Kangze Zheng

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Education

Sun Yat-sen University, Guangzhou, China — Jun. 2024 (Expected)

Master in Computer Science and Technology; GPA: 4.0/4.0 (2/59)
Advisor: Prof. Yunong Zhang

Sun Yat-sen University, Guangzhou, China — Jun. 2021

Bachelor of Engineering in Computer Science and Technology; GPA: 3.9/4.0 (22/187)

Research Experience and Publications

Robust Model for Dynamic Convex Optimization — Dec. 2022 -- Jun. 2023

- Presented a model based on the augmented Lagrange method for dynamic convex optimization, which incorporated an integral term and nonlinear technique for better robustness.
- Proved that the presented model is able to completely adapt to an important kind of noises called error-related noise in this work.
- Proposed a model-free framework based on the presented model for a surgical manipulator (a UR5 manipulator equipped with a trocar as its end-effector) with the remote-center-of-motion constraint.

``Nonlinear Integral-Augmented Model for Dynamic Convex Optimization with Perturbance Considered" by **K. Zheng** and Y. Zhang, submitted to *IEEE Transactions on Cybernetics*.

Improvement on Existing Models for Solving Dynamic Nonlinear Equation Systems

Mar. 2022 -- Nov. 2022

- Reduced computational complexity from $O(mn^2)$ to $O(mn)$, where m and n denote the numbers of equations and variables respectively.
- Accelerated the convergence rate of the proposed model by introducing nonlinear technique, leading to finite-time convergence.
- Derived a pseudoinverse-free controller from the proposed model for a UR5 manipulator to online solve the inverse kinematics problem.

``Low-Computational-Complexity Zeroing Neural Network Model for Solving Systems of Dynamic Nonlinear Equations" by **K. Zheng**, S. Li, and Y. Zhang, conditionally accepted by *IEEE Transactions on Automatic Control* as regular paper.

Design of Control Input for Multiple-Integrator System — Sept. 2021 -- Jan. 2022

- Designed control input for the triple-integrator system and generalized it for the multiple-integrator system.
- Proved that the control input could force the output of the noise-free integrator system to converge towards a reference trajectory globally and exponentially, and force the tracking error to converge within an error bound, under bounded-noise interference.

``Disturbed Zhang Dynamics Control for Triple-Integrator to Multiple-Integrator Systems: Design Formula Collection, Error Dynamics Equivalence, and Theoretical Analyses" by **K. Zheng**, C. Hu, Y. Zhang, and X. Kang, published in Proceedings of *Chinese Control Conference*, paper.

Online Solution to Dynamic Matrix Inversion — Jan. 2021 -- Jun. 2021

- Used the zeroing dynamics to easily acquire the Getz-Marsden dynamic system whose derivation had been relatively complicated initially.
- Derived two other effective continuous-time model for dynamic matrix inversion, through the combination of the zeroing dynamics and conventional gradient-based method.

``Three Different Continuous-Time GMDS-ZNN Models and Multiple-Instant Discrete-Time Ones for Time-Varying Matrix Inversion with Comparisons" by **K. Zheng** and Y. Zhang, published in Proceedings of *China Automation Congress*, paper.

Exploration of Time Discretization Formulas with Higher Precision Jul. 2019 -- Mar. 2020

- Proved the highest precision of 8-instant discretization formulas by both the Routh-Hurwitz stability criterion and Jury stability criterion.

``No 8-Instant ZTD (Zhang Time Discretization) Formula with Quintic Precision or Higher as Proved" by Y. Zhang, **K. Zheng**, and J. Guo, published in Proceedings of *China Automation Congress*, paper.

★ Scholarship

- First-Prize Postgraduate Scholarship, Sun Yat-sen University (Top 30%) 2022
- Second-Prize undergraduate Scholarship, Sun Yat-sen University (Top 15%) 2020 & 2019
- Third-Prize Undergraduate Scholarship, Sun Yat-sen University (Top 30%) 2018

Honors and Awards

- Outstanding Graduate of Sun Yat-sen University 2021
- Second Prize of SYSU Collegiate Programming Contest 2018

♡ Academic Service

- Reviewer for International Conference on Information Science and Technology 2023
- Teaching Assistant for Numerical Methods Spring 2023
- Teaching Assistant for MATLAB Computation and Simulation Fall 2022

Skills

- Programming Languages: C, C++, Python, MATLAB
- Tools: LaTeX, CMake, Git

Test of English

- IELTS: 7.0/9.0 Aug. 2023