Lin, Ching-Te

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Research Interest

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

Education

M.S. in Mechanical Engineering, *National Taiwan University (NTU)*　　　　　**Sept. 2021 - Present**
Overall GPA: 4.05/4.3
Relevant Courses: Viscous Flow, Robust Control, Introduction to Chaotic Dynamics
Advisor: Dr. Hsieh-Chen Tsai

B.S. in Mechanical Engineering, *NTU*　　　　　**Sept. 2017 - Aug.2021**
Overall GPA: 4.08/4.3 **Rank**: 6/142 (4%) **Awards:** Dean's List Award, Spring 2021
Relevant Courses: Advanced Thermodynamics, Advanced Thermal Transfer, Linear Control Systems

Research Experience

Research Assistant *in the Department of Mechanical Engineering, NTU*　　　　　**Spring 2021 - Present**
- 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%

Publication

<u>Lin, C.-T.,</u> Tsai, M.-L., Tsai, H.-C. (2022). "Flow control of a plunging cylinder based on Resolvent analysis", *Journal of Fluid Mechanics* (under review)

Teaching Experience

Teaching Assistant, *Advanced Thermodynamics (I), graduate-level*　　　　　**Present**
- 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 - Present**
- 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

Project

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 manoeuvre 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, *CoreTech System Co., Ltd. (Moldex3D)*　　　　　**July 2020 - Aug. 2020**
- Performed plastic injection moulding 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

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