Zijun Cui

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EDUCATION

Zhejiang University ***Sep. 2020 – Jun. 2024***

B.E. in Electrical Engineering and Automation *Hangzhou, Zhejiang, China*

GPA: 3.38/4.00 *Upper-division Electives:* 3.98/4.00 *Last 2 Semesters*: 3.71/4.00

EE COURSES

Design of Electric Machine Systems (92)
Fundamental Mathematics & Physics of Electric Machines (From Electricity to Motion) (93)
Technology of Modern electrified transportation (98)
Power Electric Circuit Analysis (87)
Signal Analysis and Processing (94)

PUBLICATION

H. Wang, Y. Li, **Z. Cui**, and Q. Lu, "Influence of Split Teeth on the Performance of Linear Permanent Magnet Vernier Motor," 2023 14th International Symposium on Linear Drivers for Industry Applications (LDIA), 28-30 June 2023, Hannover, Germany, available in IEEE Xplore, doi: 10.1109/LDIA59564.2023.10297520.

RESEARCH EXPERIENCES

1. Micro and Special Motor Research Institute | Research Assistant *Apr. 2023 - Pres.*

Advisors: Yanxin Li, Professor, Qinfen Lu, IEEE Senior Member, IET Fellow, Professor, College of Electrical Engineering, Zhejiang University

Proj. I: Performance Improvement of a Novel Linear Permanent Magnet Motor (LPMM) *Apr. 2023 - July. 2023*

- Conducted a comprehensive study of linear permanent magnet motors, focusing on their design and operating principles, and learned finite element analysis techniques specific to these motors.
- Conducted detailed finite element analyses in JMAG to evaluate the electromagnetic performance of three motors with varying split tooth structures, providing insights into their influence on efficiency, thrust, and power factor.
- Co-authored a conference paper presented at the 2023 14th International Symposium on Linear Drivers for Industry Application.(LDIA)

Proj. II: Thrust Force Ripple Reduction Techniques for Linear Permanent Magnet Synchronous Machine (LPMSM)*Oct.2023 - Pres.*

- Conducted a comprehensive analysis of thrust force ripple reduction methods in LPMSMs, synthesizing existing literature into a detailed report that critiques various approaches and their limitations.
- Currently engaging in advanced finite element analysis to evaluate and improve these methods under varied operational conditions, aiming to develop an optimized technique for reducing thrust force ripple in LPMSMs.

2. Micro and Special Motor Research Institute | Team Leader *Aug. 2023 - Oct. 2023*

Advisor: Jianqi Qiu, Associate Professor, College of Electrical Engineering, Zhejiang University

Project: Control System for the Brushless DC Motor (BLDCM)

- Designed and implemented a digital control system for a BLDCM on a CPLD development board (ispLSI1016), incorporating VHDL for programming logic.
- Designed the switching circuit, half-bridge power transistor driver, and pulse-wide-modulation (PWM) signal generation circuit, and configured three-phase Hall sensors.
- Prototyped the entire system on a PCB, tested it experimentally, and verified the realization of the desirable functions.

3. High-Power, High-Voltage Power Conversion Research Institute | Team Leader *Dec. 2022 - Mar. 2023*

Advisor: Taiying Zheng, Associate Professor, College of Electrical Engineering, Zhejiang University

Project: Compensation Algorithm Based Current Transformer with High Accuracy

- Proposed the current compensation algorithm and the current transformer, targeting high-accuracy measurements, robust protection, and digital output.
- Programmed magnetic hysteresis fitting and current compensation algorithms using a Keil 4 microprocessor in C and implemented data processing on STM32 microcontrollers.
- Conducted Simulink simulations and system-level optimizations, significantly improving current measurement accuracy.
- Completed the hardware prototype for current measurement in practical power converters, which verified the functionality of the compensation algorithm in improving the accuracy of the current transformer.
- Authored a comprehensive project paper on the project, which was highly commended in the final evaluation.

SELECTIVE COURSE EXPERIENCES

1. Analog Electronics Research Project |Team Leader *Apr. 2022 - May. 2022*

Advisor: Zhan Wang, Senior Engineer, College of Electrical Engineering, Zhejiang University

Project: Audio Amplifier Design

- Designed an audio amplifier including the circuit topology, PCB layout, and device packaging;
- Tested the amplification effectiveness of the system under different conditions, ensuring robust functionality;
- Performed bandwidth and noise control, meeting the desired specifications of the audio amplifier.

2. Electrical Engineering Intern Project | Team Leader *Jun. 2022 - Jul. 2022*

Advisor: Zhongfa Cai, Lecturer, College of Electrical Engineering, Zhejiang University

Project: Signal Generator & FPGA-based Digital Frequency Meter

- Designed an FPGA-based digital frequency meter, simulated it in Quartus, and validated the functionality with a signal generator;
- Optimized the circuit topology and circuit parameters through simulations in OrCAD;
- Designed PCB layout and prototyped versatile signal generator; performed comprehensive tests for performance and robustness.

3. Microcomputer & DSP Intern Project | Team Leader *Oct. 2022 - Mar. 2023*

Advisor: Xidong Xu, Associate Professor, College of Electrical Engineering, Zhejiang University

Project: Multi-function Digital Clock Based on Microcomputer

- Programmed a TMS3202812 micro-controller and an eight-segment display to realize a digital clock;
- Developed key control, input, and function-switching capabilities for the digital clock;
- Implemented multiple functions including the ADC-based voltage transformation, binary display, marquee, etc.

INTERNSHIP EXPERIENCES

Shanghai Sany Electronic Technology Co., Ltd | R&D Engineer *Jun. 2020 - Sep. 2020*

Advisor: Zhihong Fu, Director of the R&D Department, Shanghai Sany Electronic Technology

- Played a key role in developing a mining protection system, enhancing anomaly detection, and enabling instant alarm triggering in coal mining infrastructure.
- Participated in the product function design, competitor analysis, and product framework development;
- Led the design and prototype of the power management circuit, carefully selected the components to ensure robustness in the humid environment, tested the prototyped circuit, and validated the circuit functionality and reliability.

SCHOLARSHIP AND HONORS

- Excellent Student Cadre of Zhejiang University (Top 3%) *Jun. 2021*
- Excellent Student Leadership Award of Zhejiang University (Top 3%) *Oct. 2021*
- Student Leadership Award of Zhejiang University (Top 5%) *Jun. 2022*

LEADERSHIP EXPERIENCES & EXTRACURRICULAR ACTIVITIES

Class of Electrical Engineering, Zhejiang University | Student President *Sep. 2020 - Jul. 2021*

- Established the official class website, and authored 13 articles.
- Organized monthly meetings, study sessions, basketball games, and class trips.

Student Union of College of Electrical Engineering, Zhejiang University | Office Assistant *Sep. 2020 - Jul. 2021*

- Conducted study seminars for Electrical School students.
- Coordinated New Year's Party for College of Electrical Engineering.

Lingyun Musical Theater Club, Zhejiang University | Lead Actor *Dec. 2020 – Pres.*

- Lead actor in the Musical of the Year *GALA* (2021).
- Lead actor in Broadway musical *Dear Evan Hansen* (2022).

Aesthetic Education Center, Zhejiang University | Member *Dec. 2020 – Pres.*

- Lead actor in the drama *Stars & Earth* (2022).

SKILLS

- Programming Languages: C, VHDL, Python, Assembly;
- Applications: Quartus II, Cadence OrCAD, JMAG, Ansys Maxwell, Multisim, MATLAB, CLion;
- Language Proficiency: TOEFL: Overall 100, with Reading 29, Listening 27, Speaking 24, and Writing 20.