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

Machine learning, control, dynamical systems, and optimization

Theory focus

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

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-March 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

Publications

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

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. "IEEE Transactions on Control Systems Technology." 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'

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

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.

Supervisor Mentor

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

Industrial Experience

Application Engineer intern at Onsemi: (September 2022-January 2023)

As an intern, I automated data collection for power integrated circuits using Python, LabView, and TestStand and enhanced data analysis methods. I developed scripts for processing large datasets and utilized APIs for result visualization online.

Electrical Engineer at SOKHT AMA co: (2016-2018)

As a Project Manager and Engineer, I led the reconstruction and automation of various Aluminum die-cast machines and their auxiliary equipment, enhancing operational efficiency. I oversaw the design and construction of performance test machines for the oil pump of TU5 engine Peugeot cars manufactured by Iran Khodro.co, ensuring accurate and efficient testing protocols. My role encompassed end-to-end project management, from conceptualization and design to implementation and testing, driving process optimizations and automation.

References

Abhishek Halder
Associate Professor of Department of Aerospace Engineering,
Iowa State University
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Ali Mesbah
Associate Professor of Chemical and Biomolecular Engineering,
University of California, Berkeley
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Ricardo Sanfelice
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University of California, Santa Cruz
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Mehdi Rahmani
Associate Professor of Department of Electrical Engineering,
Imam-Khomeini International University
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