Mingkai Zheng

Mingkai.Zheng616@gmail.com · (+86) 18306202699

EDUCATION BACKGROUND

Xi'an Jiaotong-Liverpool University (XJTLU) 09/2016 – 07/2020
BEng in Electrical Engineering | Overall GPA: 3.94 / 4.0 GRE: 323 + 4.0 IELTS: 7.0

PROGRAMMING SKILLS

Programming: C/C++, Python, HTML, CSS, MATLAB, Verilog HDL, AHDL, Assembly
Software: OrCAD PSpice Designer, Altera Quartus, Keil μVision, Multisim, Latex

PUBLICATION & PATENT

- **M. Zheng**, H. Wen, Q. Bu, and H. Shi, "Dynamic Response Improvement for DAB Converter with Constant Power Load under Extended-Phase-Shift Control Based on Trajectory Control," IEEE 9th International Power Electronics and Motion Control Conference (IPEMC2020-ECCE Asia)
- Q. Bu, H. Wen, H. Shi, and **M. Zheng, "**Constant Power Load Stabilization Based on Trajectory Control in Dual-Active-Bridge DC-DC Converter," IEEE 9th International Power Electronics and Motion Control Conference (IPEMC2020-ECCE Asia)
- **M. Zheng**, H. Wen, H. Shi, Y. Hu, Y. Yang and Y. Wang, "Open-Circuit Fault Diagnosis of Dual Active Bridge DC-DC Converter With Extended-Phase-Shift Control," *IEEE Access*, vol. 7, pp. 23752-23765, 2019.
- D. Zheng, W. Wu, S. Wang, H. Yang, K. Xie, C. Wang, Y. Liu, G. Zheng, S. Wu, **M. Zheng**, J. Wu, *Boiler System of Condensing Thermal Power Generator Unit*. CN203703941U, 2014.

AWARDS AND HONORS

- Best Final Year Project Poster Award, IET 2019
- National Scholarship (1 of the 4 students selected from over 10,0000 students school-wide) 2019
- Provincial Outstanding Student 2019
- Outstanding Students Award, XJTLU (Top 1%) 2017 & 2018 & 2019
- Academic Excellence Award, XJTLU (Top 1) 2018 & 2019
- National Academic Encouragement Award (Top 1%) 2018
- Academic Achievement Award, XJTLU (Top 10) 2017
- Outstanding Award, Lego Design Competition, XJTLU 2016

RESEARCH AND PROJECT EXPERIENCES

Boundary Control for DAB Converter Feeding Constant Power Load
Undergraduate Researcher, Final Year Project, XJTLU 08/2019 – Present

- Using a nonlinear control method called boundary control to improve system stability and dynamic performance of dual-active-bridge (DAB) dc-dc converter feeding constant power load
- Finished the simulation (MATLAB Simulink) on using boundary control method for DAB converter under both single-phase-shift (SPS) control and extended-phase-shift (EPS) control
- Implemented DAB converter with PI controller as a comparison to the proposed boundary control
- Finished a first-author paper and a fourth-author paper and submitted to IPEMC2020-ECCE Asia

Improvement on Dynamic Performance of Modular Multilevel Converter (MMC)
Undergraduate Research Assistant, XJTLU 06/2019 – 08/2019

- Adopted two types of controller to achieve capacitor voltage balance: 1) used small signal modelling to build a feedback controller that generates the SPWM reference voltage, which could guarantee the stability of the circuit, but require for a long time; 2) applied capacitor voltage balancing method based on sorting algorithm to control the capacitor charge and discharge sequence to accelerate the dynamic equilibrium
- Verified that capacitor voltage balancing algorithm could quickly switch the circuit to a new stable state, in case of circuit imbalance, to ensure stable circuit operation

Open-Circuit Fault Diagnosis of Dual Active Bridge DC-DC Converter
Undergraduate Research Assistant, XJTLU 06/2018 – 08/2018

- Proposed a simple, cost-effective and fast open-circuit fault diagnosis strategy for bidirectional isolated dual-active-bridge (DAB) dc-dc converter under extended-phase-shift (EPS) control to improve system reliability

- Derived an open-circuit faults diagnosis strategy based on the alternation of the mean values of voltages on the middle-point of the bridge arms
- Validated the strategy through both simulation (MATLAB Simulink) and experimental test (DSP-driven converter)
- Published a first-author research article in IEEE ACCESS

Design of a Plane Wave Converter (PWC) based on T-Junction Microstrip Power Divider Array
***Electromagnetism* Course Project, XJTLU** 04/2018 – 05/2018

- Theoretically designed, numerically simulated, and experimentally tested a T-junction unequal microstrip power divider, which has lower cost compared to waveguide antenna design
- Theoretically assessed the feasibility of the design; conducted numerical simulation in Advanced Design System (ADS) to optimize geometric parameters with desired amplitude and phase tapering
- Designed an experiment to test power dividers' performance; leveraged Wilkinson power divider design and multi-section impedance transformation to achieve isolation between the output port

Development of a Library Management Application
Team Leader, *C Programming* Course Project, XJTLU 10/2017 – 12/2017

- Coordinated a team of three to design, implement and test a C-based software application for managing university library, allowing management of new print and digital additions to the collection, items circulation, check-in/check-out activities, online access to public libraries, etc.
- Practiced an array of software engineering principles and design patterns to enhance the application's modularity, extensibility, maintainability and robustness
- Prototyped a fit-for-purpose book recommendation system based on content filtering and collaborative filtering
- Employed Unified Modeling Language to streamline software architecture design and debugging

WORK EXPERIENCES

Digital Signal Processing Engineer Intern, RIGOL Co., Ltd, Suzhou, China 08/2019 – 10/2019

- Joined a group of software and hardware engineers to develop, implement, validate and test novel algorithms, hardware and workflows associated with oscilloscope
- Modified analog/digital hardware to improve signal fidelity of the oscilloscopes and probes
- Assisted digital engineers in FPGA implementation of algorithms
- Assisted test engineers in the calibration of oscilloscopes

Signal Processing Engineer Intern
Knowles Intelligent Audio Co., Ltd., Shanghai, China 08/2018 – 10/2018

- Designed audio algorithms to perform audio processing in MATLAB and Virtual Studio Technology
- Implemented DSP software modules for consumer home audio and applications using C/C++
- Deepened understanding in digital filter design, systems theory, and psychoacoustics
- Assisted in product design validation through design reviews, detailed analysis, simulation, and product testing
- Served as the liaison with multiple functions to ensure schedule, cost and performance alignment

Intern, Datang Huazhong Electric Power Research Institute, China 07/2017 – 10/2017

- Gained familiarity with power generation technology and the associated electrical equipment testing and maintenance at a thermal power plant
- Systematically studied automatic control mechanisms (e.g. PID, Fuzzy Logic Adaptive Control, etc.) associated with an array of critical components for thermal power generation, including boiler, cooling tower, coal handling system, superheater, reheater, steam turbine, condenser, economizer, and air preheater

EXTRACURRICULAR EXPERIENCES

Volunteer, Suzhou Jinji Lake International Marathon Event, China 03/2017

- Collected and managed registration information of participants and volunteers
- Assisted in on-site traffic control; provided route guidance to contestants and audience

Volunteer, XJTLU Youth Volunteer Association 2016 – 2017

- Organized and promoted campaigns to collect and sell used plastic bottles for cash, which was donated to local animal shelters