

# Jiachen Li

92, Xi Da Zhi Street, Nangang District, Harbin University of Technology  
Harbin, Heilongjiang Province, China  
1190600115@stu.hit.edu.cn  
jiachenli2001@gmail.com  
<https://jiachenli2001.github.io/>



## EDUCATION BACKGROUND

<b>Harbin Institute of Technology</b>	2019.9 - 2023.7
<ul style="list-style-type: none"><li>Automation, <i>undergraduate junior</i></li><li>GPA: 3.67/4 , 87.31/100</li><li>Institute of Intelligent Control and Systems, supervised by <a href="#">Jianbin Qiu</a> and <a href="#">Tong Wang</a></li></ul>	
<b>Nanyang Technological University Summer School</b>	2021.7 - 2021.8
<ul style="list-style-type: none"><li>Robotics, Automation and IoT Programme</li><li>Distinction, supervised by <a href="#">Ming Xie</a></li></ul>	
<b>Harbin Institute of Technology International Summer School</b>	2021.8 - 2021.9
<ul style="list-style-type: none"><li>Artificial Intelligence</li><li>Lecture-based, supervised by <a href="#">Jianwei Ma</a></li></ul>	

## REASERCH INTERESTS

Fuzzy control, event-triggered control, nonlinear control, fault-tolerant control, partial differential equations, game theory, decision-making and planning, robotics, reinforcement learning, computer vision

## PUBLICATIONS

- Runsheng Guo, **Jiachen Li**, Kangkang Sun, Tong Wang, and Jianbin Qiu. Output-Feedback Boundary Adaptive Fault-Tolerant Control for Scalar Hyperbolic PDE Systems with Actuator Faults. International Journal of Adaptive Control and Signal Processing. Under review.
- Hao Zhang, **Jiachen Li**, Tong Wang, Jianbin Qiu. Control of Nonlinear Coupled Burgers' PDE-ODE Systems with Sensor Nonlinearities: A Mixed Control Approach.
- Zichen Yao, Zhanwen Yang, Yongqiang Fu, **Jiachen Li**. Asymptotical stability for fractional-order Hopfield neural networks with multiple time delays. Mathematical Methods in the Applied Sciences.

## RESEARCH EXPERIENCES

<b>Tracking control of nonlinear discrete systems based on zero-sum games</b>	2021.9 - present
<ul style="list-style-type: none"><li>Designed a distributed feedforward tracking controller which can transform distributed tracking control problem in strict-feedback form into an equivalent distributed differential game problem of tracking error dynamics in affine form</li><li>Proposed a distributed zero-sum differential game strategy bu using adaptive dynamic programming technique and creating a critic network to</li></ul>	
<b>Autonomous vehicles decision-making algorithm research</b>	2022.1 - present
<ul style="list-style-type: none"><li>Applied reinforcement learning to make specific behavioral decisions combined with the perception module</li><li>Designed Fuzzy Petri nets to validate and propose more specific metrics for our algorithm</li></ul>	
<b>Intelligent Micromanipulation Robots</b>	2021.7 - 2021.9
<ul style="list-style-type: none"><li>Used zebrafish as a model to test the realization of different functions of the system</li><li>Processed the image of zebrafish based on OpenCV</li></ul>	
<b>Output-Feedback Boundary Adaptive Fault-Tolerant Control for Scalar Hyperbolic PDE Systems with Actuator Faults</b>	2021.4 - 2021.9
<ul style="list-style-type: none"><li>Developed parameter updating laws of gradient type to compensate actuator faults along with parameter uncertainties, based on which the adaptive FTC problem for scalar hyperbolic PDE system was effectively addressed</li></ul>	
<b>Control of Nonlinear Coupled Burgers' PDE-ODE Systems with Sensor Nonlinearities</b>	2021.4 - 2021.9
<ul style="list-style-type: none"><li>Proposed a mixed control approach to produce a fuzzy-model-based controller tackling the time dimensional nonlinearity and a boundary controller eliminating the space dimensional nonlinearity</li><li>Applied the proposed mixed control approach to a nonlinear hypersonic rocket car to testify its validity</li></ul>	

## Asymptotical stability for fractional-order Hopfield neural networks

2020.9 - 2021.4

- Gave a boundary of the stability region for linear fractional-order differential equations with delay, which is an open problem for six years
- Established framework for stability analysis of fractional-order Hopfield neural networks with multiple time delays and obtained a necessary and sufficient condition in a coefficient-type criterion, which is delay-independent

## COMPETITION EXPERIENCES

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### National College Competition on Internet of Things

2022.1 - 2022.4

Disorderly gripping of robotic arms

- Used 3D point clouds to identified object types and locations
- Designed a robotic arm to gripping control by hand-eye calibration

### National Undergraduate Electronics Design Contest

2021.10 - 2021.11

Appliance analysis and identification device

- Designed a device that determined the type and operating status of an electrical appliance
- Used converter, filter circuits and LSTM for signal processing

### National University Student Engineering Training Comprehensive Ability Competition

2020.12 - 2021.4

Intelligent Delivery Robot

- Designed a robot that can identify objects and automatically deliver

## COURSE PROJECTS

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### Automatic Control Practice II

2022.4 - 2022.5

- Used matlab and simulink to identificate the parameter of servo system in Webots virtual environment
- Adopted the double closed-loop PID controller and the disturbance observer to control the pitch axis and yaw axis of aircraft

### Automatic Control Practice I

2021.11 - 2021.12

- Designed a specific motor control circuit with adjustable-speed drives, user-friendly operations, and a low cost , and then completed the soldering
- Analyzed the relationship between input/output quantities by regulating the input signal and measuring the corresponding output

## SKILLS AND QUALIFICATIONS

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- **Proficient** : Python, PyTorch, Matlab, Simulink, Latex, HTML
- **Familiar** : C/C++, TensorFlow, Keras, Verilog, etc.
- **Duolingo**: 110
- **GRE**: 334/340+5/6.0 (Verbal 165, Quantitative 169, Analytical Writing 5)

## OTHERS / SUMMARY

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- Passionate about technology, love programming, solid foundation, good programming habits
- Lively and polite personality, strong communication and collaboration as well as social skills, organizational leadership
- Love writing, travel, good at organizing and summarizing