Lin, Ching-Te

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Research Interest

computational methods to study laminar and turbulence flow, flow control schemes utilizing control theory or data-driven approach, reduced-order modeling, and compressed sensing

Education

Ph.D. in Mechanical Engineering, *California Institute of Technology* **Sept. 2023 – Present**

M.S. in Mechanical Engineering, *National Taiwan University (NTU)* **Sept. 2021 – Aug. 2023**
Relevant Courses: Viscous Flow, Robust Control, Introduction to Chaotic Dynamics
Advisor: Dr. Hsieh-Chen Tsai
Thesis title: Closed-loop Flow Control on Harmonic Oscillation of a Circular Cylinder

B.S. in Mechanical Engineering, *NTU* **Sept. 2017 - Aug. 2021**
Relevant Courses: Advanced Thermodynamics, Advanced Thermal Transfer, Linear Control Systems

Projects & Research Experience

Research Assistant *in the Department of Mechanical Engineering, NTU* **Spring 2021 – Aug. 2023**
- Applied Resolvent Analysis on a tilted flat plate to construct a reduced-order model with a relative error of 3% on the boundary
- Develop Floquet-based Resolvent Analysis and design an active flow control strategy on a plunging cylinder to attenuate lift fluctuation by up to 25.7%

Robust Control Courses Final Project, *NTU* **Spring 2022**
- Utilized loop shaping method to design a robust controller for a chaotic Lorenz system
- Rejected the input and output disturbance and improved by 32% compared to an LQR controller

Introduction to Chaotic Dynamic Courses Final Project, *NTU* **Fall 2021**
- Performed Finite-time Lyapunov exponent to figure out the Lagrangian coherent structure of flow past a cylinder

Drone Innovation and Application Competition, *Taipei Computer Association* **Dec. 2020 - July 2021**
- High Distinction Award (Awarded top five out of fifty-seven teams nationwide)
- Proposed an autonomous aircraft with the design of a tandem wing tail sitter, which can carry 10 kg loading and maneuver with a flight distance of 15 km
- Proposed a control law to resist the side wing up to 5 m/s when hovering and verified via SIMULINK

Summer Research Project, *Moldex3D (CoreTech System Co., Ltd.)* **July 2020 - Aug. 2020**
- Performed plastic injection molding simulation via Moldex3D
- Improved unbalanced flow in multi-cavities with modified runners

Formula SAE Japan Racing Car, *NTU* **Sept. 2018 - June 2020**
- Co-lead a team of 8 members to design brake, steering, and suspension systems for a racing car
- Performed finite element analysis to study the structure limit of the designed part
- Communicated with sponsor companies and manufacturing companies

Publication

- Lin, C.-T., Tsai, M.-L., & Tsai, H.-C. (2023). Flow control of a plunging cylinder based on resolvent analysis. *Journal of Fluid Mechanics, 967*, A41. doi:10.1017/jfm.2023.526
- Ching-Te Lin & Hsieh-Chen Tsai. (2024) Feedback flow control on a plunging circular cylinder. *Physics of Fluids* 1 April 2024; 36 (4): 047126. doi:10.1063/5.0203558

Honors & Awards

Ministry of Education Taiwan-Caltech Scholarship, *Ministry of Education, Taiwan* **Sept. 2023**
- Awarded three Ph.D. students annually to support their Ph.D. studies for four years

Sing Lung Foundation Scholarship, *Sing Lung Foundation* **Nov. 2022**
- Honored students with outstanding academic achievement in mechanical engineering

Dean's List Award, *NTU* **Spring 2021**
- Awarded top five percent of students for excellent academic performance in the department of mechanical engineering

Teaching Experience

Teaching Assistant, *Advanced Thermodynamics (I), graduate-level* **Fall 2022**
- Hold weekly office hours to answer questions about the course from 50 graduate-level students

Teaching Assistant, *Engineering Mathematics (1), (2), conducted in English* **Fall 2021 – Spring 2023**

- Prepare and grade quizzes and assignments for the lecture, including ODE, linear algebra, complex analysis, and PDE
- Hold TA office hours and a review lecture of 1 hour for the midterm exam in English

Teaching Assistant*, Fluid Mechanics, conducted in English* **Spring 2022**

- Held TA office hours and graded assignments and exams for 50 sophomore-level undergraduates

Skills

Programming Language: FORTRAN, MATLAB, Python, C++
Computer-Aid Design Software: SolidWorks, Autodesk Inventor, AutoCAD
English (Advanced) : TOEFL: 102/120; GRE: 325/340, AW: 3.5
German (Beginner): Completed B1 level language courses in NTU