Zixuan ZHU

Birth Date: 09/08/2002 **Tel:** +86-18395958560 **Email:** zxzhuys@gmail.com

Education

Zhejiang University (QS World Ranking 47) ***Hangzhou, China***

- **College of Electrical Engineering**
- **Major: Electrical Engineering and Automation** *(Bachelor of Engineering)* *09/2020 - 06/2025*
- **Overall GPA: 3.87/4.0**
- **English: TOEFL iBT 96 (25+25+21+25), Japanese: JLPT N1**

Publication & Patent

- **Z. Zhu**, S. Xu, "Investigation on Policies and Projects Related to The Development of Novel Energy Storage," 2024 6th International Conference on Power and Energy Technology, ICPET 2024, Beijing, China, 2024.
- H. Wang, Z. Hu, X. Liu, S. Sun, J. Chen, and **Z. Zhu**, "Investigation on Levelized Cost of Electricity for Lithium Iron Phosphate Batteries," Environmental Science and Engineering, Vol. 10, pp. 221-234, June, 2024.
- P. Song, S. Xu, **Z. Zhu**, R. Zhang, et al., "A Method for Optimized Current Control of Permanent Magnet Synchronous Motors Based on MCU," Patent under review, 2024.

Research Experience

An Optimized Current Loop Control Strategy for Permanent Magnet Synchronous Motors (PMSMs) Based on MCU *11/2023 - 05/2024*

Team leader, under supervision of Prof. Yan Yan

Description

1. Developed a mathematical model to characterize the current loop of PMSM and conduct an analysis of the factors influencing the current loop bandwidth based on control theory.
2. Investigated and compared the current loop delay of different sampling and PWM updating strategies, and developed a PWM update strategy that utilized current oversampling.
3. Validated the theoretical analysis and comparisons through MATLAB/Simulink simulations.
4. Established an experimental platform based on TMS320F28379D and perform experimental validation.

Contributions: Completed and was responsible for all aspects of the project mentioned above.

Results

Significantly reduced the delay to under 25% compared with conventional methods. The current loop bandwidth is over 2 kHz, with a carrier frequency set at 10 kHz.

Research on The Life Cycle Cost and Investment Return Mechanisms of Novel Energy Storage Systems *05/2023 - 05/2024*

Team leader, under supervision of Prof. Fushuan Wen (IEEE Fellow)

Description

1. Compiled a comprehensive research report by analyzing and summarizing policies and current status of novel energy storage in various countries and regions, including the US, Australia, China, the UK, Japan, etc.
2. Based on life cycle theory, constructed the Levelized Cost of Electricity (LCOE) Model for lithium iron phosphate batteries and performed sensitivity analysis to the trends of LCOE in relation to the annual operating frequency, charge-discharge efficiency, average off-peak electricity price, and charge-discharge depth of energy storage systems.
3. From diverse perspectives (grid side, user side), conducted research and analysis to revenue mechanisms including capacity compensation and capacity leasing, electric energy market, and ancillary service market.

Contributions: Completed and was responsible for all aspects of the project mentioned above.

Results

1. Initial investment costs and charging costs have a significant impact on the cost per kWh.
2. The annual operating frequency plays a crucial role in determining the levelized cost. Increasing the cycle life of battery packs can effectively reduce the LCOE.

3. Economic viability is now still a critical factor restricting the widespread deployment of energy storage.

❖ **A Small High-Efficiency GaN Hybrid Inverter** *02/2023 - 05/2023*

Research member, under supervision of Prof. Tingna Shi

➢ **Description**

1. Improved the traditional HERIC topology and inverter materials.
2. Designed a new GaN power conversion circuit adopting a collaborative modulation method with Boost and O-HERIC two-level converters.

Contributions: DCDC Boost circuit simulation, market research, component selection, document writing.

➢ **Results**

Successfully increased the maximum conversion efficiency of our hybrid inverter to 98.5%.

❖ **Research on Data-Driven Identification of Three-Phase Transformer-Meter Relationship in Distribution Networks** *10/2021 - 08/2022*

Research member, under supervision of Prof. Pengfei Hu

➢ **Description**

1. Developed a phase identification system for low-voltage distribution area users based on k-means algorithm.
2. Utilized FastICA for data preprocessing and replaced Euclidean distance with cosine similarity to optimize the clustering algorithm.
3. Analyzed 30,000 sets of simulated data with 52 data points per set.

Contributions: MATLAB programming, document writing.

➢ **Results**

Successfully predicted the transformer-meter relationship with an accuracy of 87% after training and learning.

International Study

◆ **UTokyo Global Unit Courses** (In-person) | The University of Tokyo *07/2024*

◆ **Power Electronic Device and Application Techniques** (Online) | The Aalborg University *05/2023*

Extracurricular Activity

✧ **Student Education Project** (Team Leader) **|** Key Project of College *10/2023 - 05/2024*

Project Name: Construction of College Academic Assistance Website and WeChat Official Account

✧ **Volunteer in The Trinity System** (an admission project) | Zhejiang University *06/2021*

✧ **Member of the Global Engagement Program** | Zhejiang University *03/2021 - Present*

✧ **Member of Student Tennis Team** | Zhejiang University *09/2020 - 06/2021*

Awards and Honors

- **National Encouragement Scholarship** *10/2024 & 10/2023*
- Zhejiang University Scholarship - **Alumni Inspiration Scholarship** *04/2024*
- Zhejiang University Scholarship - **Third Prize** *10/2023 & 10/2021*
- Zhejiang University Award - **Academic Excellence & Student Leadership & Innovation and Entrepreneurship & Academic Progress** *10/2024 & 10/2023 & 10/2021*
- **The First Prize** in the East China Regional Competition of the 2nd Electrical & Electronic Engineering Innovation Competition *06/2023*

Technical Skill

➢ **Soft Skills:** C, MATLAB, Markdown, VHDL

➢ **Developer Tools:** MATLAB/Simulink, Code Composer Studio, PSpice, Multisim, Quartus, ispLEVER, AutoCAD, ANSYS