan Karlsson, johan.karlsson@math.kth.se

Assistant professor in mathematics with specialization in Optimization and Systems Theory, KTH Royal

Institute of Technology.

KTH Royal Institute of Technology in Stockholm has grown to become one of Europe's leading technical and engineering universities, as well as a key centre of intellectual talent and innovation. We are Sweden's largest technical research and learning institution and home to students, researchers and faculty from around the world. Our research and education covers a wide area including natural sciences and all branches of engineering, as well as architecture, industrial management, urban planning, history and philosophy.

The subject comprises theory, mathematical models and numerical methods for optimization and systems theory. The position concerns research and teaching within the subject fields. Supervision of doctoral students and undergraduate students is also expected as part of the teaching duties. The assistant professor is expected to cooperate with researchers within the division and neighbouring subject fields, and to supervise master theses that are carried out often at industrial companies. Following application, the assistant professor can apply for promotion to associate professor.

Eligibility: An individual who has obtained a PhD or equivalent research expertise is qualified for appointment as an assistant professor.

Last application date: 28 May 2020 11:59 PM CET

Further information, including full details of the application procedure and duties, may be obtained from

https://www.kth.se/en/om/work-at-kth/lediga-jobb/what:job/jobID:321012/where:4/

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6.22. Research Fellow: UNSW Canberra, Australia

Contributed by: Keiran O'Reilly , unswcanberra.recruitment@adfa.edu.au

Research Associate/ Research Fellow Position Available at UNSW Canberra

The School of Engineering and Information Technology (SEIT) at UNSW Canberra are looking for a Research Associate/ Research Fellow to join the research team working on the Australian Research Council supported, Discovery Project "Optimisation methods for coherent quantum signal estimation and filtering.

Within SEIT, the engineering disciplines have close research collaborations promoting multidisciplinary research opportunities. SEIT performs exceptionally in terms of research outputs and grant funding obtained through competitive funding opportunities as offered by the Australian Research Council, Industry partners and Defence, in addition to generous internal support provided by UNSW Canberra. SEIT offers excellent opportunities for academic career development.

About the Role:

- Research Associate (Level A): $76,570 to$102,091 per annum, or;
- Research Fellow (Level B): $107,210 to$126,386 per annum
- In addition to base salary the position holder will receive 17% superannuation and leave loading

• Fixed Term (Full Time) - 2 years, with a possibility of extension subject to satisfactory performance and availability of funding

The Research Associate/Research Fellow position is a key role within the team working on the Australian Research Council supported, Discovery Project "Optimisation methods for coherent quantum signal estimation and filtering ". The team is led by Professor Valeri Ougrinovski (Ugrinovskii) from UNSW and Professor Matthew James from the Australian National University.

The Postdoctoral Associate/ Research Fellow will conduct research into the development of novel theory and optimization methodologies for coherent quantum signal estimation and filtering. There is an opportunity to undertake some teaching duties as required.

About the Successful Applicant: To be successful in this role you will:
• Have a PhD in Quantum control, Control Systems Theory or Optimization Theory. Candidates for appointment at level B must have a subsequent postdoctoral research experience in a university or research organisation.
• Have a demonstrated ability to conduct innovative and independent research, have strong analytical and mathematical skills and excellent interpersonal and communication skills including oral and academic writing skills.
• Have a track record in the areas of quantum control, quantum estimation and filtering, semidefinite programming and/or sum of squares optimization demonstrated by high quality journal and conference publications in these fields.
• Have the ability and willingness to carry out teaching duties within the Electrical Engineering program as required.

In your application you should systematically address the selection criteria outlined in the Position Description. In order to view the position description - please ensure that you allow pop-ups for the Jobs@UNSW Portal.

An applicant may be required to undergo pre-employment checks prior to appointment to this role. For further information about UNSW Canberra, please visit UNSW Canberra website.

Contact: Professor Valeri Ougrinovski
E: v.ougrinovski@adfa.edu.au
T: +61 2 6268 8219
Applications Close: 7 June 2020 at 11:59pm AEST.

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6.23. Research Engineer: Verus Research, USA
Contributed by: Kendra Lang, kendra.lang@verusresearch.net

Research Engineer - Formal Verification

Verus Research is searching for a Research Engineer – Formal Verification to perform research & development, conception, and implementation of formal verification principals for autonomous system software

development and testing.

The primary role for the Research Engineer – Formal Verification will be to design and develop tools to model and analyze specifications, control algorithms, and high-level logic for autonomous systems, with special focus on space systems. The role will require the development of tools and technology to verify and build trust in artificial intelligence and autonomous systems, including through runtime assurance frameworks and implementation. This posting is for work in Albuquerque, NM.

The ideal candidate for the Research Engineer – Formal Verification position will possess strong analytical skills and a background in formal verification in combination with dynamics and control theory. Practical experience with runtime assurance and/or applying formal methods to autonomous systems is a big plus.

In addition, the ideal candidate will possess the following:
• US Citizenship
• Currently holding or being able to obtain a Department of Defense security clearance
• PhD in computer science, electrical engineering, aerospace engineering, or similar fields
• Advanced experience with MATLAB®, Simulink and other programming languages (e.g. C++, Python, etc.)
• Demonstrated expertise in formal methods and verification and validation
• Strong mathematical background and an ability to communicate technical concepts clearly and effectively
• Knowledge of spacecraft dynamics and control desired
• Industry experience verifying autonomous systems a plus
• Experience with requirements development a plus

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