

# ZHENYI YUAN

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## EDUCATION

### University of California, San Diego

*Ph.D. in Engineering Sciences (Mechanical Engineering)*

Advisor: Jorge Cortés

La Jolla, USA

Oct. 2020 – June 2025

### Harbin Institute of Technology, Honors School

*B.S. + M.S. in Control Science and Engineering*

Advisor: Ligang Wu

Harbin, China

Sept. 2014 – July 2020

## RESEARCH INTERESTS

- Machine Learning with Provable Guarantees
- Control and Learning for DERs in Power Systems
- Data-Driven Methods for Control and Optimization
- Distributed Control and Optimization over Networks

## PUBLICATIONS

### Book Chapters

- (B-1) **Z. Yuan**, G. Cavararo, and J. Cortés, “Learning stable Volt/Var controllers in distribution grids,” *Big Data Application in Power Systems (Second Edition)*, ed. R. Arghandeh and Y. Zhou, Elsevier Science, Netherlands, 2024.

### Journal Papers

- (J-9) **Z. Yuan**, J. Feng, Y. Shi, and J. Cortés, “Stability constrained voltage control in distribution grids with arbitrary communication infrastructures,” *IEEE Transactions on Smart Grid*, 2025. Submitted.
- (J-8) **Z. Yuan**, G. Cavararo, A. S. Zamzam, and J. Cortés, “Unsupervised learning for equitable DER control,” *Electric Power Systems Research*, 234: 110634, 2024.
- (J-7) Z. Sun\*, **Z. Yuan\***, C. Zhao, and J. Cortés, “Learning decentralized frequency controllers for energy storage systems,” *IEEE Control Systems Letters*, 7: 3459-3464, 2023.
- (J-6) **Z. Yuan**, G. Cavararo, and J. Cortés, “Constraints on OPF surrogates for learning stable local Volt/Var controllers,” *IEEE Control Systems Letters*, 7: 2533-2538, 2023.
- (J-5) **Z. Yuan**, G. Cavararo, M. K. Singh, and J. Cortés, “Learning provably stable local Volt/Var controllers for efficient network operation,” *IEEE Transactions on Power Systems*, 39(1): 2066-2079, 2024.
- (J-4) **Z. Yuan**, C. Zhao, and J. Cortés, “Reinforcement learning for distributed transient frequency control with stability and safety guarantees,” *Systems & Control Letters*, 185: 105753, 2024.
- (J-3) **Z. Yuan** and J. Cortés, “Data-driven optimal control of bilinear systems,” *IEEE Control Systems Letters*, 6: 2479-2484, 2022.
- (J-2) **Z. Yuan**, Y. Xiong, G. Sun, J. Liu, and L. Wu, “Event-triggered quantized communication-based consensus in multi-agent systems via sliding mode,” *IEEE Transactions on Cybernetics*, 52(5): 3925-3935, 2022.
- (J-1) **Z. Yuan**, Y. Tian, Y. Yin, S. Wang, J. Liu, and L. Wu, “Trajectory tracking control of a four Mecanum wheeled mobile platform: An ESO-based sliding mode approach,” *IET Control Theory & Applications*, 14(3): 415-426, 2020.

### Conference Proceedings

- (C-5) Z. Xiong, **Z. Yuan**, K. Miao, H. Wang, J. Cortés, and A. Papachristodoulou, “Data-enabled predictive control for nonlinear systems based on a Koopman bilinear realization,” in *IEEE Conference on Decision and Control (CDC)*, Rio de Janeiro, Brazil, Dec. 2025. Submitted.
- (C-4) **Z. Yuan**, G. Cavararo, A. S. Zamzam, and J. Cortés, “Unsupervised learning for equitable DER control,” in *Power Systems Computation Conference (PSCC)*, Paris-Saclay, France, Jun. 2024.
- (C-3) Z. Sun\*, **Z. Yuan\***, C. Zhao, and J. Cortés, “Learning decentralized frequency controllers for energy storage systems,” in *American Control Conference (ACC)*, Toronto, Canada, Jul. 2024.
- (C-2) **Z. Yuan**, G. Cavararo, and J. Cortés, “Constraints on OPF surrogates for learning stable local Volt/Var controllers,” in *IEEE Conference on Decision and Control (CDC)*, Marina Bay Sands, Singapore, Dec. 2023.
- (C-1) G. Cavararo, **Z. Yuan**, M. K. Singh, and J. Cortés, “Learning local Volt/Var controllers towards efficient network operation with stability guarantees,” in *IEEE Conference on Decision and Control (CDC)*, Cancún, Mexico, Dec. 2022.

## PROJECT EXPERIENCES

### CoDERMS: Coordinated Distributed Energy Resources Management System

*Collaborative Project Participant*

TotalEnergies, USA  
Nov. 2023 – June 2025

- Develop scalable distributed control algorithms for optimal Plug-in EV charging
- Develop virtual battery models that characterize the flexibility of virtual power plants

### ACE: Asynchronous Control and Estimation for Distributed Energy Resources

*Subcontract Graduate Student*

NREL, USA  
Oct. 2021 – Oct. 2023

- Design provably reliable and efficient voltage controllers using machine learning
- Publish book chapter, journal & conference papers ([B-1,J-5,J-6,J-8,C-1,C-2,C-4])
- Give academic talks/posters at international conferences & universities

## SELECTED AWARDS

- Outstanding Talk Award, Zhejiang University (2022)
- First-class Postgraduate's Scholarship, Ministry of Education (2018, 2019)
- Yingcai Honorable Graduate, Harbin Institute of Technology (2018)
- Second-class People's Scholarship, Harbin Institute of Technology (2017)
- First Prize (Jiangxi Division), Chinese Chemistry Olympiad (2011)

## INVITED TALKS

*Learning for Control with Performance Guarantees: Applications to Power Networks*

Automatic Control Laboratory, ETH Zürich (Hosted by Prof. Florian Dörfler)

Dec. 2024  
Zürich, Switzerland

*Stability Constrained Voltage Control in Distribution Grids*

Department of Automation, Shanghai Jiao Tong University (Hosted by Prof. Zhaojian Wang)

July 2024  
Shanghai, China

*Unsupervised Learning for Equitable DER Control*

23rd Power Systems Computation Conference

June 2024  
Paris, France

*Constraints on OPF Surrogates for Learning Stable Local Volt/Var Controllers*

62nd IEEE Conference on Decision and Control

Dec. 2023  
Singapore

*Data-driven Learning and Control: Performance Guarantees and Applications to Power Systems*

SONIC Lab, The Chinese University of Hong Kong (Hosted by Prof. Changhong Zhao)

Sept. 2023  
Hong Kong

*Data-driven Learning and Control: Performance Guarantees and Applications to Power Systems*

SAS Lab, UC San Diego (Hosted by Prof. Sylvia Herbert)

Sept. 2023  
San Diego, USA

*Safe Learning for Control in Power Networks*

National Academic Forum on Swarm Intelligent Unmanned Systems, Zhejiang University

Dec. 2022  
Hangzhou, China

## PROFESSIONAL SERVICES

### Reviewer for Journals & Conferences:

- IEEE Transactions on Automatic Control; IEEE Transactions on Power Systems; IEEE Transactions on Network Science and Engineering; IEEE Control Systems Letters; IEEE Robotics and Automation Letters; IEEE Open Journal of Control Systems; Systems & Control Letters; International Journal of Robust and Nonlinear Control; Electric Power Systems Research, etc.
- IEEE Conference on Decision and Control (CDC); American Control Conference (ACC); IEEE Conference on Control Technology and Applications (CCTA); Power Systems Computation Conference (PSCC); Learning for Dynamics & Control Conference (L4DC), etc.

### Professional Memberships:

- IEEE Graduate Student Member; IEEE CSS Member; IEEE PES Member

## REFERENCES AVAILABLE TO CONTACT

**Jorge Cortés**, Professor

Department of Mechanical and Aerospace Engineering  
University of California, San Diego, USA

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Department of Information Engineering  
The Chinese University of Hong Kong, Hong Kong

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**Guido Cavraro**, Senior Researcher

Power Systems Engineering Center  
National Renewable Energy Laboratory, USA

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**Yuanyuan Shi**, Assistant Professor

Department of Electrical and Computer Engineering  
University of California, San Diego, USA

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