Masih Haseli

Curriculum Vitae

Department of Computing and Mathematical Sciences
California Institute of Technology

mhaseli@caltech.edu
mhaseli.github.io

Research

- Dynamical Systems and Control Theory
- Operator Theoretic Approaches in Dynamical Systems
- Machine Learning
- Robotics

Employment

Postdoctoral Scholar Research Associate — Jul. 2025 - present
Department of Computing and Mathematical Sciences
California Institute of Technology
Advisor: Prof. Joel Burdick

Postdoctoral Scholar — Sep. 2022 - Jun. 2025
Department of Mechanical and Aerospace Engineering
University of California, San Diego
Advisor: Prof. Jorge Cortés

Education

Ph.D. in Engineering Sciences (Mechanical Engineering) — Sep. 2017 - Aug. 2022
University of California, San Diego
Advisor: Prof. Jorge Cortés

M.Sc. in Electrical Engineering – Control — Sep. 2013 - Oct. 2015
Amirkabir University of Technology, Tehran

B.Sc. in Electrical Engineering – Control — Sep. 2009 - Sep. 2013
Amirkabir University of Technology, Tehran

Honors & Awards

- Robert Skelton Systems and Control Dissertation Award — 2023
  UCSD Center for Control Systems and Dynamics
- Best Student Paper Award — 2021
  The 2021 American Control Conference, New Orleans, Louisiana
- Bronze Medal — 2014
  Iran's National Mathematics Competition
- Silver Medal — 2008
  Iran's National Physics Olympiad

Publications

Journal Articles

(J1) Modeling nonlinear control systems via Koopman control family: universal forms and subspace invariance proximity
M. Haseli, J. Cortés
Automatica, *To appear*

(J2) Two roads to Koopman operator theory for control: infinite input sequences and operator families
M. Haseli, I. Mezić, J. Cortés
IEEE Transactions on Automatic Control, *submitted*

(J3) Koopman operators in robot learning
L. Shi, **M. Haseli**, G. Mamakoukas, D. Bruder, I. Abraham, T. Murphey, J. Cortés, K. Karydis
IEEE Transactions on Robotics, *submitted*

(J4) Recursive forward-backward EDMD: guaranteed algebraic search for Koopman invariant subspaces
M. Haseli, J. Cortés
IEEE Access 13 (2025), 61006-61025

(J5) Invariance proximity: closed-form error bounds for finite-dimensional Koopman-based models
M. Haseli, J. Cortés
Systems and Control Letters, *submitted*

(J6) Generalizing dynamic mode decomposition: balancing accuracy and expressiveness in Koopman approximations
M. Haseli, J. Cortés
Automatica 153 (2023), 111001

(J7) Temporal forward-backward consistency, not residual error, measures the prediction accuracy of extended dynamic mode decomposition
M. Haseli, J. Cortés
IEEE Control Systems Letters 7 (2023), 649-654

(J8) Parallel learning of Koopman eigenfunctions and invariant subspaces for accurate long-term prediction
M. Haseli, J. Cortés
IEEE Transactions on Control of Network Systems 8 (4) (2021), 1833-18458

(J9) Learning Koopman eigenfunctions and invariant subspaces from data: Symmetric Subspace Decomposition
M. Haseli, J. Cortés
IEEE Transactions on Automatic Control 67 (7) (2022), 3442-3457

Conference Proceedings

(C1) Koopman operator extensions for control: bridging infinite input sequences and operator families
M. Haseli, I. Mezić, J. Cortés
Proceedings of the IEEE Conference on Decision and Control, Rio de Janeiro, Brazil, 2025, to appear

(C2) Real-time learning of predictive dynamic obstacle models for robotic motion planning
Stella B. Kombo, **M. Haseli**, J. Burdick
Proceedings of the IEEE International Conference on Robotics and Automation, 2026, *submitted*

(C3) Temporal forward-backward consistency, not residual error, measures the prediction accuracy of extended dynamic mode decomposition
M. Haseli, J. Cortés
Proceedings of the American Control Conference, San Diego, 2023

(C5) Data-driven approximation of Koopman-invariant subspaces with tunable accuracy
M. Haseli, J. Cortés
Proceedings of the American Control Conference, New Orleans, Louisiana, 2021, pp. 469-474
Best Student Paper Award Winner

(C6) Fast identification of Koopman-invariant subspaces: parallel symmetric subspace decomposition
M. Haseli, J. Cortés
Proceedings of the American Control Conference, Denver, Colorado, 2020, pp. 4545-4550

(C7) Efficient identification of linear evolutions in nonlinear vector fields: Koopman invariant subspaces
M. Haseli, J. Cortés
Proceedings of the IEEE Conference on Decision and Control, Nice, France, 2019, pp. 1746-1751

(C8) Approximating the Koopman operator using noisy data: noise-resilient extended dynamic mode decomposition
M. Haseli, J. Cortés
Proceedings of the American Control Conference, Philadelphia, PA, 2019, pp. 5499-5504

Teaching Experience

- Nonlinear Control (UCSD MAE 281B) — Spring 2021
  Graduate Teaching Assistant
  Instructor: Prof. Jorge Cortés

Invited Talks

- SIAM Conference on Applications of Dynamical Systems, Denver, Colorado — May 2025
  Talk Title: Koopman Control Family and Universal Finite-Dimensional Forms
- U.S. Association for Computational Mechanics, Student Chapter Seminars — Mar. 2024
  Online: YouTube
- Safe Autonomous Systems Lab Seminars — Jan. 2024
  Department of Mechanical and Aerospace Engineering, University of California, San Diego
- Scalable Optimization and Control Lab Seminars — Sep. 2023
  Department of Electrical and Computer Engineering, University of California, San Diego
- 2022 International Symposium on Nonlinear Theory and Its Applications — Dec. 2022
- *Data-Driven Reduced-Order Methods for System Control Mini-symposium* — Sep. 2021
  Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology Conference
- 37th Southern California Control Workshop, University of California, San Diego — Jan. 2020

Professional Service

Reviewer for: Automatica, IEEE Open Journal of Control Systems, IEEE Access, IEEE Control Systems Letters, Physica D: Nonlinear Phenomena, Journal of Dynamic Systems Measurement & Control, IEEE Conference on Decision and Control (CDC), American Control Conference (ACC), International Symposium on Mathematical Theory of Networks and Systems (MTNS), Resilience Week Symposium, Indian Control Conference, IFAC World Congress, International Conference on Robotics and Automation (ICRA), The Journal of Supercomputing, Mathematics of Control, Signals, and Systems