

2025 IEEE/IAS 61st Industrial and Commercial Power Systems Technical Conference (I&CPS 2025)

**Montreal, Quebec, Canada
11-14 May 2025**



**IEEE Catalog Number: CFP25CPS-POD
ISBN: 979-8-3315-0809-8**

**Copyright © 2025 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP25CPS-POD
ISBN (Print-On-Demand):	979-8-3315-0809-8
ISBN (Online):	979-8-3315-0808-1
ISSN:	2158-4893

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

Multi-Level Converters in Permanent Magnet Synchronous Motor Drives: Effects on the Common-Mode Voltage.....	1
<i>S. Saleh, A. Jee, J. Meng, S. Panetta, M. Haj-Ahmed</i>	
Power-Based Categorization of Micro-Grid Systems.....	9
<i>S. Saleh, J. Meng, E. Castillo-Guerra, M. Haj-Ahmed, D. Mohla</i>	
Application and Advantages of the Power-Based Categorization Method in Micro-Grid Systems	17
<i>S. Saleh, J. Meng, E. Castillo-Guerra, M. Haj-Ahmed, R. Ahshan</i>	
Structure and Design of Solid-State Grounding System.....	25
<i>S. Saleh, A. Jee, J. Meng, E. Ozkop, A. Al-Durra</i>	
Performance Evaluation of Solid-State Grounding	33
<i>S. Saleh, A. Jee, J. Meng, R. Ahshan, A. Al-Durra</i>	
Voltage Survivability in DC Micro-Grid Systems	41
<i>S. Saleh, A. Jee, J. Meng, M. Haj-Ahmed, E. Ozkop</i>	
A Complete Review of Frequency Regulation in Wind Turbines Considering Adaptive Droop/Inertia Hybrid Control.....	49
<i>Yuan-Kang Wu, Chang Yin-Hsuan, Duc-Tung Trinh, Ting-Yu Chen, Manh-Hai Pham</i>	
Graph-Reinforcement Learning for Service Restoration in Distribution Automation Systems.....	56
<i>Te-Tien Ku, Chia-Hung Lin, Chao-Shun Chen, Chun-Lien Su</i>	
A Comparative Study of Hybrid Frequency Control Strategies for Wind Turbines Integrating Active and Passive Controls.....	64
<i>Yuan-Kang Wu, Chia-Hsin Li, Duc-Tung Trinh, Ting-Yu Chen, Manh-Hai Pham</i>	
Online Fault Detection and Diagnosis Methodology for Photovoltaic Systems using I–V Characteristic Analysis	71
<i>Jhih-Hao Lin, Yuan-Kang Wu, Gia-Huy Le</i>	
Real-Time Estimation of Total Solar Power Output in a Region using an Efficient Hybrid Transformer - Quantile Regression - KDE Model.....	78
<i>Quoc-Thang Phan, Yuan-Kang Wu, Shu-Min Yang, Kai-Cheng Zhan</i>	
Suppression of Unstable Torsional Modes in a Hybrid Steam-Turbine Generator/Offshore Wind Farm System using an Interline Power-Flow Controller	84
<i>Li Wang, Wen-Kai Feng, Ching-Chung Tseng, Yaw-Juen Wang, Hazlie Mokhlis, Kein Huat Chua, Manoj Tripathy, Shih-Chieh Hsu</i>	
Stability Analysis of Two Renewable Systems Fed to Two Power Grids Through a Four-Terminal HVDC Link Based on a Modular Multilevel Converter.....	92
<i>Li Wang, Ting-You Li, Ching-Chung Tseng, Yaw-Juen Wang, Hazlie Mokhlis, Kein H. Chua, Manoj Tripathy, Shih-Chieh Hsu</i>	
Voltage Stability Improvement of Multi-Microgrid Clusters with Electrical Vehicle Loads using Unified Power Flow Controllers.....	100
<i>Li Wang, Yu-Wei Liu, Ching-Chung Tseng, Yaw-Juen Wang, Hazlie Mokhlis, Kein H. Chua, Manoj Tripathy, Shih-Chieh Hsu</i>	

Distributed Resilient Control for Inverter Based Resources in Shore-Ship Cyber-Physical Microgrids	108
<i>Zulfiqar Ali, Yacine Terriche, Chun-Lien Su, Giuseppe Parise, Sharifah S. S. Ahmad, Mahmoud Elsis</i>	
A Pilot Protection Scheme for Inverter-Based Isolated Microgrids in Remote Areas	115
<i>Abbas Hasani, Xiaodong Liang</i>	
Adaptive Damping Control to Improve Transient Stability in Grid-Forming VSG	123
<i>Kourosh G. Saffar, Jafar Mohammadi</i>	
Protection of Inverter-Based Isolated Microgrids: A Review	132
<i>Abbas Hasani, Xiaodong Liang</i>	
Comparative Analysis of DC Arc Faults Versus Operational Transients	139
<i>Kristophor Jensen, Long Zhao, Wei-Jen Lee</i>	
Admittance-Based Aggregated Modeling of Distributed Energy Resources with Proportional-Resonant Control in Nodal Analysis EMT Simulators	145
<i>Arash Safavizadeh, Rahul R. Ramesh, Seyyedmilad Ebrahimi, Juri Jatskevich</i>	
Transformer Health-Aware Bridge Crane Scheduling in Highly Renewable Seaport Microgrid	151
<i>Kaiyue Chen, Ying Lu, Sidun Fang</i>	
Power Sharing Model with Variable Inductors Integrated in Residential LVAC Microgrids	157
<i>Gabriele G. Muscio, Riccardo Loggia, Luigi Martirano</i>	
A Case Study of a Microgrid for a Nearly Zero-Energy Refurbished Isolated House.....	163
<i>Andrea Massaccesi, Cristina Moscatiello, Costanza V. Fiorini, Elisa Belloni, Riccardo Loggia, Alessandro Flamini, Alessandro Galasso, Roberto Menichelli, Luigi Martirano</i>	
A Monitoring Platform Tool for Energy Communities Optimization and AI Applications	170
<i>Riccardo Loggia, Roberto Menichelli, Alessandro Flamini, Alessandro Galasso, Andrea Massaccesi, Cristina Moscatiello, Michal Jasinski, Luigi Martirano</i>	
High-Frequency Voltage Analysis for Turn to Turn Short-Circuit Fault Detection in Induction Motor During Startup Transient	176
<i>Manuel A. Mazzeletti, Guillermo R. Bossio, Pablo D. Donolo, Marcos Donolo</i>	
Innovative IFC Classification in BIM Models Ready to Be Converted into Digital Twins.....	182
<i>Alessandro Galasso, Roberto Menichelli, Alessandro Flamini, Riccardo Loggia, Cristina Moscatiello, Andrea Massaccesi, Alessandro Palma, Luigi Martirano</i>	
Fault Detection using Time-Domain Incremental Negative-Sequence Energy in Distribution Grids	189
<i>Julio Rodriguez, Mahesh Illindala</i>	
A Short-Term PV Power Forecasting Method Based on GCN and Error Correction Strategy	194
<i>Haohuai Wang, Jianfeng Che, Yufei Yang, Zhao Zhen, Fei Wang</i>	
BIM and Digital Twin in Smart Electrical Power System: An Innovative Standard Classification	201
<i>Alessandro Flamini, Roberto Menichelli, Riccardo Loggia, Alessandro Galasso, Cristina Moscatiello, Andrea Massaccesi, Andrea Aiello, Luigi Martirano</i>	
Next-Generation Sustainable Shipping: A Bibliographic Analysis of Alternative Fuels in Maritime Systems.....	208
<i>Muhammad Sadiq, Alexander Micallef, Maurice Apap, John Licari, Cedric Caruana, Chun-Lien Su</i>	

Marine Environment Adaptability Testing Laboratory for Lithium-Ion Batteries	214
<i>Laiqiang Kong, Sidun Fang, Lijun Yang, Ruijin Liao</i>	
From the Laboratory to the Market: Considerations on the Electrical Safety of a Prototype of Off-Grid Charging Station for E-Bikes	226
<i>Antony Vasile, Davide Astolfi, Marco Pasetti, Gaetano Zizzo, Eleonora R. Sanseverino, Alessandra Flammini</i>	
Challenges with Modern Data Centers, Design Considerations and Recommended Power System Studies	232
<i>Guruprasad Ramani, Zahid Hussain, William Brown, Qais Alsafasfeh</i>	
LSTM-Based Approach for Operational, Fault and Cyberattack Events Classification in Digital Substations: Frequency and Waveform Applications	239
<i>Juan P. P. Pérez, Jaiverth A. T. Lozada, Felipe F. Rodríguez, Gustavo A. R. Lopez</i>	
Understanding Transient Overvoltage and Its High Frequency – A Review	244
<i>Claudio S. Mardegan, David D. Shipp, Sergio Panetta, Wendler L. N. Matos</i>	
Ultra-Short-Term Regional Distributed PV Power Forecasting Method Based on Spatiotemporal Correlation Mining and Multidimensional Features Fusion	253
<i>Zihao Tong, Yuqing Wang, Haonan Dai, Jiabao Xu, Fei Wang</i>	
Adaptive Neural Fault-Tolerant Finite Time Tracking Control for Type-4 Offshore Wind Turbine Systems.....	259
<i>M. A. Sepestanaki, Seyed H. Rouhani, Milad Darmiani, Mahdi Salimi, Alireza Ghorbani, Chun-Lien Su, Saleh Mobayen, Jin-Ting Yu</i>	
Super-Resolution Reconstruction Method for Power System Data Considering Weather Impacts Based on Self-Attention TimeGAN.....	266
<i>Yujie Zhao, Kaiqi Sun, Yidian Gao, Wei Qiu, Ke-Jun Li, Mingyang Li, Yuanyuan Sun</i>	
Dynamic Interactive Framework of Power System Considering Multiple VSC Integration.....	273
<i>Hongjin Fan, Kaiqi Sun, Dengchao Shang, Kejun Li, Mingyang Li</i>	
Research on Ultra-Short Term PV Power Forecasting Method Considering Weather Similarity Based on Multi-Dimensional Feature.....	282
<i>Guanbin Feng, Jiabao Xu, Zhao Zhen, Tao Li, Fei Wang</i>	
Long LV Circuits in Road Tunnels	289
<i>Giuseppe Parise, Marco Allegri, Luigi Parise, Chun Lien Su, Mario Lanciano</i>	
Submarine Cable Jackets Affected by Lightning Strikes in Offshore Environments	297
<i>Eduardo H. Enrique</i>	
Estimating Arcing Ground Fault Current Factor for LV Systems.....	303
<i>Claudio S. Mardegan, Rasheek Rifaat, S. A. Saleh, Wendler L. N. Matos</i>	
Optimized CNN for Fault Recognition in Power Systems with High Penetrations of Inverter-Based Resources	309
<i>Connor Tant, Ramakrishna Gokaraju</i>	
Technical Considerations for Startup of Off-Grid Microgrids with Renewable Distributed Energy Resources	317
<i>Qais Alsafasfeh, Zahid Hussain, Guruprasad Ramani, William Brown</i>	

Quantifying Reliability Improvements in Distribution Systems with Grid-Forming Inverter Integration	325
<i>Zhenlin Zhao, Rajarshi Roychowdhury, Mahesh S. Illindala, Xuan Wu</i>	
Building Energy Management System Impact on Community Microgrids Resiliency, Reliability, and Robustness Enhancement	330
<i>Mohammadreza Fathizadan, Mahesh S. Illindala</i>	
A Full Parameter Identification Approach for Dynamic Equivalent Modeling of Wind Farm	337
<i>Peng Wang, Zhenyuan Zhang, Ningyi Dai, Jie Ren, Wei-Jen Lee</i>	
Robust Online Inertia Estimation in Power Systems using Ambient Data in the Presence of Inverter-Based Resources	346
<i>Narges S. Ghiasi, Ramtin Hadidi</i>	
Two-Stage Bidding Strategy for Uninterruptible Power Supply in Energy and Reserve Markets	352
<i>Pei Sun, Xinru Guan, Yujie Li, Xiangqian Yu, Chi Zhang, Ruiqi Li, Yan Sun, Yudong Gao, Xuan Wei</i>	
Discriminative Pricing for Adjustable Capabilities of Virtual Power Plants Under Uncertainty.....	358
<i>Zhaohao Ding, Ying Zhang, Xuan Wei, Jinli Sun, Xuan Tong, Yibo Cui, Muchao Xiang</i>	
Evaluating Lightning-Caused Wildfire Risk to Alaska's Power Grid Infrastructure	364
<i>Kathleen Demichele, Masoumeh H. Kapourchali, Christine Waigl, Claire A. Richards, Micah Hahn, Long Zhao, Payman Dehghanian, Mohammad H. Kapourchali</i>	
Technical and Economic Analysis of a Multi-Source Organic Rankine Cycle Heat Recovery System	370
<i>Akhil Nelapudi, Sahand Liasi, Jan Westman, Ramtin Hadidi</i>	
TSMixer: An Innovative Model for Advanced Bias Correction of NWP Solar Irradiance and One-Day-Ahead Power Forecasting.....	376
<i>Quoc-Thang Phan, Yuan-Kang Wu, Quoc-Dung Phan</i>	
A Machine Learning Algorithm to Minimize Distribution Lines Overloads.....	382
<i>Andrea Bonfiglio, Alice La Fata, Manuela Minetti</i>	
Locating of Single Phase to Ground Fault in Multi-Branch Distribution Networks Considering Impedance Parameters Deviations.....	388
<i>Jie Ren, Zhenyuan Zhang, Shi Jing, Wei-Jen Lee</i>	
Localization for Arc Faults with Various Structure Based on Spatial Distribution of Magnetic Field	397
<i>Xiaotian Tang, Jie Ren, Shi Jing, Peng Wang, Zhenyuan Zhang</i>	
Asynchronous Operation of a Synchronous Generator Following a Fast Loss of Field Detection: Challenges and a Remedy	407
<i>Abbas Hasani, Xiaodong Liang, Moein Abedini, Majid Sanaye-Pasand</i>	

Author Index