

2025 International Conference on Power Engineering and Electrical Technology (PEET 2025)

**Shiga, Japan
22-24 October 2025**



**IEEE Catalog Number: CFP250E7-POD
ISBN: 979-8-3315-3876-7**

**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:	CFP250E7-POD
ISBN (Print-On-Demand):	979-8-3315-3876-7
ISBN (Online):	979-8-3315-3875-0

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

2025 International Conference on Power Engineering and Electrical Technology (PEET) Table of Contents

Preface.....	xiii
Committee	xiv

1. Smart Grids and Energy Management Systems

Collective self-consumption in multi-family houses: A field study on allocation strategies for shared battery storage systems	1
<i>Michel Meinert, Marcel Lüdecke, Tamara Beck, Bernd Engel</i>	
Data-Driven Operational Diagnostics and Performance Mapping of a 20 MW Hybrid PV-Wind Installation	7
<i>Sultan Sh. Alanzi, Ghada Shehada</i>	
Primary Frequency Regulation Capability Requirements Analysis for Nuclear Power Units in Low-Inertia Modern Power Systems.....	14
<i>Haifeng Liang, Luyao Nie, Yunbo Wu, Chutong Wang, Dongyuan Li, Ge Qin</i>	
Forecasting Congestion and Flexibility Needs in the STREAM Project: The sGRID Tool for Distribution Grids....	22
<i>Janez Gregor Golja, Jan Jeriha, Tomi Medved, Tamara Smolej</i>	
An Online Algorithm for Linear Optimal Power Flow Computations.....	28
<i>Daniel Galeano-Suárez, David Toquica, Nilson Henao, Kodjo Agbossou, JC Oviedo-Cepeda</i>	
Optimizing PV-Wind-Battery Energy Systems for Economic Viability and Reliability.....	34
<i>Wen-Chang Tsai, Rui Peng</i>	
Development of VPP Impact Analysis Simulator in Distribution System	39
<i>SeokWoo Hyun, WooSeok Kim, YunHyuk Choi, TaeHwan Kim, GeonHo Kim, JungSung Park</i>	
Optimizing Switching Actions for Reducing Operational Switching Effort in Transmission System Operations using a Genetic Algorithm.....	45
<i>Felix Preuschoff, Mengyuan Zhang, Christian Fester, Albert Moser</i>	
Utilizing Virtual Power Plant for Frequency-Watt Mode Response Using Distributed Energy Resources	52
<i>Hamad Albeshr, Gagandeep Singh Dua, Sajan K. Sadanandan, Tareg Ghaoud</i>	

2. Data Mining and Behavioral Modeling

Ultra-short-term power load forecasting under extreme weather based on MSTCN-MSA-ESNP	58
<i>Yan Zhong, Jun Wang, Hong Peng, Tao Wang</i>	
Knowledge-Graph-based News Monitoring for Renewable Energy News.....	64
<i>Daniel Gritzner, Cedric Fauth, Jörn Ostermann</i>	

Predictability of Electrical Loads in Various Domains: An Empirical AI-Benchmarking Approach.....	72
<i>Kilian Kunkel, Lukas Baur, Alexander Sauer, Christian Becker-Asano</i>	
A short-term net load forecasting method based on FTCN-BiLSTM	79
<i>Xin Guan, Xiao Han, Xina Leng, Jiahao He, Tao Wang, Jun Wang</i>	
Power Load monitoring method based on lightweight binary neural networks	85
<i>Zehan Liang, Lin Fan, Rui Wan, Dezheng Zhang, Jing Xu, Dong Wang</i>	
Accelerating Building Energy Simulations with PyE+: A Surrogate-Driven AI Framework for Real Time Decision-Making	92
<i>Mubashir Wani, Faizal Hafiz, Akshya Swain</i>	
3. Electric Machines, Motor Drives and Control Strategies	
Study on rotor skew for manufacturing improvement in eccentric IPM motors	102
<i>Jihyo Song, Sungsu-Shin, Jihoon-Kim, Younggyu-An, Daegeun-Choi, Jonghak-Jin</i>	
Open-circuit fault detection in 5-phase PMSM drives through mechanical vibration analysis.....	106
<i>Esther Altemir, Andres Sierra-Gonzalez, Alain Urrestarazu, Borja Prieto, Elena Trancho, Edorta Ibarra</i>	
A Transition Method Between I-f Control and Sensorless FOC for Full-Speed Range Sensorless Control of PMSMs	112
<i>Duc M. Tran, Joon-Young Choi</i>	
Design of a High-Torque-Density Dual-Permanent-Magnet-Excited Machine For Direct-Drive Applications.....	118
<i>Hongliang Guo, Rundong Huang, Hongwu Chen, Yiwen Liao, Chunhua Liu</i>	
Novel Mode-Based Fault Diagnostic Framework for BLDC Motor and Controller	124
<i>Sadiq Saleem, Somnath Sengupta</i>	
Hybridized Modulation Techniques for Common Mode Voltage Mitigation in Star-Connected Five-Phase PMSM Drives.....	134
<i>Andres Sierra-Gonzalez, Elena Trancho, Esther Altemir, Borja Prieto, Edorta Ibarra</i>	
A Deadbeat Predictive Flux-Weakening Control Considering Voltage and Current Constraints for Surface-Mounted PMSMs	140
<i>Hongwu Chen, Yiwen Liao, Hongliang Guo, Yong Chen, Chunhua Liu</i>	
Adaptive Current Control for an IPMSM Based on Dynamic Gain Tuning and Variation Estimation	146
<i>Shin-Hung Chang, Yi-Cheng Huang</i>	
4. Power Electronics and Converter Technologies	
Development of Edge-Phasor Measurement Unit Based on Enhanced Interpolated-DFT for Spectrum Leakage Compensation	152
<i>Te-Tien Ku, Chia-Hung Lin, Chun-Lien Su, Zhe-Yu Zhou</i>	
FCS-MPC Hardware Implementation for a Hybrid Cascaded Converter Using a Zynq-7000 SoC Platform	157
<i>Roberto O. Ramírez, Fernando Urra-González, Mauricio E. Arévalo</i>	

High Efficiency DC-DC Converter Using Always Triple Path Hybrid Topology.....165
Sora Yonemura, Kei Eguchi

High Frequency Induction Heating via Split Helical Coil Using Full Bridge Inverter.....170
Juthathip Haema, Rattanakorn Phadungthin

5. Power System Monitoring, Diagnostics and Fault Detection

Transformer-Based Impedance Measurement for Load Monitoring in HEMS.....175
Ismail Aouichak, Mohamad Nour, Yves Raingeaud, Jean-Charles Le Bunetel

Partial discharge characteristics of the void defect inside a 126 kV GIS post insulator.....181
Feng Chen, Mao Li, Peng Bao, Xing Li, Yang Liu, Dengwei Ding

A New Period Estimation Method Suitable for Anomaly Detection of Machinery : Solving Octave Error Problem
.....186
Shugo Terasawa, Yukihiko Kamiya

Research on Transformer Health State Assessment Method Based on Fusion of Deep Feature Modeling and
Adaptive Optimization.....192
SiYu Hu, XiaoLan Wang, Liang He, DongYang He, TongGe Fu, RunDong Li, YuYao Guan, ZongKai Wei

Machine Learning Enhances Fault Localization in Network Distribution Systems.....198
SangHyeon Lee, YongJoo Jeon, DongYeong Gwon, YunHyuk Choi

Identifying Heat-Critical Zones in EV Power Cable Systems Under Load Conditions204
*Safarudin Gazali Herawan, Sharon Yemima, Azqy Nur Farenzy Saputra, Bangkit Pramesta Yulianto, Henry
Ananda Chang, Heri Ngarianto, Rida Zuraida, Mohd Zaid Bin Akop*

Analysis of a Typical Discharge Anomaly in a 220kV GIS Basin Insulator210
Jiajun Song, Xinyu Luo, Yuyao Guan, Jing Zhang, Liang He, Yuhang He

Anomaly detection method for oil-immersed power transformer based on isolation forest and Autoencoder .214
Chunlei Liu, Peiyong Yu, Xiaolong Zhao, Minhao Hu, Wei Yang, Ziwei Zhang

Early Trend Warning Strategy Based on GA-SVR Prediction for Gases Generated in Mineral Oil-Immersed
Transformers.....220
Guowen Hao, Mengyu Shao, Bowen Zhang, Ning Yang, Yanda Wang

Class A Certification of Power Quality Analyzers: Essential Standards and Compliance Verification225
Krzysztof Chmielowiec

6. Renewable Energy Systems and Sustainable Technologies

The Characterisation of Powerline Communicationbased Smart Battery Cells in Future Energy Storage System
and Electric Vehicles.....233
He HAO, Matthew D. Higgins, James Marco, Timothy A. Vincent

European Bioenergy Pathways for the Green Transition in Rural Sectors: Demonstration Activities and
Economic Analysis of Novel Support Schemes.....239

Jernej Jozic, Jernej Zupancic, Edin Lakic, Matej Pecjak

Design of a Bioinspired Sea Urchin Triboelectric Nanogenerator for Wave Energy Harvesting on Uncontrolled Shoreline Waves.....245

John Antonio C. Mojica, Conrado F. Ostia Jr., John Vincent A. Yapoyco

Techno-Economic Analysis of Peak Shaving Using Smart Charging Techniques and Controllable Chillers251

Hamad Albeshr, Gagandeep Singh Dua, Faisal Sattar, Ali Al Marzooqi, Ali Husnain, Sajan K Sadanandan, Tareq Ghaoud

Enhancing the Efficiency of Luminescent Solar Concentrators by Reducing Reabsorption Loss Through Modular Integration257

Jerson Peter S. Misa, Gabriel R. Mari, Joseph Bryan G. Ibarra

Design Of Hybrid Charging Station for Electrical Vehicles with Web-Based Monitoring System and MySQL DataBase.....264

Fathur Habib Maulana Herman, Happy Aprillia, Riza Hadi Saputra

7. Advanced Computation and Intelligent Optimization

Synchronizing Supervisory Setpoint Controller with Local Predictive Controller for Adaptive Heating System Operation270

Ahmad Esmaeilzadeh, Mohamed Hamdy

Voiceprint Recognition Method for Urban Rail Power Transformers Based on Data Augmentation and Multi-domain Fusion.....277

Shangmin Zhou, Liang chen, Wei Zheng, Lifeng Zhang, Gang Li, Junfeng An

Characteristics of Parasitic Impedance in Coaxial Cables on Low-Frequency AC Measurement.....284

Thamonwan Natteetong, Jutarat Tanarom, Ploybussara Gomasang

Parallel Quantum Predator Prey Brain Storm Optimization for Unit Commitment.....289

Yusuke Kawauchi, Hiroyuki Mori, Shoichi Urano, Hsiao-Dong Chiang

Toward Energy Efficiency: Enhancing the Optimal Cable Model by Including Indirect Factors.....295

Abdulla Aldabbous, Kotb B. Tawfiq, Massimo Mitolo, Chun-Lien Su

Author Index