JU CHENGQUAN, PH.D

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WORKING EXPERIENCES

Optimization Engineer — Envision Digital, Singapore — Aug 2019 – Current

Grid Modeling and Optimization

- Core developer of optimization engine for grid optimization with vehicle-to-grid applications.
- Developed comprehensive models including grid connection, batter energy storage, electric vehicles, gas turbines, and various loads (curtailable, dispatchable, shiftable, interruptible).
- Developed web framework and RESTful API for hosting optimization as a service using Flask.
- Utilized advanced modeling and optimization techniques in electrical energy sectors to formulate specific business cases into optimization problems.

Research Fellow — NTU, Singapore — Sep 2017 – Aug 2019

Grid-wide Intermittency Management of Distributed Energy Storage Systems (DESS)

- Conducted grid-wide frequency regulation using by collecting, cleansing and analyzing data from distributed PV sites.
- Developed a scale-down DESS in HDB blocks for intermittency management and frequency support, and integrated latest control algorithms, including ramp-rate based, frequency and SoC regulation to hierarchical controllers.

Distributed Robust Optimization for Networked Microgrids

- Proposed a novel coordinated energy management of regional community microgrids, which reduces the total operational cost by 10% on average.
- Developed a triple-layer distributed optimization framework for microgrid clusters, to effectively reduce the operational cost and address robust operations against volatile uncertainties.

Temporal Decentralization for Stochastic Optimization

- Developed a temporal decentralized algorithm for the optimal stochastic energy scheduling.
- Achieved the fast convergence of the proposed algorithm advantages on optimal results and computation time.

PAST PROJECTS

Research Scientist (as Ph.D. Candidate) — NTU, Singapore — Jan 2014 – May 2017

Energy Management of Microgrids (*doctoral*)

- Distributed and robust optimization for energy scheduling in the regional multi-microgrid community.
- Stochastic/robust optimal power flow (OPF) under uncertainties of loads and renewables and dynamic OPF including energy storages.
- Energy management system with parameterized degradation costs.

Master Project — NTU, Singapore — Aug 2012 – May 2013

Intelligent Trading/Metering/Billing System

- Developed multi-agent wireless network communication in intelligent trading/metering/billing system.
- Data acquisition, collection and supervision in line with Zigbee coordinators using C# and MySQL database, and Web portal design for ITMBS via PHP and HTML.

Undergraduate Final Year Project — NTU, Singapore — Jan 2012 – May 2012

Battery Protection and SoC Balancing

- Designed a decentralized system of battery protection and SoC balancing, and built up a hardware-in-loop experimental platform with LabVIEW.

EDUCATION & CERTIFICATIONS

Ph.D. in Electrical Engineering (Sustainable Earth) , GPA: 4.83/5 — NTU, Singapore — 2013 – 2018

M.Sc. in Power Engineering , GPA: 4.88/5 (1st/388) — NTU, Singapore — 2012 – 2013

B.Eng. in Electrical Engineering , GPA: 3.44/4 — Wuhan University, China — 2008 – 2012

Specialization: Project Management and Other Tools for Career Development — Coursera — 2020

IBM Data Science Professional Certificate — 2019

Applied Data Science — 2019

Deep Learning — 2018

SKILLS

Strength

Modeling and Optimization, Power Systems and Microgrids, Hierarchical/Distributed Coordination, Data Analytics

Programming

Proficient	Python, LaTeX, Gurobi, Google OR-Tools, MATLAB
Intermediate	Markdown, CPLEX, Simulink, PLECS
Basic	Julia, HTML5/CSS, R, PHP, MySQL, LabVIEW, C#, Java

Language

Native	Chinese
Fluent	English
Basic	Japanese

AWARDS

Best Conference Paper Award, IEEE-EI, Beijing, China — 2017

Student Travel Grant (Best Conference Paper), POWERCON, Wollongong, Australia — 2016

Professional Engineers Board Gold Medal, Nanyang Technological University, Singapore, Singapore — 2013

Student Awards, Wuhan University, Wuhan, China — 2010

PUBLICATIONS

Journal

C. Ju, P. Wang, L. Goel, and Y. Xu, "A two-layer energy management system for microgrids with hybrid energy storage considering degradation costs," *IEEE Trans. on Smart Grid*, vol. 9, no. 6, pp. 6047–6057, 2018.

Y. Wang, T. Zhao, C. Ju, Y. Xu, and P. Wang, "Two-level distributed voltage /var control using aggregated pv inverters in distribution networks," *IEEE Transactions on Power Delivery*, pp. 1–1, 2019, ISSN: 1937-4208.

Conference

C. Ju, Y. Tang, Y. Wang, and Y. Xu, "A temporal decentralized algorithm for optimal stochastic energy scheduling in microgrids," in *2019 IEEE Power Energy Society General Meeting (PESGM)*, 2019, pp. 1–5.

C. Ju, Y. Tang, and Y. Wang, "Robust frequency regulation with hybrid energy storage systems in islanded microgrids," in *Asian Conference on Energy, Power and Transportation Electrification (ACEPT 2018)*, Oct. 2018, pp. 1–6.

C. Ju, S. Yao, and P. Wang, "Resilient post-disaster system reconfiguration for multiple energy service restoration," in *1st IEEE Conference on Energy Internet and Energy System Integration*, Nov. 2017, pp. 1–6.

C. Ju and P. Wang, "Two-stage energy management of residential microgrid community using pairing strategy," in *2017 IEEE PES General Meeting*, Jul. 2017, pp. 1–5.

C. Ju and P. Wang, "Optimal power flow with worst-case scenarios considering uncertainties of loads and renewables," in *2016 International Conference on Probabilistic Methods Applied to Power Systems (PMAPS)*, Oct. 2016, pp. 1–7.

C. Ju and P. Wang, "Energy management system for microgrids including batteries with degradation costs," in *2016 IEEE International Conference on Power System Technology (POWERCON)*, Sep. 2016, pp. 1–6.

C. Ju and P. Wang, "Dynamic optimal power flow including energy storage with adaptive operation costs," in *IECON 2015 - 41st Annual Conference of the IEEE Industrial Electronics Society*, Nov. 2015, pp. 561–566.

Y. Wang, W. Yao, C. Ju, S. Wen, Y. Xu, and Y. Tang, "Distributed secondary control of energy storage systems in islanded ac microgrids," in *2018 Asian Conference on Energy, Power and Transportation Electrification (ACEPT)*, 2018, pp. 1–6.