Iman Nodozi

Graduate Research Assistant
University of California, Santa Cruz (UCSC),
Department of Electrical and Computer Engineering

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Research Focus

Broad area

Control, dynamical systems, machine learning, and optimization

Theory focus

-Data driven modeling for control, optimization and machine learning,
-Stochastic uncertainty propagation and nonlinear estimation
-Convex and non-convex optimization
-Wasserstein Barycenter
-Bayesian inference
-Data distribution
-Learning theory
-Density control
-Data Analysis
-Statistics
-PINN
-MPC
-LLM
-LMI

Skills

Programing Language

Python, Matlab, HTML, Programmable logic controller

Framework

TensorFlow, PyTorch, Keras, DeepXDE, PYMC3, Panda

Education

Ph.D.

ECE, University of California, Santa Cruz (UCSC), California, USA. (2019-2024)

Master of Science (M.Sc.)

ECE, University of California, Santa Cruz (UCSC), California, USA. (2019-2021)
Master of Science, Electrical Engineering

Master of Science (M.Sc.)

Imam Khomeini International University (IKIU), Qazvin, Iran.(2013-2016)
Master of Science, Electrical Engineering, Control

Bachelor of Science (B.Sc.)
Hamedan University of Technology, Hamedan, Iran. (2008-2013)
Bachelor of Science, Electrical Engineering, Control

Dissertation

Ph.D. Project: "Measure-valued Proximal Recursions for Learning and Control."

M.Sc. Thesis: "Nonlinear Hybrid Systems Control via Linear Matrix Inequalities."

Academic Experience

Guest Instructor for Nonlinear Control Theory, Spring 2022, UCSC.
Teaching Assistant for Signals and Systems, Spring 2021, UCSC.
Teaching Assistant for Analog Electronics, Winter 2020, UCSC.
Teaching Assistant for Robot Automation, Fall 2020, UCSC.
Teaching Assistant for Linear Control Course, Fall 2014, IKIU.

Awards

Dissertation Year Fellowship, Baskin School of Engineering 2023-2024
Regents Fellowships, University of California, Santa Cruz, 2019-2020.

Reviewer Service

Conference
Conference on Neural Information Processing Systems (NeurIPS), 2022, 2023
American Control Conference (ACC), 2022, 2023, 2024
IEEE Conference on Decision and Control (CDC), 2022, 2023
International Conference on Machine Learning (ICML), 2022, 2023
Mathematical Theory of Networks and Systems (MTNS), 2022

Journal
Nonlinear Analysis: Hybrid Systems
Systems and Control Letters
Automatica

Leadership & Collaboration

Lead of a team of graduate students at UCSC and UC Berkeley in high-performance feedback control research for colloidal self-assembly, leveraging state-of-the-art tools in stochastic control and machine learning.

Lead of a collaborative project with the Palo Alto Research Center, focusing on developing a controlled mean-field dynamics model for micro-assembly through the application of dielectrophoretic forces.

Supervisor Mentor

Charlie Yan (Electrical and Computer Engineering). Summer 2022 – Spring 2023.
M.S. Thesis: Neural Schrödinger Bridge with Sinkhorn Losses.

Publications

Alexis Teter, **Iman Nodozi**,, and Abhishek Halder. " Proximal Mean Field Learning in Shallow Neural Networks ." Transactions on Machine Learning Research , Online paper: here.

Alexis Teter, **Iman Nodozi**, and Abhishek Halder. "Solution of the Probabilistic Lambert Problem: Connections with Optimal Mass Transport, Schrödinger Bridge, and Reaction-Diffusion PDEs." Online paper: here.

Iman Nodozi, and Abhishek Halder. "Wasserstein Consensus ADMM." Online paper: here.

Iman Nodozi, Charlie Yan, Mira Khare, Abhishek Halder, and Ali Mesbah. "Neural Schrödinger Bridge with Sinkhorn Losses: Application to Data-driven Minimum Effort Control of Colloidal Self-assembly." Online paper: here.

Iman Nodozi, Abhishek Halder, and Ion Matei. "A Controlled Mean Field Model for Chiplet Population Dynamics." IEEE Control Systems Letters, also in 62nd IEEE Conference on Decision and Control (CDC), Singapore, 2023. Online paper: here.

Charlie Yan, **Iman Nodozi**, and Abhishek Halder. "Optimal Mass Transport over the Euler Equation." 62nd IEEE Conference on Decision and Control (CDC), Singapore, 2023. Online paper: here.
Invited paper in Session 'Optimal Transport'

Iman Nodozi, Jared O'Leary, Abhishek Halder, and Ali Mesbah. " A Physics-informed Deep Learning Approach for Minimum Effort Stochastic Control of Colloidal Self-Assembly." 2023 American Control Conference (ACC), San Diego, California, USA. Online paper: here.
Invited paper in Session 'Learning and Stochastic Optimal Control'

Iman Nodozi, and Ricardo Sanfelice. "A Mixed Integer Approach for the Solution of Hybrid Model Predictive Control Problems." 61st IEEE Conference on Decision and Control, Cancún, Mexico, 2022. Online paper: here.

Iman Nodozi, and Abhishek Halder. "Schrödinger Meets Kuramoto via Feynman-Kac: Minimum Effort Distribution Steering for Noisy Nonuniform Kuramoto Oscillators." 61st IEEE Conference on Decision and Control, Cancún, Mexico, 2022. Online paper: here.

Iman Nodozi, and Abhishek Halder. "A Distributed Algorithm for Measure-valued Optimization with Additive Objective." 25th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2022), Beyreuth, Germany, 2022. Online paper: here.
Invited paper in Session 'Optimal transport: Theory and applications in networks and systems'

Iman Nodozi, and Mehdi Rahmani. "LMI-based mixed-integer model predictive control for Hybrid systems." International Journal of Control (2020): 2336-2345. Online paper: here.

Iman Nodozi, and Mehdi Rahmani. "LMI-based model predictive control for switched nonlinear systems"."Journal of Process Control" 59 (2017) 49-58. Online paper: here.

Mehdi Rahmani, and **Iman Nodozi**. "Phase-locked loops redesign by the Lyapunov theory." Electronics Letters 51.21 (2015): 1664-1666. Online paper: here.

Industrial Experience

Application Engineer Intern, Onsemi (Sept 2022-Jan 2023):
- Automated data collection for power integrated circuits using Python, LabView, and TestStand.
- Designed and implemented data analysis scripts, significantly improving large dataset processing.
- Utilized APIs for advanced data visualization and online reporting.

Electrical Engineer, SOKHT AMA co (2016-2018):
- Developed software for robotic automation, enhancing operational efficiency.
- Led the reconstruction and automation of Aluminum die-cast machines, boosting productivity.
- Oversaw the design and construction of performance test machines for the TU5 engine oil pump, manufactured by Iran Khodro.co.
- Managed projects from conceptualization to implementation, focusing on process optimization and automation, driving significant improvements in operational workflows.

Industrial course:
Academy of DQS excellence Certification of training Course for Requirements of ISO/TS 16949:2009 and IATF 16949:2016 (International Automotive Task Force) courses in winter and fall 2017, respectively, Certificate here.

References

Abhishek Halder
Associate Professor of Department of Aerospace Engineering,
Iowa State University
ahalder@ucsc.edu, ahalder@iastate.edu

Ali Mesbah
Associate Professor of Chemical and Biomolecular Engineering,
University of California, Berkeley
mesbah@berkeley.edu

Ricardo Sanfelice
Professor of Department of Electrical and, Computer Engineering,
University of California, Santa Cruz
ricardo@ucsc.edu

Mehdi Rahmani
Associate Professor of Department of Electrical Engineering,
Imam-Khomeini International University
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