

Zhiyuan LIU

Ph.D Student, Computer Science
University of Colorado, Boulder
Email: zhiyuan.liu@colorado.edu

RESEARCH DIRECTIONS

Online learning, distributed algorithm design and analysis, optimization and its engineering applications, game theory.

EDUCATION

University of Colorado, Boulder. 2015 - now
Ph.D in Computer Science. Advisor: Lijun Chen.

University of Science and Technology of China. 2011 - 2015
BA of Computer Science

RESEARCH INTERN AND PROJECT

Research Intern, Pacific Northwest National Laboratory 05/2018 - 08/2018
Host: Enoch Yeung
Topic: Convergence of Koopman Learning and Distributed Algorithms. (One paper output)
We use deep neural networks to alternatively learn the function space and linear operator.

Research Intern, Pacific Northwest National Laboratory 07/2017 - 08/2017
Host: Enoch Yeung
Topic: Koopman Learning for Control and Model Decomposition. (Two papers output)

Accelerated Algorithms For Large Scale Power Network Control. 09/2018 - 12/2018
Project funded by a reward from National Renewable Energy Laboratory.
Significantly reduced the communication burden (33x speedup); Running time from 7 hours to 10 seconds; Memory from 1GB to 25MB; Scalable to 1 million network nodes.
Under the review of Software Patent.

National Training Programs for Undergraduates. 03/2014 - 03/2015
Project: Data Analysis and Recommendation for the Online KARAOKE Karaoke named Ihou

PUBLICATIONS

Learning and Control

Towards Scalable Koopman Operator Learning: Convergence Rate and a Distributed Learning Algorithm.

Zhiyuan Liu, Guohui Ding, Lijun Chen, Enoch Yeung.
Proceedings of the American Control Conference (ACC), 2020.

Incentivized Exploration for Multi-Armed Bandits under Reward Drift.

Zhiyuan Liu, Guohui Ding, Lijun Chen, Enoch Yeung.
Proceedings of the Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI), 2020

Block Belief Propagation for Parameter Learning in Markov Random Fields.

Lu You, Zhiyuan Liu, Bert Huang.

Proceedings of the Thirty-Third AAAI Conference on Artificial Intelligence (AAAI), 2019

Decomposition of Nonlinear Dynamical Systems Using Koopman Gramians.

Zhiyuan Liu, Soumya Kundu, Lijun Chen, Enoch Yeung.

Proceedings of the American Control Conference (ACC), 2018.

A Nonconvex Relaxation Approach for Rank Minimization Problems.

Xiaowei Zhong, Linli Xu, Yitan Li, Zhiyuan Liu, Enhong Chen.

Proceedings of the Thirty- AAAI Conference on Artificial Intelligence(AAAI), 2015

Large Scale Network Control

Accelerated Voltage Regulation in Multi-Phase Distribution Networks Based on Hierarchical Distributed Algorithm.

Xinyang zhou, Zhiyuan Liu, Changhong Zhao, Lijun Chen.

IEEE Transactions on Power Systems (TPS), 2019

Hierarchical Distributed Voltage Regulation in Networked Autonomous Grids.

Xinyang Zhou*, Zhiyuan Liu*, Wenbo Wang, Changhong Zhao, Fei Ding, Lijun Chen.

Proceedings of the American Control Conference (ACC), 2019.

* means equal contribution.

Signal-Anticipation in Local Voltage Control in Distribution Systems.

Zhiyuan Liu, Seungil You, Xinyang Zhou, Guohui Ding, Lijun Chen.

IEEE Transactions on Smart Grid (TSG), 2019

A koopman operator approach for computing and balancing gramians for discrete time nonlinear systems.

Enoch Yeung, Zhiyuan Liu, Nathan O Hodas.

Proceedings of the American Control Conference (ACC), 2018.

Proportional Control Applied to Dynamic Network Resource Allocation.

Zhiyuan Liu, Lijun Chen.

Proceedings of the American Control Conference (ACC) 2017.

Distributed Online Convex Programming for Collision Avoidance in Multi-agent Autonomous Vehicle Systems.

Guohui Ding, Hadi Ravanbakhsh, Zhiyuan Liu, Sriram Sankaranarayanan, Lijun Chen.

Proceedings of the American Control Conference (ACC), 2019.

Stochastic Dual Algorithm for Voltage Regulation in Distribution Networks with Discrete Loads.

Xinyang Zhou, Zhiyuan Liu, Emiliano Dall’Anese, Lijun Chen.

IEEE International Conference on Smart Grid Communications (SmartGrid), 2017

Under Review and Working Papers

Optimal Adversarial Attack on Thompson Sampling.

Zhiyuan Liu, Huazheng Wang, Lijun Chen. (ready for submission)

Incentivize Exploration with Information Gap.

Huazheng Wang, Zhiyuan Liu. (working)

A Smoothed Analysis of Online Lasso for the Sparse Linear Contextual Bandits Problem

Zhiyuan Liu, Huazheng Wang, Bo Waggoner, Lijun Chen. (Ready for submission)

Reverse and Forward Engineering of Local Voltage Control in Distribution Networks.

Xinyang Zhou, Masoud Farivar, Zhiyuan Liu, Lijun Chen, Steven Low.

Under review of IEEE Transactions on Automatic Control (TAC).

Gradient-Based Multi-Area Distribution System State Estimation.

Xinyang Zhou, Zhiyuan Liu, Yi Guo, Changhong Zhao, Lijun Chen.

Under review of IEEE Transactions on Smart Grid (TSG).

Multi-Level Optimal Power Flow Solver in Large Distribution Networks.

Xinyang Zhou, Yue Chen, Zhiyuan Liu, Changhong Zhao, Lijun Chen.

Under review of IEEE Transactions on Smart Grid (TSG).

COMPUTER SKILLS

Programming Language: C, C++, PYTHON, JAVA, C#, mysql, MATLAB, R.

Platforms: LINUX

AWARDS

AAAI Travel Award (2020), ACC Student Travel Award (2017), Dean's match Funding (2017), PhD Student Fellowship (2015), Outstanding Student Scholarship(USTC) (2011-2015), Industrial Bank Responsibility Scholarship (2012).

TEACHING EXPERIENCE

Teaching Assistant: Operating System(Fall 15, Spring 16), Computer System(Fall 16, Spring 17), Algorithms(Fall 17, Fall 18, Spring 20), Convex Optimization(Spring 18).