Weiqi Meng

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Electrical Engineering | School of Automation

EDUCATION

Central South University, (985, 211, Double-first class A), **M. Sc** **Sep.2021-Present**

Electrical Engineering | **GPA**: **90.04**/100

Thesis: Coordinated Optimization of Electric Vehicles and Transmission and Distribution Networks in the Electric Market

Kunming University of Science and Technology, **B. Eng** **Sep.2017-Jun.2021**

Electrical Engineering and Automation (Elite Engineer Class) | **GPA: 92.65**/100

Main course: Power System Analysis (95/100), Power Electronics Technology (97/100), Linear Algebra (94/100), Complex Variables and Integral Transformations (100/100), Artificial Intelligence (93/100)

PUBLICATIONS

Journal Articles

[1] **W. Meng**, D. Song, L. Huang, X. Chen, M. Dong, J. Yang, M. Talaat, M.H. Elkholy. "Distributed Energy Management of Electric Vehicle Charging Stations Based on Hierarchical Pricing Mechanism and Aggregate Feasible Regions," **Energy**, vol. 291, p. 130332, **2024**, doi: 10.1016/j.energy.2024.130332.

[2] **W. Meng**, D. Song, L. Huang, X. Chen, M. Dong, J. Yang, M. Talaat. "A Bi-Level Optimization Strategy for Electric Vehicle Retailers Based on Robust Pricing and Hybrid Demand Response," **Energy**, vol. 289, p. 129913, **2023**, doi: 10.1016/j.energy.2023.129913.

[3] **W. Meng**, D. Song, X. Deng, M. Dong, J. Yang, R.M. Rizk-Allah, V. Snášel. "Dynamic Optimal Power Flow of Active Distribution Network Based on LSOCR and Its Application Scenarios," **Electronics**, vol. 12, no. 7, p. 1530, **2023**, doi: 10.3390/electronics12071530.

[4] D. Song, **W. Meng**, M. Dong, J. Yang, J. Wang, X. Chen, L. Huang. "A Critical Survey of Integrated Energy System: Summaries, Methodologies and Analysis," **Energy Conversion and Management**, vol. 266, p. 115863, **2022**, doi: 10.1016/j.enconman.2022.115863.

Conference Proceedings

[5] **W. Meng**, D. Song, L. Huang, X. Chen, M. Dong, J. Yang, M. Talaat. "Robust Pricing Strategy with EV Retailers Considering the Uncertainty of EVs and Electricity Market," Tsinghua-IET Electrical Engineering Academic Forum, Beijing, China, **2023**, pp. 27-33, doi: 10.1049/icp.2023.1827.

[6] J. Yang, R Zhao, D. Song, **W. Meng** et al., " Robust Optimal Scheduling of Wind Thermal Energy Storage System Considering Wind Power Uncertainty," China Automation Congress, China, **2021**:6, doi: 10.26914/c.cnkihy.2021.053552.

RESEARCH EXPERIENCE

Research Project in Master Program **Sep.2021-Jul.2024**

Master Thesis Project: Coordinated Optimization of Electric Vehicles and Transmission and Distribution Networks in the Electric Market

- Designed a distributed energy management of electric vehicle charging stations based on hierarchical pricing mechanism and aggregate feasible regions
- Developed a bi-level optimization strategy for electric vehicle aggregators based on robust pricing and hybrid demand response mechanisms
- Proposed a dynamic optimal power flow of active distribution network based on linearized second-order conic relaxation (LSOCR-DOPF) and analyzed its application scenarios
- Gave a critical survey of integrated energy system: summaries, methodologies and analysis

Undergraduate Final Year Project **Sep.2020-Jul.2021**

Thesis: Modulation Technology and Control Strategy of Three-level Converter

- Developed mathematical models in various coordinate systems for a three-level PWM converter
- Introduced an improved SPWM modulation technique suitable for DSP implementation, providing a practical solution for enhancing modulation technology in medium-high voltage applications
- Innovated a double closed-loop control strategy with optimized PI parameters, addressing issues like midpoint potential imbalance in the three-level PWM converter

Battery and Super Capacitor Hybrid Energy Storage System under Multiple Application Scenarios in Power Systems **Jun.2022-Sep.2023**

Institution: China Energy Construction Group | Contract No. HFW202300091 | 115, 000 RMB | ***Researcher***

- Investigated the electrical characteristics of various energy storage units, conducted modeling and analysis of these characteristics in Simulink
- Developed a control model for a hybrid energy storage system and a two-layer optimization model for capacity allocation, utilizing advanced intelligent algorithms for solution
- Constructed a simulation platform for the hybrid energy storage system in MATLAB, outperforming alternative two real-world scenarios (Microgrids and renewable energy) in terms of optimality and scalability

Intensive Management of Distributed Energy Systems in Industrial Scenarios **Sep.2021-Jul.2023**

Institution: Chinese Academy of Science | Contract No. 202003a05020019 | 1, 000, 000 RMB | ***Researcher***

- Real-time Scheduling Strategy for Source-Grid-Load-Storage:

  With economic efficiency as the objective, and power balance, equipment capacity, and operational costs as constraints, construct an economic optimization scheduling model for source-grid-load-storage. The model is solved using the Hessian matrix iterative interior point method, enabling the achievement of the optimal economic dispatch for the distributed energy system

Mathematical Modeling on Power Electronic Energy Equipment **Sep.2021-May.2022**

Institution: Chinese Academy of Science | Contract No. IPP-DL-21071605 | 360, 000 RMB | ***Researcher***

- Built a Microgrid test model based on the 14-bus IEEE distribution system, which serves as a research tool for analyzing electrical grids during their transition to Smart Grids
- Developed a fundamental platform for various studies, including reactive power compensation, stability and inertia analysis, reliability assessments, demand response investigations, hierarchical control, fault-tolerant control, optimization, and energy storage strategies

HONORS AND AWARDS

Master (2021-2024)

- National Scholarship (granted to top 0.01% of 300)
- National 2nd prize in the Electrical Math Modeling Competition in China
- First-class Scholarship at Central South University (2 times in 2021 and 2022)
- Annual Top 15 Outstanding Student Honor at Central South University (granted to top 0.01% of 300)

Bachelor (2017-2021)

- Provincial Scholarship (granted to top 0.01% of 200)
- 2021 Provincial Outstanding Graduate of Yunnan Province Award (granted to top 0.01% of 200)
- Provincial Excellent Undergraduate Award (granted to top 0.01%, 2 times in 2018 and 2019)
- First-class Scholarship at Kunming University of Science and Technology (3 times in 2018, 2019, 2020)
- Outstanding Undergraduate Thesis Award
- Outstanding Student Honor at Kunming University of Science of Technology (3 times in 2018, 2019, 2020)

OTHER EXPERIENCE

- **Activity**: Guest speaker at the 3rd "Lunan Youth Forum" (Reported by "Daily of People" in China); Several provincial, municipal, and campus-level volunteering endeavors
- **Student work**: Campus level: two organizational committees; Faculty-level: Vice minister of science and technology association; Class-level: Academic affairs representative

SKILLS

- **Languages** Mandarin Chinese (native), English (fluent), IELTS 6.5
- **Skill** MATLAB, YALMIP, GUROBI, Python, GAMS, Origin, CAD, LINGO, PS, PR, Computer (Office, C, Level 3 network technology), Driver license
- **Hobbies** Badminton, Notion, Obsidian, Photography, GitHub, ChatGPT