

IEEE TRANSACTIONS ON SMART GRID

A PUBLICATION OF THE IEEE POWER & ENERGY SOCIETY



TECHNICALLY COSPONSORED BY THE IEEE COMMUNICATIONS SOCIETY,
THE IEEE COMPUTATIONAL INTELLIGENCE SOCIETY, THE IEEE COMPUTER SOCIETY,
THE IEEE CONSUMER ELECTRONICS SOCIETY, THE IEEE CONTROL SYSTEMS SOCIETY,
THE IEEE INDUSTRIAL ELECTRONICS SOCIETY, THE IEEE INDUSTRY APPLICATIONS SOCIETY,
THE IEEE INSTRUMENTATION AND MEASUREMENT SOCIETY, THE IEEE POWER ELECTRONICS SOCIETY
AND THE IEEE SIGNAL PROCESSING SOCIETY



NOVEMBER 2021

VOLUME 12

NUMBER 6

ITSGBQ

(ISSN 1949-3053)

REGULAR PAPERS

AC/DC Microgrids

Distributed State of Charge-Based Droop Control Algorithm for Reducing Power Losses in Multi-Port Converter-Enabled Solar DC Nano-Grids	<i>C. Samende, S. M. Bhagavathy, and M. McCulloch</i>	4584
Distributed Optimization for Integrated Frequency Regulation and Economic Dispatch in Microgrids	<i>Y. Xu, Z. Dong, Z. Li, Y. Liu, and Z. Ding</i>	4595
Distributed Control of DC Microgrids for Optimal Coordination of Conventional and Renewable Generators	<i>Z. Fan, B. Fan, and W. Liu</i>	4607
A Converter-Based Power System Stabilizer for Stability Enhancement of Droop-Controlled Islanded Microgrids	<i>K. Guo, Y. Qi, J. Yu, D. Frey, and Y. Tang</i>	4616

(Contents Continued on Page 4581)



Parallel and Distributed Optimization Method With Constraint Decomposition for Energy Management of Microgrids	4627
..... <i>Q. Li, Y. Liao, K. Wu, L. Zhang, J. Lin, M. Chen, J. M. Guerrero, and D. Abbott</i>	
Supplementary Feedforward Control of DGs in a Reconfigurable Microgrid for Load Restoration	4641
..... <i>J.-Y. Park, J. Ban, Y.-J. Kim, and X. Lu</i>	
Stability Analysis of Microgrid Islanding Transients Based on Interconnected Dissipative Subsystems	4655
..... <i>M. H. Roos, P. H. Nguyen, J. Morren, and J. G. Sloopweg</i>	
An Energy Management System With Short-Term Fluctuation Reserves and Battery Degradation for Isolated Microgrids	4668
..... <i>S. Córdova, C. Cañizares, A. Lorca, and D. E. Olivares</i>	
Stability Analysis of Low-Voltage Distribution Feeders Operated as Islanded Microgrids	4681
..... <i>B. Wang and G. Verbič</i>	
Characteristics of Parallel Inverters Applying Virtual Synchronous Generator Control	4690
..... <i>M. Chen, D. Zhou, C. Wu, and F. Blaabjerg</i>	
Blockchain for Transacting Energy and Carbon Allowance in Networked Microgrids	4702
..... <i>M. Yan, M. Shahidehpour, A. Alabdulwahab, A. Abusorrah, N. Gurung, H. Zheng, O. Ogunnubi, A. Vukojevic, and E. A. Paaso</i>	
Power Loss Minimization of Off-Grid Solar DC Nano-Grids—Part I: Centralized Control Algorithm	4715
..... <i>C. Samende, S. M. Bhagavathy, and M. McCulloch</i>	
A Scalable Control Design for Grid-Forming Inverters in Microgrids	4726
..... <i>J. D. Watson, Y. Ojo, K. Laib, and I. Lestas</i>	
AC/DC Active Distribution Networks (ADNs)	
An MILP Model for Optimal Placement of Sectionalizing Switches and Tie Lines in Distribution Networks With Complex Topologies	4740
..... <i>M. Jooshaki, S. Karimi-Arpanahi, M. Lehtonen, R. J. Millar, and M. Fotuhi-Firuzabad</i>	
Hierarchical Voltage Control Strategy in Distribution Networks Considering Customized Charging Navigation of Electric Vehicles	4752
..... <i>X. Sun and J. Qiu</i>	
Adaptive Master-Slave Control Strategy for Medium Voltage DC Distribution Systems Based on a Novel Nonlinear Droop Controller	4765
..... <i>X. Xie, X. Quan, Z. Wu, X. Cao, X. Dou, and Q. Hu</i>	
Multi-Energy Systems	
Two-Time-Scale Energy Management for Microgrids With Data-Based Day-Ahead Distributionally Robust Chance-Constrained Scheduling	4778
..... <i>Z.-P. Yuan, J. Xia, and P. Li</i>	
Dynamic Security Control in Heat and Electricity Integrated Energy System With an Equivalent Heating Network Model	4788
..... <i>S. Zhang, W. Gu, S. Lu, S. Yao, S. Zhou, and X. Chen</i>	
Resilience-Motivated Distribution System Restoration Considering Electricity-Water-Gas Interdependency	4799
..... <i>J. Li, Y. Xu, Y. Wang, M. Li, J. He, C.-C. Liu, and K. P. Schneider</i>	
Demand Response (DR) and Demand Side Management (DSM)	
Dynamic Stochastic Demand Response With Energy Storage	4813
..... <i>Y. Xiao and M. van der Schaar</i>	
Continuous Group-Wise Double Auction for Prosumers in Distribution-Level Markets	4822
..... <i>A. Yu, X. Tang, Y. J. Zhang, and J. Huang</i>	
Optimal Energy Management of Microgrids Using Quantum Teaching Learning Based Algorithm	4834
..... <i>L. P. Raghav, R. S. Kumar, D. Koteswara Raju, and A. R. Singh</i>	
Online Learning and Distributed Control for Residential Demand Response	4843
..... <i>X. Chen, Y. Li, J. Shimada, and N. Li</i>	
Linear Quadratic Regulator Based Smooth Transition Between Microgrid Operation Modes	4854
..... <i>M. Ganjian-Aboukheili, M. Shahabi, Q. Shafiee, and J. M. Guerrero</i>	
Robust Hybrid Control for Demand Side Management in Islanded Microgrids	4865
..... <i>C. Albea, C. Bordons, and M. A. Ridao</i>	
Two-Stage Decoupled Estimation Approach of Aggregated Baseline Load Under High Penetration of Behind-the-Meter PV System	4876
..... <i>K. Li, J. Yan, L. Hu, F. Wang, and N. Zhang</i>	
Distributed Energy Resources (DER) Interactions and Integration with Power Grids	
Iteration-Based Linearized Distribution-Level Locational Marginal Price for Three-Phase Unbalanced Distribution Systems	4886
..... <i>M. Cai, R. Yang, and Y. Zhang</i>	
Learning-Based Predictive Control via Real-Time Aggregate Flexibility	4897
..... <i>T. Li, B. Sun, Y. Chen, Z. Ye, S. H. Low, and A. Wierman</i>	
Frequency-Constrained Resilient Scheduling of Microgrid: A Distributionally Robust Approach	4914
..... <i>Z. Chu, N. Zhang, and F. Teng</i>	
Distributionally Robust Microgrid Formation Approach for Service Restoration Under Random Contingency	4926
..... <i>S. Cai, Y. Xie, Q. Wu, M. Zhang, X. Jin, and Z. Xiang</i>	
Comprehensive Analytical Expressions for Assessing and Maximizing Technical Benefits of Photovoltaics to Distribution Systems	4938
..... <i>K. Mahmoud and M. Lehtonen</i>	

Prioritized Replay Dueling DDQN Based Grid-Edge Control of Community Energy Storage System	<i>H. Song, Y. Liu, J. Zhao, J. Liu, and G. Wu</i>	4950
Fast Islanding Detection of Nested Grids Including Multiple Resources Based on Phase Criteria	<i>R. Zamani, M. Parsa Moghaddam, H. Panahi, and M. Sanaye-Pasand</i>	4962
Provision of Primary Frequency Response as Ancillary Service From Active Distribution Networks to the Transmission System	<i>E. O. Kontis, A. del Nozal, J. M. Mauricio, and C. S. Demoulias</i>	4971
Transient Voltage Stability of Paralleled Synchronous and Virtual Synchronous Generators With Induction Motor Loads	<i>H. Cheng, W. Huang, C. Shen, Y. Peng, Z. Shuai, and Z. J. Shen</i>	4983
Privacy-Preserving Distributed Average Observers in Distribution Systems With Grid-Forming Inverters	<i>Y. Du, H. Tu, X. Lu, and S. Lukic</i>	5000
Probabilistic Forecasting of Regional Net-Load With Conditional Extremes and Gridded NWP	<i>J. Browell and M. Fasiolo</i>	5011
LVRT Operation Enhancement of Single-Stage Photovoltaic Power Plants: An Analytical Approach	<i>M. Nasiri, A. Arzani, and J. M. Guerrero</i>	5020
Chance Constrained Scheduling and Pricing for Multi-Service Battery Energy Storage	<i>W. Zhong, K. Xie, Y. Liu, S. Xie, and L. Xie</i>	5030
Aggregate Flexibility of Virtual Power Plants With Temporal Coupling Constraints	<i>S. Wang and W. Wu</i>	5043
Including Dynamic Line Rating Into the Optimal Planning of Distributed Energy Resources	<i>K. Morozovska, M. Heleno, A. Valenzuela Meza, and P. Hilber</i>	5052
Smart Sensors, Meters, and Advanced Metering Infrastructure (AMI)		
On the Use of Common Information Model for Smart Grid Applications—A Conceptual Approach	<i>K. Shahid, K. Nainar, R. L. O. Olsen, F. Iov, M. Lyhne, and G. Morgante</i>	5060
Online Detection of Inter-Turn Winding Faults in Single-Phase Distribution Transformers Using Smart Meter Data	<i>K. Ashok, D. Li, N. Gebraeel, and D. Divan</i>	5073
Enriching Load Data Using Micro-PMUs and Smart Meters	<i>F. Bu, K. Dehghanpour, and Z. Wang</i>	5084
PMU Hardware/Software and Applications for Distribution Systems		
Fault Location Method for Three-Terminal Lines in Distribution Network Based on Line Voltage Measured by μ MPPMU	<i>Z. Yun, T. Wen, and C. Wang</i>	5095
EV Power Grid Integration and Impact		
ACN-Sim: An Open-Source Simulator for Data-Driven Electric Vehicle Charging Research	<i>Z. J. Lee, S. Sharma, D. Johansson, and S. H. Low</i>	5113
Deep Reinforcement Learning for Continuous Electric Vehicles Charging Control With Dynamic User Behaviors	<i>L. Yan, X. Chen, J. Zhou, Y. Chen, and J. Wen</i>	5124
Integrating Battery Aging in the Optimization for Bidirectional Charging of Electric Vehicles	<i>K. Schwenk, S. Meisenbacher, B. Briegel, T. Harr, V. Hagenmeyer, and R. Mikut</i>	5135
Hierarchical Coupled Driving-and-Charging Model of Electric Vehicles, Stations and Grid Operators	<i>B. Sohet, Y. Hayel, O. Beaude, and A. Jeandin</i>	5146
Peer-to-Peer, Transactive Energy, Blockchain Power Grid Applications		
Data-Driven Stochastic Game With Social Attributes for Peer-to-Peer Energy Sharing	<i>L. Chen, N. Liu, L. Liu, X. Yu, and Y. Xue</i>	5158
Data-Driven Distributionally Robust Co-Optimization of P2P Energy Trading and Network Operation for Interconnected Microgrids	<i>J. Li, M. E. Khodayar, J. Wang, and B. Zhou</i>	5172
A Scalable Privacy-Preserving Multi-Agent Deep Reinforcement Learning Approach for Large-Scale Peer-to-Peer Transactive Energy Trading	<i>Y. Ye, Y. Tang, H. Wang, X.-P. Zhang, and G. Strbac</i>	5185
Price-Maker Bidding and Offering Strategies for Networked Microgrids in Day-Ahead Electricity Markets	<i>B. Hu, Y. Gong, C. Y. Chung, B. F. Noble, and G. Poelzer</i>	5201
Cyber-Physical and Cybersecurity Power Grid Applications		
A Privacy-Preserving Homomorphic Scheme With Multiple Dimensions and Fault Tolerance for Metering Data Aggregation in Smart Grid	<i>A. Mohammadali and M. Sayad Haghighi</i>	5212
A Cyber Attack Mitigation Scheme for Series Compensated DFIG-Based Wind Parks	<i>M. Ghafouri, U. Karaagac, A. Ameli, J. Yan, and C. Assi</i>	5221
A Homomorphic Encryption-Based Private Collaborative Distributed Energy Management System	<i>Z. Cheng, F. Ye, X. Cao, and M.-Y. Chow</i>	5233
Moving-Target Defense Against Cyber-Physical Attacks in Power Grids via Game Theory	<i>S. Lakshminarayana, E. V. Belmega, and H. V. Poor</i>	5244

Protection Against False Data Injection Attacks Considering Degrees of Freedom in Attack Vectors	<i>T. S. Sreeram and S. Krishna</i>	5258
Blockchain Based Secure Data Aggregation and Distributed Power Dispatching for Microgrids	<i>X. Luo, K. Xue, J. Xu, Q. Sun, and Y. Zhang</i>	5268
A New AC False Data Injection Attack Method Without Network Information	<i>R. Jiao, G. Xun, X. Liu, and G. Yan</i>	5280
Signcryption Based Authenticated and Key Exchange Protocol for EI-Based V2G Environment	<i>S. Ahmed, S. Shamshad, Z. Ghaffar, K. Mahmood, N. Kumar, R. M. Parizi, and K.-K. R. Choo</i>	5290
Joint Topology Identification and State Estimation in Unobservable Distribution Grids	<i>H. Sufi Karimi and B. Natarajan</i>	5299
Artificial Neural Network-Based Stealth Attack on Battery Energy Storage Systems	<i>M. Pasetti, P. Ferrari, P. Bellagente, E. Sisinni, A. Oliveira de Sá, C. B. do Prado, R. P. David, and R. C. S. Machado</i>	5310
An Optimization-Based Approach to Recover the Detected Attacked Grid Variables After False Data Injection Attack	<i>M. Jorjani, H. Seifi, A. Yazdian Varjani, and H. Delkhosh</i>	5322
A Privacy-Aware Reconfigurable Authenticated Key Exchange Scheme for Secure Communication in Smart Grids	<i>P. Gope and B. Sikdar</i>	5335
Targeted False Data Injection Attacks Against AC State Estimation Without Network Parameters	<i>M. Du, G. Pierrou, X. Wang, and M. Kassouf</i>	5349
Data Analytics and Big Data Applications to Microgrids and ADNs		
Hybrid Multitask Multi-Information Fusion Deep Learning for Household Short-Term Load Forecasting	<i>L. Jiang, X. Wang, W. Li, L. Wang, X. Yin, and L. Jia</i>	5362
Spatial-Temporal Residential Short-Term Load Forecasting via Graph Neural Networks	<i>W. Lin, D. Wu, and B. Boulet</i>	5373
Distribution Network Reconfiguration for Short-Term Voltage Stability Enhancement: An Efficient Deep Learning Approach ...	<i>W. Huang, W. Zheng, and D. J. Hill</i>	5385
An Adaptive Ensemble Data Driven Approach for Nonparametric Probabilistic Forecasting of Electricity Load	<i>C. Wan, Z. Cao, W.-J. Lee, Y. Song, and P. Ju</i>	5396
Data-Driven Copy-Paste Imputation for Energy Time Series	<i>M. Weber, M. Turowski, H. K. Çakmak, R. Mikut, U. Kühnapfel, and V. Hagenmeyer</i>	5409
Robust Regional Coordination of Inverter-Based Volt/Var Control via Multi-Agent Deep Reinforcement Learning	<i>H. Liu, C. Zhang, Q. Chai, K. Meng, Q. Guo, and Z. Y. Dong</i>	5420
Enhancing the Spatio-Temporal Observability of Grid-Edge Resources in Distribution Grids	<i>S. Lin and H. Zhu</i>	5434
Deep Learning Method With Manual Post-Processing for Identification of Spectral Patterns of Waveform Distortion in PV Installations	<i>R. A. de Oliveira, V. Ravindran, S. K. Rönnerberg, and M. H. J. Bollen</i>	5444
Application of Telecommunication Technologies to Power Systems		
An Asynchronous Forward-Backward-Splitting Power Flow Algorithm of Coupled Transmission and Active Distribution Systems	<i>K. Tang, S. Dong, and Y. Song</i>	5457
<hr/> LETTERS		
Spatial–Temporal Data Analysis–Based Event Detection in Weakly Damped Power Systems	<i>L. Zhu and D. J. Hill</i>	5472
A Novel Energy Sharing Mechanism for Smart Microgrid	<i>S. Li, J. Zhu, and H. Dong</i>	5475
Branching Dueling Q-Network-Based Online Scheduling of a Microgrid With Distributed Energy Storage Systems	<i>H. Shuai, F. Li, H. Pulgar-Painemal, and Y. Xue</i>	5479
2021 INDEX	Available online at http://ieeexplore.ieee.org	
