

# MASIH HASELI

## *Curriculum Vitae*

Department of Computing and Mathematical Sciences  
California Institute of Technology

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### 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 W. 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  
 S. B. Kombo, **M. Haseli**, J. W. 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	<ul style="list-style-type: none"> <li>• Nonlinear Control (UCSD MAE 281B) <span style="float: right;">Spring 2021</span></li> <li>Graduate Teaching Assistant</li> <li>Instructor: Prof. Jorge Cortés</li> </ul>
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INVITED TALKS	<ul style="list-style-type: none"> <li>• SIAM Conference on Applications of Dynamical Systems, Denver, Colorado <span style="float: right;">May 2025</span>            Talk Title: Koopman Control Family and Universal Finite-Dimensional Forms</li> <li>• U.S. Association for Computational Mechanics, Student Chapter Seminars <span style="float: right;">Mar. 2024</span>            Online: <a href="#">YouTube</a></li> <li>• Safe Autonomous Systems Lab Seminars <span style="float: right;">Jan. 2024</span>            Department of Mechanical and Aerospace Engineering, University of California, San Diego</li> <li>• Scalable Optimization and Control Lab Seminars <span style="float: right;">Sep. 2023</span>            Department of Electrical and Computer Engineering, University of California, San Diego</li> <li>• 2022 International Symposium on Nonlinear Theory and Its Applications <span style="float: right;">Dec. 2022</span></li> <li>• <i>Data-Driven Reduced-Order Methods for System Control Mini-symposium</i> <span style="float: right;">Sep. 2021</span>            Mechanistic Machine Learning and Digital Twins for Computational Science,            Engineering &amp; Technology Conference</li> <li>• 37th Southern California Control Workshop, University of California, San Diego <span style="float: right;">Jan. 2020</span></li> </ul>
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PROFESSIONAL SERVICE	<b>Reviewer for:</b> 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
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