Hujie Wei

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Education

Guangxi University (Project 211), ME in Control Engineering, China Sep 2020 – Jul 2023

- Weighted Average Scores: 86/100
- **Coursework:** Engineering Matrix Theory, Theory of Linear Systems, System Identification and Adaptation Control, Nonlinear System Control

Xi'an Technological University, BE in Communication Engineering, China Sep 2016 – Jul 2020

- Weighted Average Scores: 77/100
- **Coursework:** Signals and Systems, Digital Electronic Technology, Analog Electronic Technology, Digital Signal Processing, Communication Principle

Research Interest

Control Theory, Autonomous Unmanned System, Reinforcement Learning, Cooperative Control and Formation Control

Publications

- **Wei H**, Jiang Y, Luo S. Adaptive Quasi-sliding Mode Tracking Control for Quadrotors with Input Saturation. In 2022 41st Chinese control conference (CCC) 2022 Jul 25 (pp. 444-449). **IEEE (EI indexed)**
- **Wei H**, Jiang Y. Adaptive Fast Nonsingular Terminal Sliding Mode Tracking Control for Quadrotor with Disturbances Compensation and Actuator Saturation. Proceedings of the Institution of Mechanical Engineers, Part C (**SCI, JCR Q3**). 2023;238(2):301-319. **doi:10.1177/09544062231167026**
- **Wei H**, Jiang Y. Tracking Control of Quadrotor Based on Robust Adaptive Fuzzy Nonsingular Fast Terminal Sliding Mode with Time-varying Parameter Uncertainty. (Under review)

Research Experience

Fault-tolerant Super-twisting Sliding Mode Control for Quadrotor Jul 2022 – Mar 2023

- **Problem**: Quadrotor systems suffer from actuator faults and saturation, which may compromise stability and trajectory tracking performance in both single and formation flight.
- **Method**: Developed a fault-tolerant adaptive super-twisting sliding mode controller with an anti-saturation compensator for single UAVs. Designed an improved super-twisting algorithm with linear growth correction to enhance robustness. Extended the framework to multi-UAV formation control with an integrated sliding surface, ensuring finite-time convergence. Stability was analyzed using Lyapunov theory.
- **Outcome**: The approach improved robustness against partial actuator failures, achieving stable trajectory tracking in both individual and formation scenarios.
- **Funding**: This work is supported by the National Natural Science Foundation of China (Grant: 62003103).

Adaptive Fuzzy Nonsingular Fast Terminal Sliding Mode Control for Quadrotor Jan 2022 –Jun 2022

- **Problem**: UAVs face challenges from unmodeled dynamics, external disturbances, and time-varying parameters, which conventional controllers struggle to handle.
- **Method**: Proposed a robust adaptive fuzzy sliding mode controller guided by an error performance index function. Designed an arctangent nonsingular terminal sliding surface for finite-time convergence. Incorporated an error index function to constrain tracking errors and adaptive fuzzy systems to approximate unknown dynamics, yielding continuous control signals and suppressing chattering.
- **Outcome**: Simulation studies verified that the controller achieved precise trajectory tracking with strong robustness against parameter variations and disturbances. A related paper is under peer review.
- **Funding**: This work is supported in part by the Guangxi Natural Science Foundation under Grant 2022GXNSFBA035649.

Adaptive Nonsingular Terminal Sliding Mode Control for Quadrotor Sep 2020 – Dec 2021

- **Problem**: Quadrotor UAVs encounter external disturbances, parametric uncertainties, and actuator saturation, which reduce trajectory tracking accuracy.
- **Method**: Designed a global fast nonsingular terminal sliding mode surface and a novel reaching law with logarithmic terms to ensure finite-time convergence and reduce chattering. Integrated disturbance observers with adaptive laws for online estimation of unknown bounds. Introduced an anti-saturation compensator to mitigate actuator constraints.
- **Outcome**: Simulation results demonstrated significant improvement in robustness, chattering suppression, and trajectory tracking accuracy. Research outcomes were presented at the Chinese Control Conference (CCC 2022).
- **Funding**: This work is supported by the National Natural Science Foundation of China (Grant: 62003103).

Work Experience

Semiconductor Equipment Engineer Mar 2025 – Present
Semiconductor Manufacturing International Corporation Beijing, China
Team member, Wafer Coater–Developer Drip Detection Project

- **Problem**: In wafer coating/developing, only one nozzle is active per cycle; inactive nozzles occasionally drip, generating particles and reducing yield. The system required an automated way to detect and record such drip events using the tool's internal camera, without external hardware modification.
- **Solution**: Built a Python/OpenCV pipeline leveraging the built-in camera feed.Applied preprocessing (illumination normalization, ROI selection, adaptive thresholding, morphological filtering) to detect small liquid droplets.Added temporal consistency checks to reduce false positives.
- **Outcome**: Provided a non-intrusive, software-only monitoring solution that improved process transparency, enabled early detection of contamination sources, and supported yield analysis without affecting production flow.

Corporate Lecturer(PLC and Industrial Automation) Sep 2024 – Feb 2025
Wuchang Shouyi University Wuhan, China

- Taught courses on Programmable Logic Controllers (Siemens S7-1200) and industrial automation applications.
- Guided students in laboratory experiments, focusing on ladder logic programming, timers/counters, and practical automation systems.

Flight Control Algorithm Engineer Jul 2023 – Dec 2023
Xi'an Inno Aviation Technology Co., Ltd. Xi'an, China
Team member, VTOL Fixed-wing Precise Landing Project

- Participated in a construction of portable VTOL-landing hangar, addressing strong wind disturbances during the landing mode.
- Reduced the landing position error from large deviations to within 20cm of the target by incorporating a feedforward compensation term, enabling accurate and reliable autonomous landing under adverse wind conditions.

Awards and Skills

- Postgraduate second-class scholarship in 2021, postgraduate third-class scholarship in 2022.
- The 3rd prize of the national mathematics competition for college students in 2019.
- Coding Language: C, Python.
- Tools and Softwares: Latex, Visio, Matlab/Simulink.
- English Proficiency: IELTS 7.0.

Contact of references

Reference 1

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Reference 2

- Name: Yan Jiang
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