Zhenghan Chen（陈政翰）

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EDUCATION

Zhejiang University, College of Control Science and Engineering **2023.9-2026.3**

- M.S. Control Science and Engineering, Supervisor: Prof. Rong Xiong
- Research Focus: Humanoid Robot Motion Control, Embodied Intelligence
- Skills: Model Predictive Control, Reinforcement Learning
- Honors: Zhejiang University Outstanding Graduate Student

Harbin Institute of Technology (Shenzhen) **2019.9-2023.6**

- B.E. Automation, GPA: 91.16/100.0(Rank: 8%), TOEFL: 100
- Honors: First-class and Second-class Academic Scholarships

INTERNSHIP EXPERIENCE

Zhejiang Humanoid Robot Innovation Center **2024.3-Present**

- **Goal-guided Humanoid Robot Whole-body Motion Generation:** Utilize CVAE for autoregressive generation of whole-body motion guidance based on end-effector pose, and employ RL for whole-body tracking. Aim to expand the robot's operational space and enable grasping tasks. 2025.6-Present
- **Time Optimization Policy for Stable and Accurate Standing Manipulation with Humanoid Robots.** Employ VAE to encode upper-body motion priors and adopt a decoupling upper-body and lower-body controller. The upper-body directly uses PD control for trajectory tracking to enhance precision, while the lower-body uses RL for improved robustness. Subsequently, optimize the timestamps of desired trajectories using Supervised Reinforcement Learning, slowing down overly fast motions to reduce the impact of momentum changes on overall stability. This achieves enhanced accuracy and efficiency in manipulation tasks while maintaining standing balance. Project 2024.9-2025.5
- **Reinforcement Learning for Humanoid Robot Walking and Standing:** Train walking and standing strategies for humanoid robots using Reinforcement Learning. Map human motion dataset to generate upper-body trajectories and utilize domain randomization for sim-to-real transfer. The real robot exhibits good robustness and tracking performance. 2024.5-2024.8
- **Learning Human-to-Humanoid Robot Motion Mapping with Dynamic Control:** Capture human motion data using a motion capture device, and mapping the whole-body kinematic motions to the humanoid robot. Implement tracking control using Nonlinear Model Predictive Control combined with dynamic constraints. Successfully demonstrated yoga, stride and other motions in simulation, as well as walking, upper-body motions, and single-leg standing on the real-world robot. 2024.2-2024.5

PROJECT EXPERIENCE

Zhejiang University **2023.8-2024.2**

- **Nonlinear MPC for Humanoid Robot Motion Control:** Developed a NMPC + Whole-Body Control (WBC) controller for a humanoid robot based on the ocs2 quadruped framework. Represented contact forces and torques in an equivalent form for surface contact and utilized static contact force optimization to provide better initial contact force values.
- **Physical Robot Deployment and Debugging:** Debugged Elmo drivers, communication protocols, and SDKs. Deployed linear MPC for system-wide troubleshooting and implemented walking functionality verification. Deployed NMPC and WBC for humanoid robot control.

Zhejiang University & Harbin Institute of Technology (Shenzhen) **2022.7-2023.4**

- **NMPC Optimization for Desired Torque of Legged Mobile Manipulators:** Solved inverse kinematics with zero-space constraints to achieve desired end-effector circular trajectory commands, obtaining desired robot poses. Implemented tracking control using NMPC + WBC.
- **Reinforcement Learning with QP solver for Quadruped Robots:** Utilized Reinforcement Learning to learn the required acceleration for quadruped robot locomotion. Solved for corresponding joint torques

using a QP solver, enabling quadruped robot movement in a simulated environment.

Harbin Institute of Technology (Shenzhen) **2022.3-2022.8**

- Robocon of quadruped, Project Leader
- Led the control module, primarily researching quadruped robot control. Achieved quadruped robot locomotion and secured third prize in the Robocon competition.

Harbin Institute of Technology (Shenzhen) **2021.3-2021.9**

- Drone Delivery Competition, Leader
- Responsible for hardware, control algorithms, and path planning. Awarded the Bronze Prize in the National Undergraduate Engineering Training Competition

PUBLICATIONS

TOP: Time Optimization Policy for Stable and Accurate Standing Manipulation with Humanoid Robots, ***IEEE Robotics and Automation Letters (RAL, First Author, Revise and resubmit)*** **2025.5**

A Whole-body Imitation Framework From Human Data For Full-Size Humanoid Robot, ***IEEE International Conference On Real-time Computing and Robotics(RCAR, First Author)*** **2025.4**

Others：RAI(Second Author), TMECH(Third Author), IROS x2(Third Author)