

E-LETTER ON SYSTEMS, CONTROL, & SIGNAL PROCESSING ISSUE 379, MARCH 2020

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Welcome to Issue 379 of the CSS E-letter available [here](#).

- To submit new articles, visit [article submissions](#) on the E-Letter website.
- To **subscribe**, send an empty email to elletter-css-join@lists.it.utsa.edu and you will be automatically subscribed to the CSS E-Letter.
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The next E-Letter will be mailed out at the beginning of April 2020.

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- 5.4 International Conference on Systems and Control, France
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- 5.6 ICRA Workshop on Security and Privacy in Robotics, France
- 5.7 Conference on Control, Automation and Systems, South Korea

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- 6.2 PhD: University of Warwick, UK
- 6.3 PhD: Università di Napoli Parthenope, Italy
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- 6.8 PhD: Norwegian University of Science and Technology, Norway
- 6.9 PhD: University of Kentucky, USA
- 6.10 PhD: KTH, Sweden
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- 6.12 PhD: Clemson University, USA
- 6.13 PhD: University of Louisiana at Lafayette, USA
- 6.14 PhD/Postdoc: Technical University of Cluj-Napoca, Romania
- 6.15 PhD/Postdoc: KU Leuven, Belgium
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- 6.17 Postdoc: University of California, Berkeley, USA
- 6.18 Postdoc: KTH, Sweden
- 6.19 Postdoc: Inria Lille, France
- 6.20 Postdoc: Uppsala University, Sweden
- 6.21 Postdoc: Queen's University Belfast, UK
- 6.22 Postdoc: IIT Hyderabad, India
- 6.23 Postdoc: University of Luxembourg, Luxembourg
- 6.24 Postdoc/Research Engineer: Aarhus University, Denmark
- 6.25 Faculty: KTH, Sweden
- 6.26 Faculty: IMT Atlantique, France
- 6.27 Faculty: UC Santa Cruz, USA
- 6.28 Research Fellow: National University of Singapore, Singapore

- 6.29 Research Scientist/Engineer: Bordrin New Energy Vehicle, USA
- 6.30 Research Engineer: Technology Centre for Offshore and Marine, Singapore
- 6.31 Scientist: Technology Centre for Offshore and Marine, Singapore

1 IEEE CSS Headlines

1.1. Become a CSS Member

Contributed by: Ahmad Taha, ahmad.taha@utsa.edu

Become a CSS Member by visiting the following link <https://bit.ly/2ZBWCCs>.

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1.2. Follow the CSS Social Media Accounts

Contributed by: Ahmad Taha and Ankush Chakrabarty ahmad.taha@utsa.edu, chakrabarty@merl.com

Follow us on Twitter <https://twitter.com/CSSIEEE>

Like us on Facebook <https://facebook.com/CSSIEEE>

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1.3. 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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1.4. 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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1.5. IEEE Transactions on Automatic Control

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

Volume 65 (2020), Issue 2 (February)

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- Control Synthesis for Permutation-Symmetric High-Dimensional Systems With Counting Constraints Peter Nilsson, Necmiye Ozay, p. 461
- Reachability Analysis of Large Linear Systems with Uncertain Inputs in the Krylov Subspace Matthias Althoff, p. 477
- Marking Estimation in a Class of Time Labelled Petri Nets Ziyue Ma, Zhiwu Li, Alessandro Giua, p. 493
- Lyapunov Event-triggered Stabilization with a Known Convergence Rate Anton V. Proskurnikov, Manuel Mazo Jr., p. 507
- Stability Theory of Stochastic Models in Opinion Dynamics Zahra Askarzadeh, Rui Fu, Abhishek Halder, Yongxin Chen, Tryphon T. Georgiou, p. 522
- Near-Optimality of Linear Strategies for Static Teams with 'Big' Non-Gaussian Noise Ankur A. Kulkarni, p. 534
- Lyapunov Criterion for Stochastic Systems and Its Applications in Distributed Computation Yuzhen Qin, Ming Cao, Brian D.O. Anderson, p. 546
- Synthesizing communication plans for reachability and safety specifications Kazumune Hashimoto, Dimos V. Dimarogonas, p. 561
- 2-D Frequency-Domain System Identification Xiaoyin Wang, Tao Qian, Iengtak Leong, You Gao, p. 577
- Whittle Index Policy for Dynamic Multi-channel Allocation in Remote State Estimation Jiazheng Wang, Xiaoqiang Ren, Yilin Mo, Ling Shi, p. 591
- Optimal Event-Triggered Control of Nondeterministic Linear Systems Dipankar Maity, John S. Baras, p. 604
- Periodic event-triggered control for nonlinear networked control systems Wei Wang, Romain Postoyan, Dragan Netic, W.P.M.H. Heemels, p. 620
- Data-driven Economic NMPC using Reinforcement Learning Sebastien Gros, Mario Zanon, p. 636
- Parametric Optimization Based MPC for Systems of Systems with Affine Coordination Constraints Branimir Novoselnik, Vedrana Spudic, Mato Baotic, p. 649
- Distributed Stochastic Approximation Algorithm With Expanding Truncations Jinlong Lei, Han-Fu Chen, p. 664
- Polling-systems-based Autonomous Vehicle Coordination in Traffic Intersections with No Traffic Signals David Miculescu, Sertac Karaman, p. 680

- Delay-tolerant Adaptive Robust Tracking Control of Uncertain Time-Delay Systems Jayaprakash Suraj Nandiganahalli, Cheolhyeon Kwon, Inseok Hwang, p. 695
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- Discrete-Time Implementation of Homogeneous Differentiators Stefan Koch, Markus Reichhartinger, Martin Horn, Leonid Fridman, p. 757
- Event-Triggered Adaptive Control for a Class of Nonlinear Systems With Unknown Control Direction and Sensor Faults Chenliang Wang, Changyun Wen, Qinglei Hu, p. 763
- State-Constrained Nonlinear L2-Gain Control Jenq-Lang Wu, Yung-Shan Chou, p. 771
- Distributed event-triggered gradient method for constrained convex minimization Changxin Liu, Huiping Li, Yang Shi, Demin Xu, p. 778
- Identification using Binary Measurements for IIR Systems Mathieu Pouliquen, Eric Pigeon, Olivier Gehan, Abdelhak GOUDJIL, p. 786
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- Adaptive error feedback regulator design for 1D heat equation with unknown harmonic disturbance anti-collocated with control Wei Guo, Feng-Fei Jin, p. 824
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- Leader-Following Attitude Consensus of Multiple Rigid Spacecraft Systems Under Switching Networks Maobin Lu, Lu Liu, p. 839
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- Observer-Based Robust Controller Design with Simultaneous Optimization of Scaling Matrices Masayuki Sato, p. 861
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- Varying-Parameter Convergent-Differential Neural Solution to Time-Varying Overdetermined System of Linear Equations Zhijun Zhang, Lunan Zheng, Tairu Qiu, Feiqi Deng, p. 874
- Continuous Control for Fully-Damped Mechanical Systems with Input Constraints: Finite-Time and Exponential Tracking Griselda Ivone Zamora-Gomez, Arturo Zavala-Rio, Daniela Juanita Lopez-Araujo, Emmanuel Cruz-Zavala, Emmanuel Nuño, p. 882
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1.6. IEEE Transactions on Control Systems Technology

Contributed by: Michelle Colasanti, ieeetcst@osu.edu

Volume 28 (2020), Issue 2 (March)

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- Load Control Problems in Direct Current Distribution Networks: Optimality, Equilibrium of Games, S. Zou, Z. Ma, and S. Liu, page 347
- A Hybrid Command Governor Scheme for Rotary Wings Unmanned Aerial Vehicles, W. Lucia, G. Franzè, and M. Sznaier, page 361
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- An Offline-Sampling SMPC Framework With Application to Autonomous Space Maneuvers, M. Mammarella, M. Lorenzen, E. Capello, H. Park, F. Dabbene, G. Guglieri, M. Romano, and F. Allgöwer, page 388
- Proportional–Integral Extremum Seeking for Vapor Compression Systems, D. J. Burns, C. R. Laughman, and M. Guay, page 403

- Iterative Identification and Control Using Non-normalized Coprime Factors With Application in Wafer Stage Motion Control, F. Boeren, A. Lanzon, and T. Oomen, page 413
- Sparsity-Exploiting Anytime Algorithms for Model Predictive Control: A Relaxed Barrier Approach, C. Feller and C. Ebenbauer, page 425
- Video-Rate Non-Raster AFM Imaging With Cycloid Trajectory, N. Nikooienejad, A. Alipour, M. Maroufi, and S. O. R. Moheimani, page 436
- Beyond Performance/Cost Tradeoffs in Motion Control: A Multirate Feedforward Design With Application to a Dual-Stage Wafer System, J. van Zundert, T. Oomen, J. Verhaegh, W. Aangent, D. J. Antunes, and W. P. M. H. Heemels, page 448
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- Fitted Q-Function Control Methodology Based on Takagi–Sugeno Systems, H. Díaz, L. Armesto, and A. Sala, page 477
- On the Stability of Nonlinear Wheel-Slip Zero Dynamics in Traction Control Systems, E. Reichensdörfer, D. Odenthal, and D. Wollherr, page 489
- An Adaptive Observer Design for Real-Time Parameter Estimation in Lithium-Ion Batteries, D. W. Limoge and A. M. Annaswamy, page 505
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- Set-Based State Estimation in Quantized State Feedback Control Systems With Quantized Measurements, T. Zanma, T. Ohtsuka, and K.-Z. Liu, page 550
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- Experimental Validation of an Antilock Braking System for Snowmobiles With Lateral Stability Considerations, M. Corno, F. Roselli, L. Onesto, F. Molinaro, E. Graves, A. Doubek, and S. M. Savaresi, page 705

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1.7. IEEE Transactions on Control of Network Systems: CFP & Deadline Extension

Contributed by: Jeff Shamma and Silvia Ferrari, ferrari@cornell.edu, jeff.shamma@kaust.edu.sa

(Deadline Extension) TCNS Special Issue on Control of Very-large Scale Robotic (VLSR) Networks

The Transactions on Control of Network Systems invites submissions for a special issue on Control of Very-large Scale Robotic (VLSR) Networks, tentatively scheduled for publication in March 2021.

Submission Deadline (extended): March 15, 2020

Submissions instructions can be found on the TCNS special issue web page:

<http://sites.bu.edu/tcns/vlsr/>

Guest Editors:

* Silvia Ferrari, Professor, Sibley School of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY

* Richard Linares, Charles Stark Draper Assistant Professor, Department of Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, MA

* Thomas A. Wettergren, Senior Technologist (ST) for Operational and Information Science, Naval Undersea Warfare Center (NUWC), Newport, RI

* Keith LeGrand, Senior Member of Technical Staff, Sandia National Laboratories, Albuquerque, NM

Scope: Future applications of robotics and autonomous systems will involve increasingly large numbers of collaborative robots, sensors, and unmanned vehicles that are each capable of collecting, processing, and acting upon information with little or no human intervention. By sharing and coordinating information, plans, and decisions, these very-large-scale robotic (VLSR) networks can dramatically improve their

performance in various industrial and military applications. Sensing and control of collaborative agents, however, present many technical challenges, including required computations that increase with the number of agents, and the challenge of accounting for information and uncertainties propagating through the network. Probability density function (PDF) based methods and partial differential equation (PDE) models are emerging, promising approaches for deriving decentralized control strategies that scale up to VLSR networks comprised of hundreds of agents. Random finite set (RFS) theory and finite set statistics (FISST) have also emerged as a unifying approach to estimation and tracking via multi-object PDFs that can be used to describe the state of multiple objects utilizing multiple sensor measurements.

TCNS solicits original contributions which propose new scalable theory and algorithms for solving emerging challenges in the control and estimation of complex, large-scale systems, including rigorous contributions on new theoretical analysis and new methods for VLSR control, tracking, and estimation, as well as emerging VLSR applications of partial differential equation (PDE) and probability density function (PDF)-based methods, as well as other novel approaches. This special issue also solicits original contributions that explore the use of random finite set (RFS) and other emerging theories on complex systems for representing the statistical properties of large collections of agents by compact and efficient representations, such as multi-object PDFs. Furthermore, probabilistic methods have been shown to generalize traditional Bayesian filtering and estimation to include flexible detection, sensing, and dynamic behaviors to many agents. However, several unsolved technical issues remain, including but not limited to the scalability of information value functions, the assimilation of heterogeneous data, and how to determine the object dynamics from data.

Special Topics include but not limited to:

- Controllability and observability in PDE models of VLSR networks
- Optimality conditions for PDE and PDF-based control and estimation
- Efficient numerical and analytical solutions to large-scale control problems
- Solutions to large-scale control problems that utilize RFS theory
- New PDE or RFS models and state representations of VLSR systems
- New theory and analysis of VLSR discrete and continuous representations and dynamics
- Probabilistic solutions to swarming systems
- New theoretical results in stochastic control of large-scale systems leveraging RFS theory
- New formulations of estimation and control problem using RFS theory
- New applications of RFS theory to networked systems

Submission Details:

Information on the submission process and manuscript format can be found at:

<http://sites.bu.edu/tcns/information-for-authors/>

For more information, visit: <http://sites.bu.edu/tcns/vlsr/>

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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. International Graduate School on Control

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

2020 International Graduate School on Control (EECI-IGSC-2020)

Early registration and Grant application deadline for M10 to M25 of the *2020 International Graduate School on Control*, technically co-sponsored by IFAC and IEEE CSS, is approaching: *8 March 2020*.

M10 – Model Predictive Control by Eduardo F. Camacho

M11 – Control and Optimization of Autonomous Power Systems by Florian Dörfler and Saverio Bolognani

M12 – An Introduction to Financial Markets for the Uninitiated: New Research Directions for Engineers by B. Ross Barmish

M13 – Distributed Computation and Control by A. Stephen Morse

M14 – Computational Issues in Nonlinear Control and Estimation by Arthur Krener

M15 – Stability and Stabilisation of Nonlinear Time-Varying Systems: Applications to Multi-Agent systems by Elena Panteley and Antonio Loria

M16 – Homogeneity Based Design of Sliding Mode Controllers by Leonid Fridman, Jaime Alberto Moreno Pérez and Bijan Bandyopadhyay

M17 – Sparsity and Big Data in Control, Systems Identification and Machine Learning by Mario Sznaier

M18 – Hybrid Control Design by Ricardo G. Sanfelice

M19 – Time-Delay and Sampled-Data Systems by Emilia Fridman and Pierdomenico Pepe

M20 – Decentralized and Distributed Control by Giancarlo Ferrari-Trecate and Marcello Farina

M21 – Introduction to Discrete Event Systems by Stephane Lafortune and Christos Cassandras

M22 – Introduction to Optimal and Stochastic Control by Alessandro Astolfi and Giordano Scarciotti

M23 – Dynamic Control Allocation by Andrea Serrani, Sergio Galeani and Mario Sassano

M24 – LMIs for Optimization and Control by Didier Henrion

M25 – Robust and Adaptive Output Regulation of Multivariable and Hybrid Systems by Alberto Isidori and Lorenzo Marconi.

Courses will take place in Berlin, Istanbul, Lausanne, London, Marseille, Mumbai, Padova, Paris-Saclay, Prague, Rome, Shanghai, Stockholm, and Toulouse.

For more details, see <https://eeciinstitute.web-events.net/igsc-program-2020>

Limited number of seats at some course locations.

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3 Books

3.1. Cloud Control Systems: Analysis, Design and Estimation

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

Cloud Control Systems: Analysis, Design and Estimation by Magdi S. Mahmoud Yuanqing Xia

ISBN: 9780128187012

17th January 2020, Academic Press

Paperback, 506 pages, \$150

Series: Emerging Methodologies and Applications in Modelling, Identification and Control

<https://www.elsevier.com/books/cloud-control-systems/mahmoud/978-0-12-818701-2>

Description: Cloud Control Systems: Analysis, Design and Estimation introduces readers to the basic definitions and various new developments in the growing field of cloud control systems (CCS). The book begins with an overview of cloud control systems (CCS) fundamentals, which will help beginners to better understand the depth and scope of the field. It then discusses current techniques and developments in CCS, including event-triggered cloud control, predictive cloud control, fault-tolerant and diagnosis cloud control, cloud estimation methods, and secure control/estimation under cyberattacks. This book benefits all researchers including professors, postgraduate students and engineers who are interested in modern control theory, robust control, multi-agents control.

Key Features:

- Offers insights into the innovative application of cloud computing principles to control and automation systems
- Provides an overview of cloud control systems (CCS) fundamentals and introduces current techniques and developments in CCS
- Investigates distributed denial of service attacks, false data injection attacks, resilient design under cyberattacks, and safety assurance under stealthy cyberattacks

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12. A unified game approach under DoS attacks
13. Secure estimation subject to cyber stochastic attacks
14. Cloud-based approach in data centers

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3.2. Control applications for Biomedical Engineering Systems

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

Control Applications for Biomedical Engineering Systems edited by Ahmad Taher Azar

ISBN: 9780128174616

24th January 2020, Academic Press

Paperback: 476 pages, \$150

<https://www.elsevier.com/books/control-applications-for-biomedical-engineering-systems/azar/978-0-12-817461-6>

Description: Control Applications for Biomedical Engineering Systems presents different control engineering and modeling applications in the biomedical field. It is intended for senior undergraduate or graduate students in both control engineering and biomedical engineering programs. For control engineering students, it presents the application of various techniques already learned in theoretical lectures in the biomedical arena. For biomedical engineering students, it presents solutions to various problems in the field using methods commonly used by control engineers.

Key Features:

- Points out theoretical and practical issues to biomedical control systems
- Brings together solutions developed under different settings with specific attention to the validation of these tools in biomedical settings using real-life datasets and experiments
- Presents significant case studies on devices and applications

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1. Neuro-fuzzy inverse optimal control incorporating a multistep predictor as applied to T1DM patients
2. Blood glucose regulation in patients with type 1 diabetes by means of output-feedback sliding mode control
3. Impulsive MPC schemes for biomedical processes: Application to type 1 diabetes
4. Robust control applications in biomedical engineering: Control of depth of hypnosis
5. Robust control strategy for HBV treatment: Considering parametric and nonparametric uncertainties
6. A closed loop robust control system for electrosurgical generators
7. Application of a T-S unknown input observer for studying sitting control for people living with spinal cord injury
8. Epidemic modeling and control of HIV/AIDS dynamics in populations under external interactions: A worldwide challenge
9. Reinforcement learning-based control of drug dosing with applications to anesthesia and cancer therapy
10. Control strategies in general anesthesia administration
11. Computational modeling of the control mechanisms involved in the respiratory system
12. Intelligent decision support for lung ventilation
13. Customized modeling and optimal control of superovulation stage in in vitro fertilization (IVF) treatment
14. Models based on cellular automata for the analysis of biomedical systems

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3.3. Control Systems Design of Bio-Robotics with Advanced Applications

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

Control Systems Design of Bio-Robotics and Bio-Mechatronics with Advanced Applications edited by Ahmad Taher Azar

ISBN: 9780128174630

30th November 2019, Academic Press

Paperback 502 pages, \$150

<https://www.elsevier.com/books/control-systems-design-of-bio-robotics-and-bio-mechatronics-with-advanced-applications/azar/978-0-12-817463-0>

Description: Control Systems Design of Bio-Robotics and Bio-Mechatronics with Advanced Applications delivers essential and advanced bioengineering information on the application of control and robotics technologies in the life sciences. Judging by what we have witnessed so far, this exciting field of control systems and robotics in bioengineering is likely to produce revolutionary breakthroughs over the next decade. While this book is intended for senior undergraduate or graduate students in both control engineering and biomedical engineering programs, it will also appeal to medical researchers and practitioners who want to enhance their quantitative understanding of physiological processes.

Key Features:

- Focuses on the engineering and scientific principles underlying the extraordinary performance of biomedical robotics and bio-mechatronics
- Demonstrates the application of principles for designing corresponding algorithms
- Presents the latest innovative approaches to medical diagnostics and procedures, as well as clinical rehabilitation from the point-of-view of dynamic modeling, system analysis and control

Table of Contents

1. Human-Robot Interaction for Rehabilitation Scenarios
2. State Observation and Feedback Control in Robotic Systems for Surgery and Therapy
3. Robin Heart Surgical Robot: Description and future challenges
4. Real-Time Object Detection and Manipulation Using Biomimetic Musculoskeletal Soft Robotic Grasper Addressing Robotic Fan Handling Challenge
5. Formal Verification of Robotic Cell Injection Systems
6. Identifying Vessel Branching from Fluid Stresses on Microscopic Robots
7. Navigation and Control of Endovascular Helical Swimming Microrobot Using Dynamic Programming and Adaptive Sliding Mode Strategy
8. Robotics in endoscopic transnasal skull base surgery: literature review and personal experience
9. Strategies for mimicking the movements of an upper extremity using superficial electromyographic signals
10. Automated Transportation of Micro-particles in vivo
11. Medical Nanorobots: Design, applications and future challenges
12. Impedance Control Applications in Therapeutic Exercise Robots
13. Architecture and Application of Nanorobots in Medicine

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3.4. Generalized Homogeneity in Systems and Control

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

Generalized Homogeneity in Systems and Control by Andrey Polyakov

ISBN: 978-3-030-38448-7

April 2020, Springer

Hardcover, 447 pages, \$159.99/€129,99

<https://www.springer.com/gb/book/9783030384487>

This monograph introduces the theory of generalized homogeneous systems governed by differential equations in both Euclidean (finite-dimensional) and Banach/Hilbert (infinite-dimensional) spaces. It develops methods of stability and robustness analysis, control design, state estimation and discretization of homogeneous control systems.

Generalized Homogeneity in Systems and Control is structured in two parts. Part I discusses various models of control systems and related tools for their analysis, including Lyapunov functions. Part II deals with the analysis and design of homogeneous control systems. Some of the key features of the text include:

- mathematical models of dynamical systems in finite-dimensional and infinite-dimensional spaces;
- the theory of linear dilations in Banach spaces;
- homogeneous control and estimation;
- simple methods for an “upgrade” of existing linear control laws;
- numerical schemes for a consistent digital implementation of homogeneous algorithms; and
- experiments confirming an improvement of PID controllers.

The advanced mathematical material will be of interest to researchers, mathematicians working in control theory and mathematically oriented control engineers.

Contents

1. Introduction
2. Finite-Dimensional Models
3. Infinite-Dimensional Models
4. Stability and Convergence Rate
5. Method of Lyapunov Functions
6. Dilation Groups in Banach, Hilbert, and Euclidean Spaces
7. Homogeneous Mappings
8. Analysis of Homogeneous Dynamical Systems
9. Homogeneous Stabilization
10. Consistent Discretization of Homogeneous Models
11. Homogeneous State Estimation
12. Homogeneous Optimal Control

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3.5. Nonsmooth Lyapunov Analysis in Finite and Infinite Dimensions

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

Nonsmooth Lyapunov Analysis in Finite and Infinite Dimensions by Yury Orlov

ISBN: 978-3-030-37624-6

February 2020, Springer

Hardcover, 340 pages, \$179.99/€155,99

<https://www.springer.com/gb/book/9783030376246>

Nonsmooth Lyapunov Analysis in Finite and Infinite Dimensions provides helpful tools for the treatment of a broad class of dynamical systems that are governed, not only by ordinary differential equations but also by partial and functional differential equations. Existing Lyapunov constructions are extended to discontinuous systems—those with variable structure and impact—by the involvement of nonsmooth Lyapunov functions. The general theoretical presentation is illustrated by control-related applications; the nonsmooth Lyapunov construction is particularly applied to the tuning of sliding-mode controllers in the presence of mismatched disturbances and to orbital stabilization of the bipedal gait. The nonsmooth construction is readily extendible to the control and identification of distributed-parameter and time-delay systems.

The first part of the book outlines the relevant fundamentals of benchmark models and mathematical basics. The second concentrates on the construction of nonsmooth Lyapunov functions. Part III covers design and applications material.

This book will benefit the academic research and graduate student interested in the mathematics of Lyapunov equations and variable-structure control, stability analysis and robust feedback design for discontinuous systems. It will also serve the practitioner working with applications of such systems. The reader should have some knowledge of dynamical systems theory, but no background in discontinuous systems is required—they are thoroughly introduced in both finite- and infinite-dimensional settings.

Contents:

1. Benchmark Models
2. Mathematical Background
3. Mathematical Tools of Dynamic Systems in Hilbert Spaces
4. Modern Lyapunov Tools
5. Control Lyapunov Functions
6. Lyapunov-Based Tuning
7. Lyapunov Approach to Adaptive Identification and Control in Infinite-Dimensional Setting
8. Control Applications

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3.6. Variable-Structure Systems and Sliding-Mode Control

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

Variable-Structure Systems and Sliding-Mode Control edited by Martin Steinberger, Martin Horn, and Leonid Fridman

ISBN: 978-3-030-36620-9

February 2020, Springer

Hardcover, 462 pages, \$179.99/€155,99

<https://www.springer.com/gb/book/9783030366209>

The book covers the latest theoretical results and sophisticated applications in the field of variable-structure systems and sliding-mode control.

This book is divided into four parts. Part I discusses new higher-order sliding-mode algorithms, including new homogeneous controllers and differentiators. Part II then explores properties of continuous sliding-mode algorithms, such as saturated feedback control, reaching time, and orbital stability. Part III is focused on the usage of variable-structure systems (VSS) controllers for solving other control problems, for example unmatched disturbances. Finally, Part IV discusses applications of VSS; these include applications within power electronics and vehicle platooning.

Variable-structure Systems and Sliding-Mode Control will be of interest to academic researchers, students and practising engineers.

Contents:

1. New Homogeneous Controllers and Differentiators
2. Discontinuous Integral Control for Systems with Arbitrary Relative Degree
3. Computing and Estimating the Reaching Time of the Super-Twisting Algorithm
4. Saturated Feedback Control Using Different Higher-Order Sliding-Mode Algorithms
5. Constrained Sliding-Mode Control: A Survey
6. Analysis of Orbital Stability of Self-excited Periodic Motions in Lure System
7. Chattering Comparison Between Continuous and Discontinuous Sliding-Mode Controllers
8. Sliding-Mode Stabilization of SISO Bilinear Systems with Delays
9. Compensation of Unmatched Disturbances via Sliding-Mode Control
10. Grid-Connected Shunt Active LCL Control via Continuous SMC and HOSMC Techniques
11. On the Robust Distributed Secondary Control of Islanded Inverter-Based Microgrids
12. Local and Wide-Area Sliding-Mode Observers in Power Systems
13. Sliding-Mode-Based Platooning: Theory and Applications
14. Single-Loop Integrated Guidance and Control Using High-Order Sliding-Mode Control

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3.7. Nonsmooth Lyapunov Analysis in Finite and Infinite Dimensions

Contributed by: Yury Orlov, yorlov@cicese.mx

Nonsmooth Lyapunov Analysis in Finite and Infinite Dimensions by Yury Orlov

ISBN: 978-3-030-37624-6

March 2020, Springer

Communication and Control Engineering Series

Hardcover, 340 pages, €149.99

<https://www.springer.com/in/book/9783030376246>

A systematic construction of possibly non-differentiable Lyapunov functions forms a core of the present research monograph, focusing on variable structure systems with resets and coming with elements of a textbook on such systems. The extension to other discontinuous (e.g., relay, impulsive, switched, hybrid, event-triggered) systems is possible and the development is rather involved.

The monograph consists of three parts. Part I outlines relevant fundamentals for the investigation to be conducted. Chapter 1 previews discontinuous benchmark models of variable structure systems (VSS) with resets in continuous- and discrete-time perspectives. Background material and mathematical tools are presented for these models in Chap. 2 in the finite-dimensional setting and in Chap. 3 in the infinite-dimensional setting. Special attention is given to peculiar motions such as sliding modes (SMs), Zero modes, and bifurcations under unilateral constraints that will arise in the sequel.

Part II constructs Lyapunov functions for discontinuous systems of interest. For such systems, Chap. 4 updates modern Lyapunov tools, capturing strict and nonstrict semiglobal Lyapunov functions as well as so-called input-to-state stable (ISS), finite time stable (FTS), and homogeneous Lyapunov functions. The construction of Lyapunov–Krasovskii functionals is additionally presented in a Hilbert space. Constructive Lyapunov functions are then introduced in Chap. 5 as specific (viscous/proximal Filippov) solutions of properly interpreted linear gradient Lyapunov and quadratic Hamilton–Jacobi partial differential equation/inequality (PDE/PDI), derived for discontinuous systems. The combination of the conventional Lyapunov stability theory with the homogeneity concept constitutes the key idea to design feedback control systems with finite-time convergence, which is not accessible for Lipschitzian systems.

Attractive features of the proposed Lyapunov function constructions are illustrated in Part III. Based on the Hamilton–Jacobi PDE approach, the gains of first and second-order sliding mode algorithms are properly tuned in Chap. 6 not only for rejecting matched external disturbances but also for attenuating mismatched ones. A remarkable extension to the boundary control of a heat process is additionally presented here. In Chap. 7, the Lyapunov redesign is applied in the infinite-dimensional setting for adaptive identification of linear distributed parameter systems (DPS) and time-delay systems (TDS). Finally, Chap. 8 advertises engineering control applications such as robust stabilization of a bipedal gait under unilateral constraints as well as the sine-Gordon energy control, constituting an academic example of controlling continuum of oscillators.

This book will benefit the academic research and graduate student interested in the mathematics of Lyapunov equations and variable-structure control, stability analysis and robust feedback design for discontinuous systems. It will also serve the practitioner working with applications of such systems.

Contents:

1. Benchmark Models
2. Mathematical Background
3. Mathematical Tools of Dynamic Systems in Hilbert Spaces
4. Modern Lyapunov Tools
5. Control Lyapunov Functions
6. Lyapunov-Based Tuning
7. Lyapunov Approach to Adaptive Identification and Control in Infinite-Dimensional Setting
8. Control Applications

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3.8. The Koopman Operator in Systems and Control

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

The Koopman Operator in Systems and Control by Alexandre Mauroy, Igor Mezic, and Yoshihiko Susuki

ISBN: 978-3-030-35712-2

February 2020, Springer

Hardcover, 556 pages, \$179.99/€155,99

<https://www.springer.com/gb/book/9783030357122>

This book provides a broad overview of state-of-the-art research at the intersection of the Koopman operator theory and control theory. It also reviews novel theoretical results obtained and efficient numerical methods developed within the framework of Koopman operator theory.

The contributions discuss the latest findings and techniques in several areas of control theory, including model predictive control, optimal control, observer design, systems identification and structural analysis of controlled systems, addressing both theoretical and numerical aspects and presenting open research directions, as well as detailed numerical schemes and data-driven methods. Each contribution addresses a specific problem. After a brief introduction of the Koopman operator framework, including basic notions and definitions, the book explores numerical methods, such as the dynamic mode decomposition (DMD) algorithm and Arnoldi-based methods, which are used to represent the operator in a finite-dimensional basis and to compute its spectral properties from data.

The main body of the book is divided into three parts:

- theoretical results and numerical techniques for observer design, synthesis analysis, stability analysis, parameter estimation, and identification;
- data-driven techniques based on DMD, which extract the spectral properties of the Koopman operator from data for the structural analysis of controlled systems; and
- Koopman operator techniques with specific applications in systems and control, which range from heat transfer analysis to robot control.

A useful reference resource on the Koopman operator theory for control theorists and practitioners, the book is also of interest to graduate students, researchers, and engineers looking for an introduction to a

novel and comprehensive approach to systems and control, from pure theory to data-driven methods.

Contents:

1. Introduction to the Koopman Operator in Dynamical Systems and Control Theory
2. Koopman Framework for Global Stability Analysis
3. Koopman Framework for Nonlinear Estimation
4. Global Bilinearization and Reachability Analysis of Control-Affine Nonlinear Systems
5. Koopman Spectrum and Stability of Cascaded Dynamical Systems
6. Koopman Operator Theory for Nonautonomous and Stochastic Systems
7. Dynamic Mode Decomposition—A Numerical Linear Algebra Perspective
8. Data-Driven Approximations of Dynamical Systems Operators for Control
9. Koopman Model Predictive Control of Nonlinear Dynamical Systems
10. Feedback Control of Nonlinear PDEs Using Data-Efficient Reduced Order Models Based on the Koopman Operator
11. Solving Optimal Control Problems for Monotone Systems Using the Koopman Operator
12. Data-Driven Nonlinear Stabilization Using Koopman Operator
13. Parameter Estimation and Identification of Nonlinear Systems with the Koopman Operator
14. Manifold Learning for Data-Driven Dynamical System Analysis
15. Phase-Amplitude Reduction of Limit Cycling Systems
16. Experimental Applications of the Koopman Operator in Active Learning for Control
17. Application of Koopman-Based Control in Ultrahigh-Precision Positioning
18. Modeling of Advective Heat Transfer in a Practical Building Atrium via Koopman Mode Decomposition
19. Data-Driven Voltage Analysis of an Electric Power Grid via Delay Embedding and Extended Dynamic Mode Decomposition
20. Koopman Performance Analysis of Nonlinear Consensus

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3.9. An Introduction to Compressed Sensing

Contributed by: Mathukumalli Vidyasagar, M.Vidyasagar@iith.ac.in

New Research Monograph on Compressed Sensing

I have recently published a comprehensive and state of the art monograph on compressed sensing. A distinctive feature of this book is the use of sparse binary measurement matrices. Much of compressed sensing theory to date is based on randomly generated Gaussian samples. As a result, the measurement matrices are dense and must be stored to high precision.

The approach of using sparse binary measurement matrices leads to efficient implementation of compressed sensing algorithms. Another distinctive feature is a thorough discussion of the matrix completion problem, including a solution of the problem using some concepts from graph theory.

The book can be purchased at:

<https://my.siam.org/Store/Product/viewproduct/?ProductId=31254937>

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4 Journals

4.1. Evolution Equations and Control

Contributed by: Irena Lasiecka, lasiecka@memphis.edu

EECT (Evolution Equations and Control)

Volume 9, Number 4, March 2020

<https://www.aims sciences.org/journal/A0000-0000/2020/9/1>

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- Abdelmouhcene Sengouga, Exact boundary observability and controllability of the wave equation in an interval with two moving endpoints , p. 1
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- Gilbert Peralta, Uniform exponential stability of a uid-plate interaction model due to thermal effects , p. 39
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4.2. Systems & Control Letters

Contributed by: Lusia Veksler, lveksler@ucsd.edu

Systems & Control Letters

Volume 136, February 2020

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- Contraction analysis of nonlinear noncausal iterative learning control, Felix H. Kong, Ian R. Manchester, Article 104599

- Global adaptive stabilization of stochastic high-order switched nonlinear non-lower triangular systems, Ben Niu, Ming Liu, Ang Li, Article 104596
- Finite determination of accessibility and singular points of nonlinear systems: An algebraic approach, Mohammad Amin Sarafrazi, Ülle Kotta, Zbigniew Bartosiewicz, Article 104600
- Cubification of SDE and exact moment equations, Alessandro Borri, Francesco Carravetta, Pasquale Palumbo, Article 104602
- Stochastic Nicholson-type delay system with regime switching, Wentao Wang, Wei Chen, Article 104603
- The Deficiency Zero Theorem and global asymptotic stability for a class of chemical reaction networks with arbitrary time delays, Hirokazu Komatsu, Hiroyuki Nakajima, Article 104601
- Stability analysis of impulsive stochastic delayed differential systems with unbounded delays, Wei Hu, Quanxin Zhu, Article 104606
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- Boundary sampled-data feedback stabilization for parabolic equations, Hanbing Liu, Peng Hu, Article 104618

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4.3. Applied and Computational Mathematics an International Journal

Contributed by: Fikret Aliev, chief_ed@acmij.az

Applied and Computational Mathematics an International Journal

Vol.19, No.1, February 2020

www.acmij.az

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4.4. Asian Journal of Control

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

Asian Journal of Control

Vol. 22, No. 1

January, 2020

<https://onlinelibrary.wiley.com/toc/19346093/2020/22/1>

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26. Paper Title: Observer-Based Multiple Faults Diagnosis Scheme for Satellite Attitude Control System (Page: 307-322)
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27. Paper Title: Finite-Time Average Consensus Based Approach for Distributed Convex Optimization (Page: 323-333)

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Authors: Yicheng Liu, Xiaofeng Liao, Chuandong Li

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Authors: Farhad Bayat, Mojtaba Javaheri

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Authors: Ming Yue, Xiaoqiang Hou, Junjie Gao, Lu Yang

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Authors: Chunyu Wei, Yue Cai, Ke Zhang, Zhan Wang, Wenda Yu

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40. Paper Title: Tensor Product-Based Model Transformation and Optimal Controller Design for High Order Nonlinear Singularly Perturbed Systems (Page: 486-499)

Author: Hajer Bouzaouache

41. Paper Title: Modeling, Reachability and Controllability of Bounded Petri Nets Based on Semi-Tensor Product of Matrices (Page: 500-510)

Authors: Xiaoguang Han, Zengqiang Chen, Kuize Zhang, Zhongxin Liu, Qing Zhang

42. Paper Title: H-Infinity Filtering for Spatially Interconnected Time-Delay Systems with Interconnected Chains in Finite Frequency Domains (Page: 511-520)

Authors: Guopeng Wang, Huiling Xu, Guizhou Zhang, Juan Yao

43. Paper Title: Adaptive Composite Fuzzy Dynamic Surface Control for Electro-Hydraulic-System, with Variable-Supply-Pressure (Page: 521-535)

Authors: Qinyang Guo, Guanglin Shi, Dongmei Wang

44. Paper Title: H-Infinity Consensus of Directed Lur'e Networks with Incremental Nonlinearities (Page: 536-546)

Authors: Weixin Han, Zhenhua Wang, Yi Shen

45. Paper Title: Radial Pole Paths SVSC for Linear Time Invariant Multi Input Systems with Constrained Inputs (Page: 547-555)

Authors: Mojtaba Kaheni, Mohammed Hadad Zarif, Ali Akbarzadeh Kalat, Mohammed Sami Fadali

46. Paper Title: Composite Finite-time Convergent Guidance Law for Maneuvering Targets with Second-order Autopilot Lag (Page: 556-569)

Authors: Junxiong Wu, Hui Wang, Shaoming He, Defu Lin

47. Paper Title: Global projective lag synchronization of fractional order memristor based BAM neural networks with mixed time varying delays (Page: 570-583)

Authors: Anbalagan Pratap, Ramachandran Raja, Chandran Sowmiya, Ovidiu Bagdasar, Jinde Cao, Grieng-rai Rajchakit

Brief Papers:

1. Paper Title: Prediction-based Adaptive Robust Tracking Control of an Uncertain First-Order Time-Delay System (Page: 584-589)

Authors: Jayaprakash Suraj Nandiganahalli, Cheolhyeon Kwon, Inseok Hwang

2. Paper Title: Distributed Event-Triggered Consensus for Multiple Underactuated Systems Under Markovian Switching Topologies (Page: 590-599)

Authors: Zhen Zhou, Hongbin Wang, Zhongquan Hu, Shungang Ge

3. Paper Title: Statistical Tests for Integrity Attacks on Cyber-Physical Systems (Page: 600-605)

Authors: Qingliang Zeng, Shaoning Pu, Xin Zhang

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4.5. IET Control Theory & Applications

Contributed by: Eleanor Gendle, egendle@theiet.org

IET Control Theory & Applications

Volume 14

February 2019

<http://digital-library.theiet.org/content/journals/iet-cta/14/4>

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- Ming Gao, Jun Hu, Dongyan Chen, Chaoqing Jia, Resilient state estimation for time-varying uncertain dynamical networks with data packet dropouts and switching topology: an event-triggered method, p. 367–377

- Peng Wang and Jun Zhao, Stability and guaranteed cost analysis of switched positive systems with mode-dependent dwell time and sampling, p. 378–385

- Yaning Lin, Pareto optimality in the infinite horizon cooperative difference game, p. 386–395
- Guanglei Zhao and Shida Yang, Distributed stochastic MPC for linear systems with probabilistic constraints and quantisation, p. 396–404
- Kangli Xu and Yaolin Jiang, Structure-preserving interval-limited balanced truncation reduced models for port-Hamiltonian systems, p. 405–414
- Zhenyi Yuan, Yingxin Tian, Yunfei Yin, Siyi Wang, Jianxing Liu, Ligang Wu, Trajectory tracking control of a four mecanum wheeled mobile platform: an extended state observer-based sliding mode approach, p. 415–426
- Shin-Chen Hu and Yen-Chen Liu, Event-triggered control for adaptive bilateral teleoperators with communication delays, p. 427–437
- Luy Nguyen Tan, Event-triggered distributed H-Infinity control of physically interconnected mobile Euler-Lagrange systems with slipping, skidding and dead zone, p. 438–451
- Haonan Jiang and Yuanli Cai, Gaussian sum pseudolinear Kalman filter for bearings-only tracking, p. 452–460
- Xiaoping Liu, Yao Zou, Ziyang Meng, Zheng You, Velocity-free coordinated attitude synchronisation and tracking control of multiple spacecraft, p. 461–469
- Adrian E. Onyeka, Yan Xing-Gang, Zehui Mao, Bin Jiang, Qingling Zhang, Robust decentralised load frequency control for interconnected time delay power systems using sliding mode techniques, p. 470–480
- Min Li, Na Li, Zhen Wu, Linear-quadratic mean-field game for stochastic large-population systems with jump diffusion, p. 481–489

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- Guipu Li, Xiangyu Wang, Shihua Li, Consensus control of higher-order Lipschitz non-linear multi-agent systems based on backstepping method, p. 490–498
- Fengming Han and Yingmin Jia, Boundary control and exponential stability of a flexible Timoshenko beam manipulator with measurement delays, p. 499–510
- Sen Zhang, Li Sheng, Ming Gao, Donghua Zhou, Intermittent fault detection for discrete-time linear stochastic systems with time delay, p. 511–518
- Luxin Lin, Zhen Liu, Yonggui Kao, Ruiping Xu, Observer-based adaptive sliding mode control of uncertain switched systems, p. 519–525

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4.6. 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>

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Vol. 18, No. 3, March 2020

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- Marine Robotics and Control Systems Son-Cheol Yu, Antonio M. Pascoal, and Jinwhan Kim, pp.521-522

Papers:

- Realistic Sonar Image Simulation Using Deep Learning for Underwater Object Detection Minsung Sung, Jason Kim, Meungsuk Lee, Byeongjin Kim, Taesik Kim, Juhwan Kim, and Son-Cheol Yu*, pp.523-534
- Development of an Autonomous Surface Vehicle and Performance Evaluation of Autonomous Navigation Technologies Jinwoo Choi, Jeonghong Park, Jongdae Jung, Yoongeon Lee, and Hyun-Taek Choi*, pp.535-545
- Collaborative Mission and Route Planning of Multi-vehicle Systems for Autonomous Search in Marine Environment Sukmin Yoon, Haggi Do, and Jinwhan Kim*, pp.546-555
- Control Allocation for Double-ended Ferries with Full-scale Experimental Results Tobias R. Torben*, Astrid H. Brodtkorb, and Asgeir J. Sørensen, pp.556-563
- Three-dimensional Visual Mapping of Underwater Ship Hull Surface Using Piecewise-planar SLAM Seonghun Hong and Jinwhan Kim*, pp.564-574
- Analysis of Electromagnetic Waves Attenuation for Underwater Localization in Structured Environments Daegil Park, Wan Kyun Chung, and Jinhyun Kim*, pp.575-586
- 3D Reconstruction Using Two Sonar Devices in a Monte-Carlo Approach for AUV Application Hangil Joe, Jason Kim, and Son-Cheol Yu*, pp.587-596
- Tracking a Sea Turtle by an AUV with a Multibeam Imaging Sonar: Toward Robotic Observation of Marine Life Toshihiro Maki*, Hiroumi Horimoto, Takashi Ishihara, and Kazuya Kofuji, pp.597-604
- Underwater Image Dehazing via Unpaired Image-to-image Translation Younggun Cho, Hyesu Jang, Ramavtar Malav, Gaurav Pandey, and Ayoung Kim*, pp.605-614
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- A Survey on Filtering Issues for Two-Dimensional Systems: Advances and Challenges Fan Wang, Zidong Wang, Jinling Liang* and Jun Yang, pp.629-642
- Gaussian Sum FIR Filtering for 2D Target Tracking Jung Min Pak, pp.643-649
- The Auxiliary Model Based Hierarchical Estimation Algorithms for Bilinear Stochastic Systems with Colored Noises Chunqiu Guo, Longjin Wang*, and Fang Deng, pp.650-660
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- Stability of Stochastic Functional Differential Systems with Semi-Markovian Switching and Lévy Noise and Its Application Wenpin Luo, Xinzhi Liu, and Jun Yang*, pp.708-718

- Robust Tracking Control with Preview Action for Uncertain Discrete-time Systems Li Li, Fucheng Liao*, and Zhenqin Ren, pp.719-729
- Quadrotor Flight Controller Design Using Classical Tools Tomasz Zubowicz*, Krzysztof Arminski, and Arkadiusz Kusalewicz, pp.730-738
- Fault-tolerant Compensation Control Based on Sliding Mode Technique of Unmanned Marine Vehicles Subject to Unknown Persistent Ocean Disturbances Li-Ying Hao, He Zhang, Wei Yue*, and Hui Li, pp.739-752
- A Constrained Predictive Controller for AUV and Computational Optimization Using Laguerre Functions in Unknown Environments Ali Jabar Rashidi*, Bahram Karimi, and Ayoub Khodaparast, pp.753-767
- Layered Formation-containment Control of Multi-agent Systems in Constrained Space Dongyu Li, Shuzhi Sam Ge, Guangfu Ma*, and Wei He, pp.768-779
- A New Iterative Least Squares Parameter Estimation Approach for Equation-error Autoregressive Systems Lijuan Wan, Feng Ding*, Ximei Liu*, and Chunping Chen, pp.780-790
- Estimation of Slag Removal Path using CNN-based Path Probability of Ladle Image Blocks Jeong-Soo Kim, Geon-Tae Ahn, Soon-Yong Park*, pp.791-800

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4.7. CFP: Asian Journal of Control

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

Asian Journal of Control: 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:

Michael Basin Autonomous University of Nuevo, Mexico mbasin@cfm.uanl.mx

Laura Celentano University of Naples Federico II, Italy laura.celentano@unina.it

Mohammed Chadli University of Paris-Saclay, Univ Evry, France mohammed.chadli@univ-evry.fr

Peng Shi University of Adelaide, Australia peng.shi@adelaide.edu.au

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, 2021 (Tentatively Vol. 23, No. 2) Publication

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5 Conferences and Workshops

5.1. Symposium on Machine Learning and Dynamical Systems, Canada

Contributed by: Boumediene Hamzi, boumediene.hamzi@gmail.com

Second Symposium on Machine Learning and Dynamical Systems, Fields Institute, Toronto
Sept. 21-25,2020

Dear colleagues,

You are cordially invited to make a contribution to the Second Symposium on Machine Learning and Dynamical Systems at the Fields Institute in Toronto from Sept. 21 to Sept. 25, 2020.

Some details about the event are at

<https://sites.google.com/site/boumedienehamzi/second-symposium-on-machine-learning-and-dynamical-systems>.

For details about the first edition:

<https://bit.ly/2ScYhZo>

More details about the event will be posted on the website in due course. In the meantime, please contact me if you are interested in giving a talk or presenting a poster. Also, please disseminate this email among your colleagues who may be interested in making a contribution.

Thanks and best wishes,

Boumediene Hamzi (on behalf of the organization committee)

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5.2. Conference on Methods and Models in Automation and Robotics, Poland

Contributed by: Pawel Dworak, pawel.dworak@zut.edu.pl

25th International Conference on Methods and Models in Automation and Robotics
24-27 August 2020

Amber Baltic Hotel, Miedzyzdroje, Poland

It is our great pleasure to invite You to participate in the 25th International Conference on Methods and Models in Automation and Robotics, MMAR 2020 to be held in Miedzyzdroje, Poland, from August 24th to August 27th, 2020.

The Conference will be a good opportunity for highlighting the new results and directions of Automatic Control theory, technology and applications. As such, it mainly will concentrate on the following key points:

- emphasis on invited lectures including plenaries,
- industry participation promotion,

– attract young people to study and work in the field.

The participants of the 25th International MMAR Conference will have the opportunity to take part in the wide spectrum of categories for technical presentations, including plenary lectures, regular papers of both lecture and poster session types, and panel discussion. We look forward to seeing our old and new friends in Poland. You are kindly invited to participate in the 25th International MMAR Conference in Miedzydroje, Poland.

Topics of interest include, but are not limited to:

- Identification, modelling and simulation
- Signal processing
- Control and systems theory
- Robotics
- Intelligent systems and methods
- Control systems

The proceedings of the conference will be submitted for review and approval for inclusion in the IEEE Xplore® Digital Library and will be submitted for inclusion in the Conference Proceedings Citation Index - Science (ISI Web of Science).

Key Dates

March 2, 2020 - Paper submission

May 18, 2020 - Notification of acceptance

June 22, 2020 - Registration

June 22, 2020 - Camera-ready paper submission

For more information see <http://www.mmar.edu.pl>

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5.3. Workshop on Nonlinear Systems and Control, USA

Contributed by: Xiaobo Tan, xbtan@egr.msu.edu

Workshop on Nonlinear Systems and Control, in Celebration of Hassan Khalil's 70th Birthday

Hassan Khalil has been a wonderful mentor, colleague and friend to many of us working in control systems during his illustrious career spanning over four decades. In celebration of his 70th birthday and retirement, a Workshop on Nonlinear Systems and Control will be held on April 18, 2020, Saturday, at the Marriott East Lansing at University Place, East Lansing, Michigan. The workshop will consist of a number of invited talks by distinguished speakers and conclude with a dinner banquet for invited guests.

The confirmed speakers:

- Jeff Ahrens, Corning Inc.
- Tamer Basar, University of Illinois at Urbana-Champaign
- Jay Farrell, University of California, Riverside
- Zoran Gajic, Rutgers University

- Jessy Grizzle, University of Michigan, Ann Arbor
- Alberto Isidori, University of Rome “La Sapienza”
- Miroslav Krstic, University of California, San Diego
- Daniel Liberzon, University of Illinois at Urbana-Champaign
- Zongli Lin, University of Virginia
- Alexis Prasov, MIT Lincoln Lab
- Jing Sun, University of Michigan, Ann Arbor
- Andrew Teel, University of California, Santa Barbara
- Petar Kokotovic (dinner speaker)

For additional information and (complimentary) registration, please visit:
<https://www.egr.msu.edu/khalilworkshop2020/home>

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5.4. International Conference on Systems and Control, France

Contributed by: Driss Mehdi, driss.mehdi@univ-poitiers.fr

The 9th International Conference on Systems and Control (ICSC 2020)

The 9th edition of the International Conference on Systems and Control will be held on October 14-16, 2020, at the ENSICAEN, Ecole Nationale Supérieure d'Ingénieurs de Caen. Caen, France. This edition is technically co-sponsored by IEEE-CSS with proceedings acquisition.

Paper submission: Papers must be submitted electronically via the Web upload system only. The authors are invited to submit the full version of their manuscripts online through the online paper submission <https://controls.papercept.net/conferences/scripts/start.pl>

The guidelines are given at the ICSC 2020 Website.

Important Dates:

- Contributed papers, invited session papers: May 30, 2020
- Notification of Acceptance / Rejection: July 30, 2020
- Final, Camera ready papers due: September 15, 2020
- Conference opening: October 14, 2020

Websites: <http://lias.labo.univ-poitiers.fr/icsc/icsc2020>

Program Chairs

- Abdel Aitouche, France.

General Chairs:

- Driss Mehdi, France.
- Mondher Farza, France.

For more information please feel free to contact Prof. Driss Mehdi (driss.mehdi@univ-poitiers.fr)

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5.5. 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 23-26, 2020

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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5.6. ICRA Workshop on Security and Privacy in Robotics, France

Contributed by: Quanyan Zhu, quanyan.zhu@nyu.edu

Call for Posters and WiP at ICRA Workshop on Security and Privacy in Robotics

This workshop aims to addresses recent security and privacy challenges with the robotic systems. The

trend of integrating robots with information and communication technologies (ICTs) such as cloud services and IoTs has imposed cybersecurity risks. Interdisciplinary approaches that bridge cryptography, communication networks, data sciences, control systems, and robotic operating systems will be examined and discussed to address the emerging challenges. This workshop will gather experts in this emerging area of research and provide a perspective on relevant challenges and opportunities for the academia and industry. The workshop will focus on recent advances in areas such as ROS security, cloud robotic security, and privacy issues in robotics. It will give the audience an overview of the systematic security solutions to robotic systems in these areas and provide a platform to discuss new research directions. Conclusions will be summarized in a report released to the community.

Workshop Website:

<https://sites.google.com/view/icra-workshop-2020/>

Topics include (but are not limited to):

- Robot security architectures
- Secure deployment of robotic systems
- Accountability
- Safety and Security modeling of robot systems
- Lessons learned from practice
- Demonstrations of practical solutions
- Cloud operated robots
- Cryptography and Applications in robotics
- Cross-disciplinary topics
- Resilient robotic systems
- Security of multi-agent robotic systems

Important Dates:

- Submission deadline: March 31, 2020
- Notification: April 15, 2020
- Camera-ready deadline: April 25, 2020
- Submission site: <https://conference2.aau.at/event/27/>

Submission of work-in-progress:

The (WiP) session provides an opportunity to present and discuss new challenges and visions, showcase early research results, and explore novel research directions. The specific aim of the WiP session is to provide a forum for timely presentation, discussion and feedback for novel, controversial, and thought-provoking ideas.

Submission of demos: The (WiP) session provides an opportunity to present and discuss new challenges and visions, showcase early research results, and explore novel research directions. The specific aim of the WiP session is to provide a forum for timely presentation, discussion and feedback for novel, controversial, and thought-provoking ideas.

Authors are requested to submit original, unpublished abstracts of no more than 500 words or 2 pages of extended abstract. All submissions must be in PDF format and uploaded through the online system

<https://conference2.aau.at/event/27/>. The submitted abstract describing the work or demo will be evaluated based on technical merit, innovation, and the potential to stimulate lively discussions at the conference.

For any further questions on the submission or workshop format, please don't hesitate to contact us (email addresses given below).

Workshop organizers:

Quanyan Zhu, New York University, USA, quanyan.zhu@nyu.edu
Stefan Rass, Universitaet Klagenfurt, Austria, stefan.rass@aau.at
Bernhard Dieber, Joanneum Research, Austria, Bernhard.Dieber@joanneum.at

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5.7. Conference on Control, Automation and Systems, South Korea

Contributed by: Zee Yeon Lee, conference@icross.org

2020 The 20th 19th International Conference on Control, Automation and Systems (ICCAS 2020)
October 13–16, 2020, BEXCO, Busan, Korea
<http://2020.iccas.org>

The aim of the ICCAS is to bring together researchers and engineers worldwide to present their latest works, and disseminate the state-of-the-art technologies related to control, automation, robotics, and systems.

The conference invites three types of submission: "Regular Paper", "Research Poster Paper", and "Organized (Invited) Session/Mini-symposium Paper". Indexed in: IEEE Xplore, EI compendex, and SCOPUS

Plenary Speaker:

Prof. Francesco Bullo (Univ. of California, Santa Barbara)
Dr. Shuuji Kajita (National Institute of Advanced Industrial Science and Technology (AIST))
Prof. Anna Stefanopoulou (University of Michigan)

Organizing Committee

General Chair: Duk Hyun Kang (RS Automation, Korea)
General Co-Chair: Kyung-Soo Kim (KAIST, Korea)
Program Co-Chairs: Hyo-Sung Ahn (GIST, Korea), Hyungbo Shim (Seoul National Univ., Korea)
Organized by Institute of Control, Robotics and Systems (ICROS)

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6 Positions

6.1. PhD: City University of Hong Kong, Hong Kong

Contributed by: Ehsan Nekouei, enekouei@cityu.edu.hk

PhD position at the Department of Electrical Engineering, City University of Hong Kong.

In this project, we will study the privacy level of human users in networked control systems, e.g., intelligent transportation networks and smart buildings, wherein sensor measurements are accessible by untrusted parties. We will also develop design methodologies to ensure the privacy of users within these systems, based on dynamic programming and reinforcement learning (RL) techniques.

International applicants will be considered for the Hong Kong PhD fellowship scheme which provides an annual stipend of HK\$309,600 (approximately US\$39,700) and a conference and a research-related travel allowance of HK\$12,900 (approximately US\$1,700) per year for each awardee for a period up to three years. <https://cerg1.ugc.edu.hk/hkpfs/index.html>

Requirements:

- 1- An undergraduate or a master degree from an internationally recognized university
- 2- Strong background in probability theory and control systems
- 3- Good programming skills
- 4- A background in dynamic programming and optimal control is a plus

Contact: Please send the following documents to enekouei@cityu.edu.hk and indicate in the subject "PhD Application"

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6.2. PhD: University of Warwick, UK

Contributed by: Declan Bates, d.bates@warwick.ac.uk

PhD in Modelling, Simulation and Control of Acute Lung Injury

A fully funded PhD studentship is available in the group of Prof. Declan Bates at the University of Warwick, UK, to work on modelling, simulation and control of acute lung injury. The studentship covers UK/EU fees and stipend and there are no nationality restrictions (although non UK/EU students would have to self-fund the difference between UK/EU and international fees).

The Bates group has pioneered the use of advanced techniques from Systems and Control Engineering to investigate improved treatment of critically ill patients, in collaboration with multiple medical specialists worldwide. The clinical impact of our work is evidenced by our publications in leading medical journals, some recent examples include:

- S. Saffaran, A. Das, J.G. Hardman, N. Yehya and D.G. Bates, "High-fidelity Computational Simulation to Refine Strategies for Lung-Protective Ventilation in Paediatric Acute Respiratory Distress Syndrome", Intensive Care Medicine.

- M. Laviola, A. Das, M. Chikhani, D.G. Bates and J.G. Hardman, "Computer simulation clarifies mechanisms of carbon dioxide clearance during apnoea", *British Journal of Anaesthesia*.
- M. Haque, A. Das, T.E. Scott, D.G. Bates, and J.G. Hardman, "The primary blast lung injury simulator: A new computerised model", *Journal of the Royal Army Medical Corps*.
- S. Saffaran, W. Wang, A. Das, W. Schmitt, J.G. Hardman, G. Weimann and D.G. Bates, "An inhaled sGC modulator can lower PH in COPD patients without deteriorating oxygenation", *CPT Pharmacometrics & Systems Pharmacology*.

Full details of the proposed research project can be found here:

<https://bit.ly/2Oz8oa0>

We are looking for a student with an outstanding academic track record in any area of engineering or mathematics who shares our passion to improve the treatment of critically ill patients. Interested candidates should email me with a full CV: d.bates@warwick.ac.uk

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6.3. PhD: Università di Napoli Parthenope, Italy

Contributed by: Marco Ariola, ariola@uniparthenope.it

The PhD School of Information and Communication Technology and Engineering at the Università di Napoli Parthenope, Napoli, Italy, offers various PhD positions in control engineering and mathematical control theory.

Besides scholarship, help with accommodation is provided. Students will also get the opportunity of spending research periods outside Italy during the program with an extra funding. The Course has a duration of three years.

The selection is based on the evaluation of the CV, publications and reference letters. Moreover the candidates should present a detailed plan of the research activity they intend to carry out during the PhD. The best candidates will be invited to an interview, which can also be held on Skype.

Perspective candidates are encouraged to contact the Coordinator of the PhD board, Prof. Marco Ariola by sending an e-mail to ariola@uniparthenope.it

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6.4. PhD: Lehigh University, USA

Contributed by: Eugenio Schuster, schuster@lehigh.edu

PhD Positions in Control Systems

Fully funded PhD positions in the general area of Control Systems are available within the Laboratory for Control of Complex Physical Systems in the Department of Mechanical Engineering and Mechanics at Lehigh University. PhD candidates should have an undergraduate, or preferably a Masters degree, in engineering, physics or applied math. A solid mathematical background is required together with a broad education in control systems. Some demonstrated research experience is a plus. The candidates should be

interested in doing research in one of the following areas: modeling and control of distributed parameter systems, model predictive control of systems described by partial differential equations, control and estimation augmentation by machine learning.

Lehigh University, founded in 1865, is located in Bethlehem, Pennsylvania, 50 miles north of Philadelphia and 75 miles southwest of New York City. It offers an inspiring academic environment, excellent education, state-of-the-art research and computer facilities, very competitive economic conditions (tuitions, stipend, housing, health insurance) for graduate students, and great career opportunities after graduation. More information can be found at <https://www1.lehigh.edu/academics/graduate-studies>.

Candidates interested in being part of this educational and research opportunity are encouraged to send by e-mail their Curriculum Vitae to Prof. Eugenio Schuster at schuster@lehigh.edu.

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6.5. PhD: French-German Research Institute of Saint-Louis, France

Contributed by: Spilios Theodoulis, Spilios.Theodoulis@isl.eu

PhD: French-German Research Institute of Saint-Louis, France

The Guidance, Navigation & Control (GNC) group of the French-German Research Institute of Saint-Louis (ISL) is inviting applications for two fully funded PhD positions in the general area of flight dynamics and control of autonomous systems. The successful candidate must hold (or soon complete) an MSc degree on automatic control with additional skills in flight mechanics being also appreciated. Excellent programming skills in MATLAB/Simulink are also required.

The positions are to be filled immediately and are in collaboration with industry and academia from France and Germany. The institute offers a very attractive salary, a multidisciplinary working environment with great scientific interactions and is located near the metropolitan area of Basel.

To apply for this position, send a CV, transcripts and motivation letter to Spilios.Theodoulis@isl.eu (only EU citizenship applications will be considered).

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6.6. PhD: KTH, Sweden

Contributed by: Henrik Sandberg, hsan@kth.se

PhD student in Reliable Networked Control and Learning Systems at KTH, Stockholm, Sweden

We are currently looking for 1-3 doctoral students with a very strong background and interest in control theory, mathematics, and machine learning. The successful candidates will work projects on networked control systems focusing on reliability, cyber-security, and learning. We will develop new theory and methods for machine learning in safe and cyber-secure control of critical infrastructures, such as water distribution, building management systems, transport systems, and smart electrical grids. The PhD program in Electrical Engineering provides world class quality education, including a large list of graduate courses ensuring an in-depth development of relevant competences and skills.

The Division of Decision and Control Systems at KTH's School of Electrical Engineering and Computer Science consists of around 80 personnel (faculty, postdocs and PhD students) who contribute to a dynamic and ambitious research environment and friendly and open workplace. The division is internationally well established, with a comprehensive network of international research collaborations, and is involved in several national and international research projects with academia and industry.

The complete announcement text can be found here:

<https://www.kth.se/en/om/work-at-kth/lediga-jobb/what:job/jobID:316357/where:4/>

Please do not hesitate to contact Professor Karl Henrik Johansson, kallej@kth.se, or Henrik Sandberg, hsan@kth.se, for more details about the position.

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6.7. PhD: University of Cyprus, Cyprus

Contributed by: Marios M. Polycarpou, mpolycar@ucy.ac.cy

10 PhD Scholarships at the KIOS Research and Innovation Center of Excellence at the University of Cyprus

The KIOS Research and Innovation Center of Excellence (KIOS CoE) announces 10 full-time PhD Student Scholarships. The KIOS CoE operates within the University of Cyprus, in collaboration with Imperial College London.

The selected students will be enrolled in either the Electrical Engineering or the Computer Engineering PhD program of the University of Cyprus and they will conduct their research at the facilities of the KIOS Center of Excellence in one or more of the following thematic areas: Control systems, computational intelligence, and machine learning, autonomous systems, optimization, networks, embedded and real-time systems hardware and software, fault diagnosis, cyber-security, reliability, resiliency and fault tolerance, cyber-physical systems, Internet of Things, dependable integrated systems, intelligent transportation systems, water networks, power and energy systems, telecommunication networks and edge computing. Motivated candidates with strong mathematical and/or algorithm development backgrounds are especially sought.

The KIOS Research and Innovation Center of Excellence is the largest research center at the University of Cyprus and has recently been upgraded to a European Research Center of Excellence through the KIOS CoE Teaming project. Currently, the Center employs more than 130 researchers (at various ranks/levels), who are supported by externally funded research projects. The vision of KIOS is that it will grow to 180-200 researchers by 2022.

KIOS provides an inspiring environment for carrying out top-level research in the area of Information and Communication Technologies with emphasis on the Monitoring, Control, Management and Security of Critical Infrastructures including power and energy systems, water networks, transportation networks, telecommunication networks, and emergency management and response. The Center instigates interdisciplinary interaction and promotes collaboration between industry, academia and research organizations in high-tech areas of global importance. The KIOS CoE operates in a diverse environment as an equal oppor-

tunity employer.

Short Description/Duties and Responsibilities: The successful candidates will have the opportunity to conduct fundamental or applied research in the areas of Information and Communication Technologies with emphasis on the Monitoring, Control, and Security of Critical Infrastructure Systems. They will be encouraged to produce, submit and publish research results in international conferences and journals, with a view to acquiring the PhD degree. They will also be expected to assist and contribute to various projects of KIOS CoE in order to accomplish its strategic objectives.

Profile of the ideal candidate: The ideal candidate must possess excellent knowledge of the English Language, have strong self-management and organizational skills. The ideal candidate must possess technical and analytical skills and the knowledge needed to perform specific mechanical, information technology, mathematical or scientific tasks. He/ She must have the ability of critical thinking, where he/she should be able to use logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to specific problems. The ability to prioritize tasks and manage effectively his/ her own time is essential.

Qualifications:

- Bachelor's or Master's in Engineering (Electrical, Computer, or Mechanical Engineering) or Computer Science or Mathematics or a related field from an accredited institution.
- Previous research experience will be considered an advantage.

Scholarship Terms: The scholarship will be for one year and may be renewed annually, based on performance, for 3-5 years. It includes the University tuition fees and a monthly salary between €1000-€1700 depending on the candidate's qualifications and expertise. The 13th salary bonus is incorporated into the monthly salary. According to the Law of the GHS, from the date of commencement of the contract of the employee, the monthly amount of 1.7% will be deducted from the total gross earnings for Outpatient Medical Services. As of 01/03/2020, the monthly cut rate will be 2.65% of the total gross earnings. Additionally, the Employee may join either the State Health Care Plan, at an annual cost of €150 per person, or the Private Medical Scheme for an additional cost of 3.95% of their monthly gross salary (provided that a one-year contract exists, and the total working time is over 18 hours per week). Please note that in full implementation of the GHS (01/06/2020) the above Health Care Plans are abolished. Maternity leave will be granted based on Social Insurance Laws from 1980 until 2012.

Application: Interested candidates should submit the following items online on the link:

<https://applications.ucy.ac.cy/recruitment>

- A cover letter that specifies their employment availability date as well as the research area that they apply to (a candidate may apply to more than one area)
- Short description of their academic and research experiences (can be combined with the cover letter) (1-page maximum)
- A detailed curriculum vitae in English or in Greek
- Copies of transcripts of BSc/MSc degree(s)
- At least two reference letters from University Professors uploaded directly from the referees

The applications should be submitted as soon as possible, but no later than Friday, 20 March 2020 at 5 pm. The evaluation of the applications will begin immediately. For more information please contact the KIOS Center of Excellence, by phone at +357 22893460 or via e-mail at kioshiring@ucy.ac.cy.

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6.8. PhD: Norwegian University of Science and Technology, Norway

Contributed by: Damiano Varagnolo, damiano.varagnolo@ntnu.no

Three PhD positions within the project Autonomous Underwater Fleets at NTNU in Trondheim, Norway

The Departments of Engineering Cybernetics and of Electronic Systems at the Norwegian University of Science and Technology (NTNU) in Trondheim, Norway, have three joint vacant PhD positions within the fields of distributed cooperative control, distributed statistical estimation & numerical optimization, and underwater acoustic communications, with deadline 31st of March.

The positions are within the Norwegian Research Council project "Autonomous Underwater Fleets", starting in September 2020, and whose focus is on enabling fleets of Autonomous Underwater Vehicles (AUVs) to operate collectively, cooperatively, adaptively, and in a leaderless fashion, so to enable more efficient & reliable monitoring and utilization of sea resources & infrastructures.

The three PhD positions will focus on approaching theoretical, algorithmic and practical problems relative to, respectively,

- 1) developing distributed leaderless control strategies for multi-AUV systems that can autonomously re-plan the mission objectives if necessary and on the fly by leveraging on sensors readings from all the AUVs,
- 2) develop distributed optimization and estimation algorithms that establish inter-AUVs information exchange and mixing mechanisms that deal with packet losses, communication delays, channel asymmetries, drifts of the communication clocks, and little-to-none knowledge about the topology of the communication networks,
- 3) develop adaptive communication schemes for underwater vehicles that can adapt their transmission and reception schemes according to both the current status of the fleet and the current underwater channel conditions.

The project will be executed under the supervision of professors Kristin Y. Pettersen (acting as main supervisor for sub-project 1), Damiano Varagnolo (acting as main supervisor for sub-project 2), and Hefeng Dong (acting as main supervisor for sub-project 3) from NTNU, of Dr. Claudio Paliotta from Sintef Digital, and of Prof. Joao Tasso de Sousa, University of Porto.

The project will be integrated in the Centre of Excellence on Autonomous Marine Operations and Systems (CoE NTNU AMOS) and will build on & strengthen the established cooperation in marine robotics and autonomy with NTNU AMOS partners, e.g., Equinor and DNV GL. The main workplaces will be the Departments of Engineering Cybernetics and of Electronic Systems at the Norwegian University of Science and Technology (NTNU) in Trondheim, an equal opportunity employer described in detail at <https://www.ntnu.edu/itk>. The project will give the opportunity to pay extended visits to Porto, Portugal, and to other Universities, research institutes or companies, potentially also outside Europe.

The qualification requirement is completion of a master's degree with a grade of B or better in terms of

NTNU's grading scale in one of the following fields: Engineering Cybernetics, Control systems, Mechanical Engineering, Underwater Acoustics, Communication, Signal Processing, or equivalent education. Persons with knowledge within nonlinear systems theory, statistical methods, numerical optimization, autonomous systems, underwater acoustic communications, networks, and experience with instrumentation are particularly encouraged to apply. Good written and oral English language skills are a non-negotiable prerequisite. Moreover, since the goal of the project is to bring the concept of cooperative robotics into the underwater realm by simultaneously advancing and merging different scientific fields, the PhD students will have to work as a closely cooperating team.

The starting date shall be during August 2020, with little flexibility allowed. The employment period is 3 years, with the possibility of extending the contract for maximum one year by serving maximum 25% of the employment time for teaching duties. The PhD candidate salary is normally NOK 449400 before tax per year; from the salary, 2% is deducted as a contribution to the Norwegian Public Service Pension Fund. Applications are to be submitted through

<https://www.jobbnorge.no/en/available-jobs/job/183782/phd-position>.

All applications will be treated in the strictest confidence. For more information, please contact damiano.varagnolo@ntnu.no. The applicants should specify in their cover letter which (one or more) of these PhD projects they apply for.

Note moreover that our research has civilian objectives. However, equipment that is restricted by export licenses and ITAR (International Traffic in Arms Regulations) is being used in the research project. Applicants that are citizens of Norway, Australia, Japan, New Zealand, Switzerland, EU or NATO countries are eligible. Other applicants, instead, in order to be considered for the position are required to provide evidence of eligibility to use such equipment and attach this evidence in their application.

Deadline: March 31st, 2020

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6.9. PhD: University of Kentucky, USA

Contributed by: Xu Jin, xu.jin@uky.edu

Ph.D. Positions in Mechanical Engineering in intelligent control at the University of Kentucky

Ph.D. openings are available beginning Fall 2020 in the Department of Mechanical Engineering at the University of Kentucky, Lexington, KY, USA, on the topics of intelligent control. Our group's focus is on adaptive control and iterative learning control with applications to multiagent systems, constrained formation systems, robot manipulation systems, and cyber-physical systems. More research details can be found on Dr. Xu Jin's website:

<https://www.engr.uky.edu/directory/jin-xu> and the external links included.

The positions include stipend, health care, and tuition support. The offers are valid for two years, and renewable for additional years based on performance of the students. Qualifications: The applicants MUST ALREADY HAVE the GRE and TOEFL test scores meeting the departmental minimum requirement. Applicants with a strong background in mathematics, control systems, and/or robotics, and with experience in mathematical analysis, Matlab numerical simulations, hands-on experiences on robotic systems, are en-

couraged to apply. The applicant must demonstrate competent analysis, experimental skills, and programming ability. Dates: Beginning Fall 2020 (1 position).

How to apply: Applications should be emailed to Dr. Xu Jin at xu.jin@uky.edu as soon as possible. Please include a full CV (including GRE and TOEFL scores), PDFs of relevant publications, and names of at least three references. Upon initial email discussions, those who are encouraged to apply should then apply to the department as soon as possible, and indicate my name in the application package.

Short note about the department and the city: Mechanical Engineering is the largest department in the College of Engineering with 35 tenured and tenure-track faculty members, over 1,000 undergraduate students, and over 120 graduate students. The department also has state-of-the-art computational facilities, research labs, and classrooms, including UAV, ground robot, and air table satellite testing facilities. The city of Lexington is ranked # 3 Best City to Raise a Family, # 4 City with Best Tech Career Potential, # 8 City with the Lowest Living Cost, # 21 Best Places to Live in America, and # 31 Most Educated Cities in America. Located in the heart of the Bluegrass Region, Lexington is known as the "Horse Capital of the World".

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6.10. PhD: KTH, Sweden

Contributed by: Mikael Johansson, mikaelj@kth.se

The Division of Decision and Control Systems at KTH, Stockholm, Sweden is looking for one PhD student in the area of large-scale optimization.

The position is funded by a national research initiative in the mathematics for AI, <https://wasp-sweden.org/graduate-school/>. We are therefore particularly interested in students with a strong background in applied mathematics, and a broad interest in learning and autonomous decision-making.

The full announcement and instructions for how to apply can be found here:

<https://www.kth.se/en/om/work-at-kth/lediga-jobb/what:job/jobID:316343/where:4/>

Deadline: March 15, 2020.

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6.11. PhD: Delft University of Technology, The Netherlands

Contributed by: Tamas Keviczky, t.keviczky@tudelft.nl

The Delft Center for Systems and Control (www.dcsc.tudelft.nl) at the Delft University of Technology, The Netherlands has two vacancies for PhD positions on:

1. Probabilistic anomaly detection for online-monitoring in data-driven resilient control
2. Distributionally robust control algorithms for reconfigurable control

For these positions we are looking for candidates with an MSc degree in systems and control, computer science, applied mathematics, electrical engineering, mechanical engineering, or chemical engineering, and

with a strong background or interest in fault detection and identification, reconfigurable control, model predictive control, moving horizon estimation, distributionally robust control, scenario optimization, convex optimization. The candidates are expected to work on the boundary of several research domains, implementation tasks on industrial demonstrators and use cases, and interact with various industries and stakeholders within the DIGITAL TWIN program funded by the Dutch Research Council (NWO). 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 appointments will be for up to 4 years. As an employee of the university, successful applicants will receive a competitive salary, as well as excellent secondary benefits.

More information on these positions and on how to apply can be found at <http://www.dsc.tudelft.nl/vacancies.html> or by contacting Tamas Keviczky (t.keviczky@tudelft.nl) for the first position or Peyman Mohajerin Esfahani (p.mohajerinesfahani@tudelft.nl) for the second position.

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6.12. PhD: Clemson University, USA

Contributed by: Mohammad Naghnaeian, mnaghna@clemson.edu

There are 2-3 PhD positions available at the Mechanical Engineering Department at Clemson University in the area of dynamic systems and control.

Qualified applicants must have a working knowledge on classical and modern control. The research topics involve optimal control, distributed optimization, and convex relaxation of nonlinear programs.

Interested applicants are encouraged to send their CVs to Dr. Naghnaeian (mnaghna@clemson.edu) or Dr. Vahidi (vahidi@clemson.edu).

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6.13. PhD: University of Louisiana at Lafayette, USA

Contributed by: Afef Fekih, afef.fekih@louisiana.edu

The Advanced Controls Laboratory at the University of Louisiana at Lafayette, USA has available funding to support a PhD student in the general area of advanced control design/Fault Tolerant Control with application to dynamic systems. Special considerations will be given to students who have a strong background in control of wind turbines. The successful candidate is expected to have a strong background in control systems theory and a very good knowledge of power systems. Programming skills in MATLAB/Simulink are required. A genuine interest and curiosity in the subject, excellent oral and written English communication skills are needed.

Applicants shall have a Master's degree or equivalent in systems and controls, power systems, electrical engineering, mechanical engineering, applied Math or a related discipline. The PhD student is expected to carry out original research and complete coursework throughout the period of appointment. Results will be communicated in the form of journal publications, conference presentations, and the PhD dissertation.

The funding covers the cost of full tuition and stipends at a competitive rate and will start in Fall 2020.

Interested individuals should send their detailed curriculum vitae, a copy of their best publication in English, and if applicable GRE test scores to Dr. Afef Fekih (afef.fekih@louisiana.edu).

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6.14. 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 1 postdoctoral researcher and 2 PhD students 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 competitive salaries are estimated at 2250EUR gross per month for the postdoc (2 years starting summer-autumn 2020), and 1890EUR for each 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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6.15. PhD/Postdoc: KU Leuven, Belgium

Contributed by: Panos Patrinos, panos.patrinis@esat.kuleuven.be

Fully funded PhD and postdoc positions at the Department of Electrical Engineering (ESAT), KU Leuven

The group of Prof. Patrinos at STADIUS Center for Dynamical Systems, Signal Processing and Data Analytics, Department of Electrical Engineering (ESAT), KU Leuven is offering fully funded PhD and postdoc positions on the following projects:

- Learning to optimize nonconvex problems: provably and efficiently
- Optimization frameworks for deep kernel machines
- Optimization algorithms for structured low-rank matrix/tensor approximation

KU Leuven is among the top European universities (ranked 1st in Times Higher Education list of most innovative universities in Europe) and a hub for interdisciplinary research in AI, control and optimization.

Candidate requirements: We are seeking outstanding candidates who have obtained a master's or doctoral degree in mathematical engineering, computer science, electrical engineering or mathematics. Strong candidates have a proven record in numerical optimization, machine learning and/or systems & control. They should have excellent analytical and problem-solving skills and, preferably, well-developed programming skills. Candidates must be fluent in English.

Application procedure: To apply send an email to panos.patrinos@esat.kuleuven.be attaching an academic CV, a pdf of your diplomas and transcript of course work and grades, sample of technical writing (publications or thesis) and contact details of at least two referees.

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6.16. Postdoc: KTH, Sweden

Contributed by: Dimos Dimarogonas, dimos@kth.se

Postdoc position in hybrid control of multi-robot systems at KTH

A postdoc position in hybrid control of multi-robot systems is available at KTH. The full description can be found here:

<https://www.kth.se/en/om/work-at-kth/lediga-jobb/what:job/jobID:314564/where:4/>

In case of interest, please contact Prof. Dimos Dimarogonas at dimos@kth.se for further information.

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6.17. Postdoc: University of California, Berkeley, USA

Contributed by: Javad Lavaei, lavaei@berkeley.edu

Multiple postdoctoral positions are available in the Department of Industrial Engineering and Operations Research at the University of California, Berkeley. The positions are on optimization theory, data science, energy, and control.

To apply, please email a CV along with sample research papers to Professor Javad Lavaei (lavaei@berkeley.edu).

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6.18. Postdoc: KTH, Sweden

Contributed by: Henrik Sandberg, hsan@kth.se

Postdoc scholarship in Networked Control Systems at KTH, Stockholm, Sweden

The Division of Decision and Control Systems at KTH's School of Electrical Engineering and Computer Science is looking for 3-5 postdocs with a very strong background and interest in networked control systems, mathematics, and modeling. The successful candidates will join a project on developing novel mathematical and computational tools for the fundamental understanding and engineering design of emerging networked control systems, and with a particular focus on resilient and secure cyber-physical systems or

intelligent transportation systems.

Applicants should have a very strong background in systems and control theory, optimization, or cyber-physical systems. Applicants should also have an outstanding research and publication record, and well-developed analytical and problem solving skills. We are looking for strongly motivated candidates, who are able to work independently. Good command of English orally and in writing is required to present and publish research results.

The complete announcement text can be found here:

<https://www.kth.se/en/om/work-at-kth/stipendier/postdoc-scholarship-in-networked-control-systems-1.955581>

Questions regarding the scholarship:

Karl Henrik Johansson (kallej@kth.se),

Jonas Mårtensson (jonas1@kth.se),

Henrik Sandberg (hsan@kth.se)

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6.19. Postdoc: Inria Lille, France

Contributed by: Andrey Polyakov, andrey.polyakov@inria.fr

Postdoc Position in Automatic Control (Inria, Lille, France)

Valse Team of Inria Lille-Nord Europe (<https://team.inria.fr/valse>) invites applications to fill the postdoc position (15 months). Our research is focused on algorithms for distributed finite-time control and estimation based on homogeneity theory (see e.g. <https://www.springer.com/gp/book/9783030384487> for more details).

The post-doctoral fellow will develop computational algorithms for implementation of homogeneous algorithms in digital devices and make tests on experimental setups. The successful candidate should have a PhD in Automatic Control or in Applied Mathematics (with a research experience in numerical methods or control theory).

Interested candidates should email to Dr. Andrey Polyakov "Andrey (dot) Polyakov (at) inria (dot) fr", <https://bit.ly/37PdQMq>

The submission deadline: 1st of April 2020. The starting date: 1st of July 2020

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6.20. Postdoc: Uppsala University, Sweden

Contributed by: Ayca Ozcelikkale, ayca.ozcelikkale@angstrom.uu.se

Postdoctoral Position - Decision Making with Limited Data using Artificial Intelligence - An Active Inference Approach

Signals and Systems Division, Department of Electrical Engineering, Uppsala University has a vacancy for a postdoctoral position. The position is a part of the strategic research area effort eSENCE's PostDoc-program towards new e-science methods and tools for artificial intelligence in research.

Project description: Success of machine learning (ML) and artificial intelligence (AI) methods typically rely on the availability of large amounts of data. This dependence on high amounts of data/interactions is an important handicap for applying the current AI approaches in data-limited scenarios, such as Internet-of-Things scenarios. This project will address this handicap of limited data using the active inference (ActInf) framework. Similar to the reinforcement learning, the ActInf framework generates actions/policies so that a specific desired outcome is obtained by interacting with the surroundings. ActInf is closely connected to probabilistic dynamical models, belief propagation, and model based reinforcement learning. ActInf can also be used to recover standard cost-based control solutions for the linear quadratic setup, a well-known scenario which is of central importance in the control community.

Duties: To conduct original research in the area of decision making under limited data using the ActInf framework, in particular i) develop novel, general-purpose, active inference based adaptive data collection, decision making and control strategies to optimize the overall inference and control performance under limited data, ii) reveal the trade-offs between data collection, decision making and control performance and provide guidelines for cost-efficient autonomous operation for various application scenarios.

The duties include theoretical analysis, algorithm design and implementation via software-based simulations, and reporting of the results in the form of technical papers. Participation in the undergraduate and/or graduate education and supervision of PhD students is also required.

Requirements: PhD degree or a foreign degree equivalent to a PhD degree in Electrical Engineering or Computer Science with a background in Automatic Control, Signal Processing, Machine Learning or Communications. The PhD degree must have been obtained no more than three years prior to the application deadline. The three year period can be extended due to circumstances such as sick leave, parental leave, duties in labour unions, etc. A proven publication record in top-ranked journals or conferences is required. Emphasis will be placed on computer programming abilities together with a strong mathematical background where previous research in active inference or closely related areas such as probabilistic dynamical models, information theory, optimization theory or reinforcement learning will be beneficial.

Starting date: 2020-06-01 or as otherwise agreed. **Further Information:** The complete announcement text can be found here:

<https://www.uu.se/en/about-uu/join-us/details/?positionId=315433>

For further information do not hesitate to contact Ayca Özcelikkale, ayca.ozcelikkale@angstrom.uu.se or Anders Ahlén, anders.ahlen@signal.uu.se.

Application Instructions: Please submit your application by April 1, 2020 through Uppsala University's recruitment system: <https://uu.varbi.com/en/what:login/type:job/jobID:315433>

Note that applications by email cannot be considered.

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6.21. Postdoc: Queen's University Belfast, UK

Contributed by: Nikolaos Athanasopoulos, n.athanasopoulos@qub.ac.uk

Postdoctoral position: Cyber-Physical Systems Analysis and Control

Application closing date: 23/03/2020

For informal queries and further info, email to Dr Nikolaos Athanasopoulos n.athanasopoulos@qub.ac.uk

Full description and application portal: <https://bit.ly/2Pxr7Dc>

This post is available for 29 months with a possibility for extension.

Salary: £33,797 to £40,322 per annum.

The School of Electronics, Electrical Engineering and Computer Science (EEECs) and the multidisciplinary Centre for Intelligent Autonomous Manufacturing Systems (i-AMS) at Queen's University Belfast (QUB) offer an exciting Research Fellowship in the area of cyber-physical systems control and in specific resource allocation and control co-design in dynamic networks. The successful candidate will be an active member of a wider community, contributing world leading research outputs and completely new research initiatives in the broader area of control theory and cyber-physical systems.

The position is offered within the "Edge Computing Resource Allocation for Dynamic Networks" - DRUID-NET project <http://www.chistera.eu/projects/druid-net>, funded by EPSRC and internationally by the CHIST-ERA programme. The research network comprises of research institutes in Europe (Inria Lille, UCLouvain, NTUA) and Canada (ETS Montreal) contributing with a diverse skillset within Control, Computer Science, Applied Mathematics, Networks and Communications and Software Engineering.

Our research network develops (i) new smart resource allocation mechanisms in dynamic networks, where the availability of computing, communication and storage resources is limited and time-varying, (ii) and new co-design control strategies for control of cyber-physical systems. This setting raises several critical challenges, among others real-time identification of workload and resources, development of decision mechanisms formally guaranteeing satisfaction of constraints and QoS requirements. This becomes extremely relevant when control applications, which are time-critical and safety-critical, run through these networks. These issues will be addressed in a unified manner.

The research at QUB will be focused on: (i) developing new theoretical and algorithmically practical solutions to dynamic resource allocation problems and (ii) proposing new co-design strategies in control synthesis of cyber-physical systems.

The ideal candidate will:

- Have or shortly expect to obtain a PhD in Control or a similar discipline
- A minimum of 3 years relevant research experience in systems and control theory, and/or analysis of cyber-physical systems.
- Have a record of publishing in the proceedings of high quality international conferences and journals.

The successful candidate will have substantial opportunities to build their career, including training in innovation, commercialisation and soft skills, travelling to research conferences, and internships within the group's research network.

Queen's University Belfast is a driver of innovation based on our talented, multinational workforce. Throughout the University, our academics are collaborating across disciplines to develop new discoveries and insights, working with outside agencies and institutions on projects of international significance. We are connected and networked with strategic partnerships across the world, helping us to expand our impact on wider society locally, nationally and globally. The University is committed to attracting, retaining and developing the best global talent within an environment that enables them to realise their full potential. The School of EECS is committed to the promotion of equality of opportunity and to creating and sustaining an environment that values and celebrates the diversity of its staff and student body. In particular, the School is committed to supporting the career progression of women in science, engineering and technology (SET) in line with the principles of the Athena SWAN Charter. We are ranked 1st in the UK for knowledge transfer partnerships, (Innovate UK) 9th in the UK for University facilities (Times Higher Education Student Experience Survey 2018) and 14th in the UK for research quality (Times and Sunday Times Good University Guide 2019).

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6.22. Postdoc: IIT Hyderabad, India

Contributed by: Mathukumalli Vidyasagar, M.Vidyasagar@iith.ac.in

Post-Doctoral Position in Deep / Reinforcement Learning at IIT Hyderabad

I have an opening for a post-doctoral fellow to work with me on the theoretical foundations of reinforcement and/or deep learning, and their connections to statistical learning theory / dynamical system theory. The selected candidate will work with me as I explore this new (for me) direction of research. I am looking for candidates with an aptitude for mathematical research, as demonstrated by published research. Prior familiarity with reinforcement and/or deep learning would be desirable but not mandatory.

The funding is available for a three-year period, and the selected candidate can work with me for any subset of that period.

The position is open only to Indian citizens. The stipend, as per the norms of the Government of India, will be about Rs. 60,000 per month. There will be opportunities/funding to present one's work at national and international conferences.

To apply, please send a statement of interest, a c.v., and the names of three references to me at m.vidyasagar@iith.ac.in

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6.23. Postdoc: University of Luxembourg, Luxembourg

Contributed by: Johan Markdahl, johan.markdahl@uni.lu

Postdoc (Research Associate) in (applied) mathematics, physics, or engineering
The University of Luxembourg is a multilingual, international research university.

The Systems Control Group of the Luxembourg Centre of Systems Biomedicine has the following vacancy:
Postdoc (Research Associate) in (applied) mathematics, physics, or engineering

- Ref: RCREQ0003812

- Fixed-term contract for 12 months with the possibility of renewal for up to 5 years
- Full time 40 h/week
- Start date: as early as possible

Your Role: The Systems Control Group seeks a highly skilled Postdoctoral Research Associate. The project, based on synchronization of biological networks, aims to develop mathematical tools to model and analyse systems of interacting agents that evolve on nonlinear spaces. Moreover, it will build detailed multi-agent models of colony life, e.g. amoeba *Dictyostelium discoideum*. The group aims to build and expand on its already existing track record in this area.

For further information, please contact Johan Markdahl (johan.markdahl@uni.lu).

Your Profile: Hold a Ph.D. degree in (applied) mathematics, physics, or engineering. Have a good understanding of dynamical systems, collective behavior, or control theory. Excellent working knowledge of English is required.

We offer:

- Full contract for 1 year with the possibility of renewal up to 5 years contingent on performance and availability of funding
- A highly interdisciplinary research environment integrating biologists, physicists, mathematicians, and clinical researchers working in the area of systems biology
- A competitive salary

Further Information: Applications should contain the following documents:

- A detailed Curriculum vitae
- A motivation letter that includes a description of past research experience and future interests (maximum 2 pages)
- Please ask at least three references to email their confidential letters directly to Johan Markdahl (johan.markdahl@uni.lu) within two weeks after submitting the application

Review of applicants will begin immediately and will continue until the position is filled.

The University of Luxembourg is an equal opportunity employer. All applications will be treated in the strictest confidence.

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6.24. Postdoc/Research Engineer: Aarhus University, Denmark

Contributed by: Erdal Kayacan, erdal@eng.au.dk

Postdoc or research engineer position

The Department of Engineering, Aarhus University, invites applicants for a 1-year Postdoc or research engineer position offering applicants an exciting opportunity to join a new research project on visual-SLAM-based autonomous navigation and inspection of ships using aerial robot.

The position is available from June 1, 2020 or as soon as possible hereafter

Your profile: Applicants should hold a MSc or PhD in automatic control engineering, mechatronics engineering, electrical engineering, mechanical engineering, computer science or other related disciplines. (the degree should have been completed within the last 5 years at most).

Candidates, who will complete and defend their MSc or PhD thesis by June 2020, are welcome:

- The candidate should have excellent verbal and writing skills in English with very good communication skills,
- A solid publication track record in peer-reviewed journals and conferences,
- Concrete knowledge in C/C++,
- Experience in aerial robotics,
- Background in computer vision,
- Background in Visual Odometry, SLAM algorithms
- Experience in Occupancy Mapping or related framework (Octomap, Voxelmap,...)
- Hands-on experience in visual sensor, stereo and depth camera systems is a plus
- Experience in hands on experience in real UAV systems is a plus,
- Experience of Robot Operating System (ROS) is a plus
- Experience of machine learning / deep learning / AI is a plus

Deadline: April 10th, 2020

Start Date: June 1st, 2020 (With some flexibility)

Online application link:

<https://international.au.dk/about/profile/vacant-positions/job/postdoc-or-research-assistant-position-in-visual-slam-based-autonomous-navigation-and-inspection-of/>

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6.25. Faculty: KTH, Sweden

Contributed by: Bo Wahlberg, bo@kth.se

Assistant Professor in Cooperative Autonomous Systems, EECS, KTH Royal Institute of Technology, Sweden

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 cover a wide area including natural sciences and all branches of engineering, as well as architecture, industrial management, urban planning, history, and philosophy.

Wallenberg AI, Autonomous Systems and Software Program (WASP) is Sweden's largest individual research program ever, a major national initiative for strategically motivated basic research, education and faculty recruitment. The program addresses research on artificial intelligence and autonomous systems acting in collaboration with humans, adapting to their environment through sensors, information, and knowledge, and forming intelligent systems-of-systems.

The vision of WASP is excellent research and competence in artificial intelligence, autonomous systems, and software for the benefit of Swedish industry.

Read more: <https://wasp-sweden.org/>

KTH Royal Institute of Technology invites applicants to the following assistant professor position in intelligent systems with a specialization in cooperative autonomous systems. The position comes (after approval of the WASP Board) with a substantial WASP recruitment package including full funding of two Ph.D. students and two postdocs.

Subject field: Intelligent systems with a specialization in cooperative autonomous systems

Subject description: Cooperative autonomous systems is a sub-area of intelligent systems that concerns distributed dynamic systems that can interact with the environment, make their own decisions and improve over time

Duties: The applicant is expected to be able to teach in subjects at the department of intelligent systems. The work consists of advancing KTH's research and teaching in the subject area. The work also includes supervising doctoral students and postdoctoral fellows, as well as establishing research collaborations both within and outside KTH. Furthermore, the person should cooperate with industry and society. The candidate is expected to contribute to the WASP program and its activities.

The assistant professor will be given the opportunity to develop their independence as a researcher and gain accreditation that may allow them to take other teaching positions with higher eligibility requirements (see Chapter 4, Section 12 a of the Higher Education Ordinance). Following application, the assistant professor can apply for promotion to associate professor in accordance with Chapter 4, Section 12 c of the Higher Education Ordinance.

Eligibility: An individual who has obtained a Ph.D. or equivalent research expertise is qualified for appointment as an assistant professor. Candidates who met those qualifications within five years prior to the expiration of the application period should be prioritized. Other candidates may also be considered if there are extraordinary grounds for doing so. Extraordinary grounds refer to illness, parental leave or similar circumstances.

For more information see

<https://www.kth.se/en/om/work-at-kth/lediga-jobb/what:job/jobID:306404/where:4/>

Deadline: April 5, 2020

Contacts:

- Bo Wahlberg, Professor, WASP KTH, bo@kth.se
- Hedvig Kjellström, Head of Department, hedvig@kth.se,
- Mikael Visén, HR Officer, tenuretrack@eecs.kth.se

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6.26. Faculty: IMT Atlantique, France

Contributed by: Fabien Claveau, fabien.claveau@imt-atlantique.fr

Associate/Assistant Professor in Automatic Control - IMT Atlantique / LS2N (Nantes)

IMT Atlantique, internationally recognized for the quality of its research, is a leading general engineering school under the aegis of the Ministry of Industry and Digital Technology, ranked in the 3 main international rankings (THE, SHANGAI, QS). Situated on 3 campuses, Brest, Nantes and Rennes, IMT Atlantique aims to combine digital technology and energy to transform society and industry through training, research and innovation. It aims to be the leading French higher education and research institution in this field on an international scale. With 290 researchers and permanent lecturers, 1000 publications and 18 M€ of contracts, it supervises 2300 students each year and its training courses are based on cutting-edge research carried out within 6 joint research units: GEPEA, IRISA, LATIM, LABSTICC, LS2N and SUBATECH.

Presentation of the scientific field: The Automation, Production and Computer Sciences department (french acronym DAPI) of IMT Atlantique is recruiting a research lecturer specialized in the fields of Automatic Control for its Control team.

The Department DAPI is based on Nantes campus. It has about 110 staff including 44 permanent lecturer-researchers, distributed through three research groups. The department is involved in the lab of digital sciences in Nantes, LS2N (Laboratoire des Sciences du Numérique de Nantes, UMR CNRS 6004).

You will join the Robotics, Automatic Control and Interactions group of the department, more precisely the Control Team. Collaborations with other teams of the department or more generally the LS2N will be strongly encouraged. The control team is well-known for its theoretical and methodological developments. Main results are about robust and optimized control or diagnosis solutions, applied to dynamical systems. Taking benefits from these results, industrial applications are frequently addressed, especially in the transportation sector; road transportation with driving assistance systems or autonomous vehicles, sea transport (e.g. energy optimization or sails control for cruise ships of next generation). Current projects are also about agricultural robots / cobots. The team has also several activities in the energetic sector; smart-grid optimization, nuclear plant control.

In this context, to join our teams:

- Teaching: In the department, as a research lecturer, you will fulfil the main rôles of training, research and development in academic and industrial circles, as well as internationally. A large part of the teaching activities will be in the first year of graduate engineering school; in particular, you will be strongly involved in the course named "Analysis, Signal Processing and Automatic Control", where you will teach the basics of these three disciplines. You will teach also basics of analog and digital electronic, and will supervise practical labs or projects.

Otherwise you will be involved in the majors "Automatic Control and Cyber-Physical Systems" or "Robotics and Interactions". You will have to teach identification and diagnosis (courses and labs) including tools based on neural networks, and also robust control (labs). You will be also strongly involved in teachings concerning "embedded systems".

Finally, you will be involved in the design of a new work-study program in industry 4.0. In particular, you

will have to coordinate teaching on automatic control. Your significant experience in designing and supervising teaching activities will allow you to promote learning by confronting learners with multidisciplinary problems. You are particularly interested in the competency-based approach, innovative teaching methods and the diversification of assessment methods.

Your command of English is strong enough to teach in this language.

- Research: You will do your research in the Control team, interested in robust control, estimation theory and diagnosis. You will have strong skills in the fields of dynamical systems, signal processing, automatic control, estimation or diagnosis. You have also a first experience about artificial intelligence, deep learning approaches, or you are strongly motivated to progress on that topic. On the speculative and methodological field, you will bring your vision on the possible ways to remove certain locks among the most essential for controlling industrial or biological systems: i) widening of the class of dynamic systems which it is possible to apprehend effectively, ii) realistic methods of managing the constraints on the inputs and states of the system, iii) new methods of efficient learning, in connection with developments in Artificial Intelligence.

Your scientific skills and your experience in project management will enable you to develop and participate in partnerships with partners from the economic and academic world, at regional, national and international levels.

Currently, research topics and industrial partnerships are in the transportation sector, energetic management and robotics. On the transportation topic, current research works are on intelligent vehicles (autonomous ones, or with high level driving assistance). Concerning energy management, the team contributes mainly on methodological results dealing with multi-energy systems, from the optimization of energy consumption to the control of large-scale systems. Finally, on the robotic applications, human-machine cooperation is currently the main topic. In the short term, you will be involved in the scientific supervisory of PhD, working on AI embedded in agricultural robots (autonomous vehicles).

You will contribute to the development and influence of the school through high-level publications, a proactive attitude to contract negotiation and an active contribution to the life of the school. You are really dynamic and know how to develop synergies and manage projects in training and research in a multidisciplinary environment. Sensitive to the challenges of sustainable development and social responsibility, you act in an ethical and responsible manner and have demonstrated that these dimensions are taken into account in the projects you have carried out.

The post is based on the Nantes campus. Travel in France and abroad is to be expected.

You will be asked to submit an integration project for all the tasks described to demonstrate your motivation for the job. (for more information on the selection criteria, consult the job description of a lecturer-researcher – Associate Professor, Assistant Professor/Senior Lecturer/ on the school website)

Level of training and/or experience required:

- Doctorate in the field of Automatic Control and Signal Processing, Applied Mathematics.

Additional information

You can contact:

Alexandre Dolgui, head of department DAPI

– Automation, Production and Computer Sciences department – alexandre.dolgui@imt-atlantique.fr

– tél : (+33)2 51 85 82 18

Philippe Chevrel, head of research control team

– philippe.chevrel@imt-atlantique.fr

– tél : (+33)2 51 85 83 40

Website (english): <https://www.imt-atlantique.fr/en/school/job-offers/2019-recruitment-campaign>

Website (french): <https://www.imt-atlantique.fr/fr/1-ecole/offres-emploi/enseignants-chercheurs>,

<https://www.imt-atlantique.fr/fr/maitre-assistant-fh-en-automatique>

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6.27. Faculty: UC Santa Cruz, USA

Contributed by: Gabriel Hugh Elkaim, elkaim@soe.ucsc.edu

UC Santa Cruz ECE Faculty recruitment in Intelligent Robotics

The Department of Electrical and Computer Engineering at the University of California, Santa Cruz invites applications for a Tenure Track Assistant Professor in Intelligent Robotics.

We seek outstanding applicants that work at the intersection of robotics, control, and cyber-physical systems. Of interest are individuals working on applied research in sensing/perception and on closing the control loop using advanced techniques [e.g., machine learning (ML); data-driven control; intelligent control (AI)] to enable the applications of robotics and autonomous systems in complex and uncertain environments. These environments include, but are not limited to, autonomous robots for AgTech, self-driving cars and trucks in densely populated areas, ocean and space exploration, unmanned flying vehicles in crowded and unstructured spaces, surgical operating rooms, rescue missions, and infrastructure protection after natural disasters.

Candidates are required to have a doctoral degree in a relevant discipline. Candidates should be able to teach core ECE and Robotics courses, robotics courses for non-engineering majors, and be passionate about innovation in hands-on, project-based, and laboratory-based educational activities at the undergraduate and graduate levels. The successful candidate is expected to develop an externally funded research program, advise and support graduate students in their research area, develop and teach courses within the undergraduate and graduate curriculum, perform university, public, and professional service, and cherish working with students, faculty, and staff from a wide range of social and cultural backgrounds.

UCSC is an EEO/AA/Vet/Disability/Minority Employer. For full consideration, applications must be received by March 20, 2020. Apply at:

<https://recruit.ucsc.edu/apply/JPF00799>

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6.28. Research Fellow: National University of Singapore, Singapore

Contributed by: Bernard How, bernard_how@tcoms.sg

We are seeking highly motivated researchers to perform research related to offshore operation, including developing sensing-based predictors, digital twin platform, efficient control strategies.

This project is one of the several working packages of offshore operations in complex operations. Prospective candidates applying for this position will join a team working with researchers from other leading research agencies in Singapore on research and development of control technologies and systems using sensing + physics-based predictors, including the algorithm design and implementation, system integration and testing on digital twin platforms.

Qualifications

- Candidates should have a PhD in Electrical Engineering, Computer Science, Mathematics or related fields.
- Self-motivated and independent working ability is a must.
- Strong math/programming background or familiarity with marine system development is a plus.
- Preferably working experience on software/hardware development and system integration in relevant subjects.
- Open to fixed term contract.

For application, please refer to the URL:

<https://nuscareers.taleo.net/careersection/nusep/jobdetail.ftl?job=00CC5>

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6.29. Research Scientist/Engineer: Bordrin New Energy Vehicle, USA

Contributed by: Yonghua Li, yonghua.li@bordrin.com

Research Scientist/Engineer: Bordrin New Energy Vehicle Inc. US R & D Center, Oak Park, Michigan, USA

Bordrin New Energy Vehicle Inc., a start-up electric vehicle OEM based in Shanghai, China, is looking for up to 3 research scientist/engineers in its US R & D center located in Oak Park, Michigan, USA. Interested candidates with advanced degrees and research or work experiences are encouraged to apply.

Candidates are expected to work in one (or more) of the following areas:

- Electric vehicle battery management system (BMS);
- Electric vehicle thermal systems analysis and control design;
- Electric vehicle energy analysis and management strategy development.

Responsibilities:

- For battery management system, starting from battery system requirements and battery data,
 - Develop BMS feature requirements,
 - Develop and validate related algorithms using model-based approach,
 - Develop feature software using Matlab/Simulink tools,
 - Validate feature software using MIL/SIL/HIL/Vehicle Test approaches,
 - Coordinate with global development team to deliver BMS software on time, with highest quality

- Create intellectual properties in related areas.
- For thermal systems analysis and control design, starting from vehicle performance requirements and associated data,
 - Develop overall thermal management architecture based on system analysis using commercial tools such as AMESim,
 - Specify and acquire system components,
 - Develop and validate related control algorithms that meet full working conditions of the vehicle, develop overall control software using matlab/simulink tools,
 - Validate overall control software using mil/sil/hil/vehicle test approaches,
 - Work with energy management engineers and battery systems engineers to find optimal parameter settings for the thermal control system calibrations,
 - Coordinate with global development team to deliver overall vehicle thermal management software on time, with highest quality
- Create intellectual properties in related areas.
- For energy analysis and management, starting from vehicle performance requirements, initial vehicle design and associated data,
 - Build complete vehicle energy performance model using commercial tools such as AMESim,
 - Validate vehicle energy performance model using existing vehicle test data,
 - Create DOE experiments to identify potential energy performance issues with current design,
 - Identify key areas where improved design may lead to improved overall vehicle energy performance,
 - Work with thermal management engineers and battery systems engineers to find optimal parameter settings for the thermal control system calibrations,
 - Coordinate with global development team in achieving program target performance,
- Create intellectual properties in related areas.

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6.30. Research Engineer: Technology Centre for Offshore and Marine, Singapore

Contributed by: Bernard How, bernard_how@tcoms.sg

Research Engineer (Control System), Technology Centre for Offshore and Marine, Singapore

Job Description

- Develop hardware and software control architectures to support R&D in the marine and offshore domain. This includes developing, testing, troubleshooting software and verification procedures.
- Develop engineering requirements, specification and validation criteria for high-quality research using combinations of physical experiments, sensing, numerical simulations as well as data analytics to develop integrated physical-numerical modelling, simulations and applications.
- Perform dynamic modelling of physical systems and control algorithm design.
- Survey literature and implement state-of-the-art techniques and tools (such as AI, deep learning, machine learning, etc) to solve challenging problems.)
- Collaborate with industry partners, affiliated research institutes and other relevant stakeholders to contribute to grant proposals for research funding consistent with the strategic goals of TCOMS.

- Any other duties as assigned by supervisor.

Qualification & Field of Study

Bachelor's or Master's Degree from reputable universities in Electrical Engineering, Computer Engineering/ Science, Mechatronics, or other related disciplines.

Experience

- Preferably having relevant research/industry experience with competent knowledge in some of the following areas:
- Control system applications or experiments using Advanced/PID control
- Common PLC/SCADA systems
- Knowledge of software such as LabView, MATLAB, etc. and experience with engineering simulations and prototyping tools

Other Requirements

- Good interpersonal and communications skills
- Ability to adapt and work effectively as members of a team
- Good command of written and spoken English language
- Resourceful and self-driven with a high degree of professional integrity

How to Apply:

Please submit your application at this job portal

<https://bit.ly/38C1poI>

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6.31. Scientist: Technology Centre for Offshore and Marine, Singapore

Contributed by: Bernard How, bernard.how@tcoms.sg

Scientist (Control System), Technology Centre for Offshore and Marine, Singapore

Job Description

- Perform dynamic modelling of physical systems, control design and the coupling of numerical and physical systems applied to the marine and offshore domain
- Develop hardware and software control architectures to support R&D in the areas of offshore hydrodynamics and fluid-structure interactions. This includes developing, testing, troubleshooting software and verification procedures
- Develop engineering requirements, specification and validation criteria for high-quality research using combinations of physical experiments, sensing, numerical simulations as well as data analytics to develop integrated physical-numerical modelling, simulations and applications
- Survey literature and implement state-of-the-art techniques and tools (such as AI, deep learning, machine learning, etc) to solve challenging problems
- Collaborate with industry partners, affiliated research institutes and other relevant stakeholders to contribute to grant proposals for research funding consistent with the strategic goals of TCOMS
- Any other duties as assigned by supervisor

Qualification & Field of Study

PhD from reputable universities in Electrical Engineering, Computer Engineering / Science, Mechatronics, or other related disciplines

Experience

- Preferably over 3 years of relevant postdoctoral/research/industry experience with competent knowledge in some of the following areas:
- Systems dynamics, control systems and/or control theory.
- Control system applications or experiments using Advanced/PID control
- Common PLC/SCADA/micro-processor systems
- Knowledge of software such as LabView, MATLAB, etc. and experience with engineering simulations and prototyping tools

Other Requirements

- Good interpersonal and communications skills.
- Ability to adapt and work effectively as members of a team
- Good command of written and spoken English language
- Resourceful and self-driven with a high degree of professional integrity

How to Apply:

Please submit your application at this job portal

<https://bit.ly/2SVB7Hd>

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