Xinyi Zhao

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EDUCATION BACKGROUND

Tsinghua University   **Shenzhen, China**
M.S. in Electrical Engineering, Tsinghua-Berkeley Shenzhen Institute (TBSI)   *Sept. 2018-Now*
GPA: 3.98/4.00 (Rank 1/128); Co-advised by: Prof. Hongbin Sun and Dr. Xinwei Shen; To be conferred Jun. 2021

Wuhan University   **Wuhan, China**
B.Eng. in Electrical Engineering, Department of Electrical Engineering and Automation   *Sept. 2014-Jun. 2018*
GPA: 3.87/4.00 (Rank 4/340);

PUBLICATIONS

◇ **Journals:**
- **Xinyi Zhao**, Xinwei Shen, Qinglai Guo, Hongbin Sun and Shmuel S. Oren. *A Stochastic Distribution System Planning Method Considering Regulation Services and Energy Storage Degradation.* **Applied Energy**, 2020, 277:115520. [PDF]
- Haizhou Liu, Xinwei Shen, Qinglai Guo, Hongbin Sun, Mohammad Shahidehpour, Wenzhi Zhao, **Xinyi Zhao**. *Application of Modified Progressive Hedging to Stochastic Unit Commitment in Electricity-Gas Coupled Systems.* **CSEE Journal of Power and Energy Systems**, 2020. [PDF]

◇ **Conferences:**
- **Xinyi Zhao**, Xinwei Shen, Hongkun Chen, *et al*. *A Two-Stage Multi-Objective Planning Strategy for Electric Vehicle Charging Stations Considering Power-loss Sensitivity in Distribution System.* **2nd IEEE Conference on Energy Internet and Energy System Integration**, 2018. [PDF]
- **Xinyi Zhao**, Xinwei Shen, Tian Xia, *et al*. *Optimal Distribution System Planning Considering Regulation Services and Degradation of ESSs.* **11th International Conference on Applied Energy**, 2019. [PDF]
- Yuquan Liu, **Xinyi Zhao**, Xinwei Shen, *et al*. *A Distribution System Expansion Planning Method Considering Integrated Energy Service Providers' Revenue on Energy Storage Investment.* **25th International Conference on Electricity Distribution**, 2019. [PDF]

◇ **Patent:**
- **Xinyi Zhao**, Linxin Yin, Shinan Song, Huiyi Hu, Zhi Zhang and Yu Zheng. *Human Body Knee Jerk Intelligent Diagnosis and Treatment Percussion Hammer based on Six-axis Acceleration Transducer.* (**No: 201710279460.6, Invention Granted**), 2017. [Abstract]

RESEARCH EXPERIENCE

Smart Grid and Renewable Energy Laboratory   **Shenzhen, China**
Distribution System Planning Considering Regulation Services and ESS Degradation   *Sept. 2018-Now*

◇ **Considered degradation model of storage units in distribution system planning**
- Added a linear degradation penalty term in the objective to avoid excessive charge/discharge of ESSs;
- Compared degradation curves of ESSs in different cases, and identified that the storage lifetime was prolonged for one year when considering degradation penalty.

◇ **Developed Gaussian mixture model to generate stochastic scenarios**
- Adopted GMM to model distributions of load demand, LMP, regulation signals and prices accurately to generate diverse stochastic scenarios.

◇ **Modified progressive hedging algorithm**
- Proved that a rational average solution is superior to the traditional mathematical expectation ($\sum_{s \in S} \theta_s \cdot X_s$) on stable convergence when implementing *non-anticipativity* constraints;
- Found that with parallel computing and gap-dependent penalty factors, the modified progressive hedging outperformed Gurobi and the L-shaped method.

Smart Grid and Renewable Energy Laboratory | **Shenzhen, China**
Distribution System Expansion Planning Considering IESPs' Revenue on ESSs | *Jan. 2019-Jul. 2019*

$\diamond$ **Analyzed cost contribution arrangement between the utility and integrated energy service providers**
- Helped Guangzhou Power Grid Corp. determine an investment proportion of ESSs to attract IESPs, which was published in CIRED 2019. [Poster]

$\diamond$ **Adopted benders decomposition in the planning problem**
- Solved the planning problem within acceptable time, and improved the computation efficiency by 2–6 times compared with the Branch & Bound method.

Power System Research Center at WHU | **Wuhan, China**
Multi-objective Planning for Large-scale EVs Considering Power-loss Sensitivity | *Feb. 2018-Jun. 2019*

$\diamond$ **Calculated power-loss sensitivity index to identify candidate sites of electric vehicle charging stations**
- Based on power flow equations in polar coordinates, a sensitivity index which is the derivative of the total power loss with respect to node voltage is established;
- Located charging stations at nodes with largest sensitivity indices, to reduce the energy losses of the whole system as much as possible.

$\diamond$ **Designed multi-objective sizing problem**
- Maximized the utility income as well as minimized the overall cost for charging stations;
- Employed NSGA-II to obtain the Pareto solution set, and adopted fuzzy clustering to select the optimal solution from the Pareto set.

AWARDS

Graduate Career:
- Tsinghua Comprehensive Scholarship (3/84) | *Sept. 2019*

Undergraduate Career:
- First Prize in the 10th National University Students Electrical Math Modeling Competition | *Aug. 2017*
- First Power Exploration Scholarship of Wuhan University (3/340) | *Sept. 2016*
- China National Scholarship (Top 0.2% of all undergraduate students in China) | *Nov. 2015*
- First-class Student Scholarship & Merit Student Scholarship of Wuhan University | *Nov. 2015*
- Merit Freshmen Scholarship of Wuhan University (Top 5% of students enrolled at WHU) | *Dec. 2014*

TEACHING

- TA, Reinforcement Learning for Energy Systems (16 hrs), Prof. Scott Moura | *Summer, 2020*
- TA, Introduction of Smart Grid (32 hrs), Prof. Ye Guo and Prof. Yinliang Xu | *Spring, 2020*
- TA, Energy-Environment and Data-Information 100 level (16 hrs), Prof. Xuan Zhang | *Fall, 2019*

INVITED PRESENTATION

- Conference oral presentation: *Optimal Distribution System Planning Considering Regulation Services and Degradation of Energy Storage Systems.* **ICAE 2019**, Västerås, Sweden, selected for further considerations in **Applied Energy** (Top 5%). [PPT]

SKILLS & CERTIFICATE & OTHERS

- Skills: Matlab (Proficient with YALMIP toolbox), Visio (Proficient), Multisim, LaTex, Microsoft Office Suite;
- Certificate: China National Computer Rank Examination Level 2 (C Language Programming: 90+ /100), Chinese Calligraphy and Painting Tests Level 9.
- Volunteering: Worked as a volunteer in ACM SenSys 2018 and ICAE 2019, and participated in one-day volunteer activities at Perkins School for the Blind.