

2025 Workshop on Communication Networks and Power Systems (WCNPS 2025)

**Brasilia, Brazil
27-28 November 2025**

IEEE Catalog Number:
ISBN:

CFP25O04-POD
979-8-3315-7076-7



Copyright © 2025, IEEE

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:	CFP25O04-POD
ISBN (Print-On-Demand):	979-8-3315-7076-7
ISBN (Online):	979-8-3315-7075-0
ISSN:	2768-0037

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

TABLE OF CONTENTS

Influence of Cut-In and Cut-Out Speeds on Tidal Current Turbine Power Generation	1
<i>Anna D. E. F. Rocha, Edna R. da Silva, Diego L. S. Cosme, Ramiro R. Camacho, Osvaldo R. Saavedra Arcilan T. Assireu</i>	
Estimation of 5G Core Power Consumption for Open RAN Deployments	8
<i>Jean Z. Correia, Fuad M. Abinader, Ivan Aldaya</i>	
Incorporating Exogenous Variables into AI Models for Electricity Demand Forecasting: A Comparative Analysis	14
<i>Yan T. de Oliveira, José Oniram de A. Limaverde Filho, Eugênio Fortaleza, Eduardo Liberato</i>	
Exogenous Variable Modeling Strategy for Load Forecasting in Electrical Microgrids	21
<i>Kevin D. Martinez-Zapata, Daniel Ospina-Acero, Jhon J. Granada-Torres</i>	
Lithium-Ion Battery Aging Estimation with Federated Deep Learning	28
<i>Luan L. Santos, Guilherme A. Thomaz, Lucas A. C. Souza, Marcelo L. D. Lanza, Robson F. S. Dias Luís Henrique M. K. Costa, Miguel Elias M. Campista</i>	
Analysis and Prediction of Lithium-Ion Battery Degradation in Equatorial Environments Using a Hybrid Approach	34
<i>Lukas S. S. Macedo, Raphael de S. Nunes, Luiz E. S. e Silva, Iury Bessa, Renan L. P. de Medeiros</i>	
IEEE 13-Bus Analysis in OpenDSS with PVSyst and Storage	41
<i>Rafaela Oliveira Silva de Sena, Mauren Pomalis Coelho da Silva, Guilherme Penha da Silva Júnior</i>	
Reinforcement Learning for Energy-Efficient Resource Management in RAN Slicing	48
<i>Lucas Queiroz Costa, Cleverson Nahum, Andrey Silva, Aldebaro Klautau</i>	
Stochastic Assessment of the Technical and Economic Impacts of Distributed Photovoltaic Generation Across an Entire Electric Utility Associated with Future Projections	55
<i>Izabelle Mour Gomes Rivas, Marcus Vinicius de Resende Maia Leite, Anésio de Leles Ferreira Filho Elder Geraldo Domingues</i>	
Analyzing the Impact of Phase-Locked Loops on Voltage Support Grid Code from Grid-Following Inverter-Based Resources Under Fault Conditions	62
<i>Pedro Henrique de Moraes Martins, Felipe Vigolvinho Lopes, Luciano Sales Barros Karcus Marcelus Colaço Dantas</i>	
Impact of DER Allocation on Security Regions for Distribution Systems	69
<i>João Marcos Rabelo Baccarini, Wesley Peres, João Alberto Passos Filho</i>	
Decentralized Spectrum Sharing: A Proof-of-Concept Evaluation	75
<i>João Gabriel, Edilson Filho, Wilker Feitosa, Carlos F. M. e Silva, Thiago Nóbrega Francisco R. P. Cavalcanti</i>	
Optimal Allocation and Setting of D-FACTS Devices in Power Distribution Systems Using Genetic Algorithm	82
<i>Edivan Q. P. Regis, Jonatas Boas Leite</i>	
Evaluation of Hosting Capacity in Low Fidelity Modeled Grids	89
<i>Ângelo Jerônimo Da Silva Kothe, Davi Oliveira Buarim, Anésio de Leles Ferreira Filho Elder Geraldo Domingues</i>	

Methodology for Building Realistic Network Intrusion Detection Datasets: A Case Study with the Energy-Based Flow Classifier	96
<i>Eduardo Rodrigues de Oliveira, Robson de Oliveira Albuquerque, João José Costa Gondim</i>	
Checking the Representativeness of an Equivalent Inverter-Based Resource Model for Short-Circuit Studies via EMTP Simulations	102
<i>Felipe V. Lopes, Moisés J. B. B. Davi, Murillo C. Vargas, Jéssica F. Alves</i>	
Statistical Evaluation of Machine Learning Classifiers Using Monte Carlo Cross-Validation for Breast Cancer Diagnosis	109
<i>Mateus José Gonsalves Dias, Luso de Jesus Torres, Híterson de Oliveira Silva, Jacquelynn Rose Harmon Raimundo Guimarães Saraiva Júnior, Francisco Assis de Oliveira Nascimento</i>	
Reinforcement Learning to Reduce Papr in Communication Systems	116
<i>Bianca S. de C. da Silva, Luiz A. M. Pereira, Luciano L. Mendes</i>	
Radar Monitoring of Estuarine Fronts in Guanabara Bay, Southeastern Brazil	122
<i>Marcelle Mattos Rios, Marlon da Silva Borges, João Régis dos Santos Filho, Victor Fernandes</i>	
Statistical Approach for Microgrid Fault Analysis Based on Monte Carlo Simulations	128
<i>Saad Aljohani, Pablo Gomez, Erkan Dursun</i>	
Assessment of Leakage Current on Polymeric Insulators Under Non-Uniform Saline Pollution Conditions	135
<i>Ana B. F. Oliveira, Elaine S. Araújo, Johnny H. P. Oliveira, Bruno V. S. Araujo, Gustavo A. Rodrigues George V. R. Xavier, Tarso V. Ferreira</i>	
Opportunities and Challenges in Cybersecurity Governance Through a Systematic Review	141
<i>Nayara Oliveira Sales, Durval Júnior Vargas Vieira, Vicente Ferreira Júnior, Guilherme Dantas Bispo Luiz Antônio Ribeiro Júnior, Clóvis Neumann</i>	
Comparative Analysis of Thermal Profile Alignment Techniques for Surge Arresters	148
<i>J. H. P. de Oliveira, B. V. S. Araujo, G. A. Rodrigues, G. V. R. Xavier, U. D. E. d. S. Lebre, C. A. Cordeiro T. V. Ferreira</i>	
Voltage Variation Estimation in Wind Farms Using Mlp Neural Networks	155
<i>Juan Magalhães B. de Oliveira, Denis V. Coury, Ricardo A. S. Fernandes, Mario Oleskovicz</i>	
Open-Source 5G RAN Platforms: A Dual Perspective on Performance and Capabilities	162
<i>Maria Barbosa, Iasmin Gomes, Vinícius Melo, Kelvin Dias</i>	
A Machine Learning Approach for Detecting Defective Energy Meters	169
<i>Juan M. Home-Ortiz, Ivan De Sousa Oliveira, Vinicius C. Cunha, Vinicius B. F. Da Costa Fernanda C. L. Trindade, Camila Omae, Yulun Ren, Nathan Fernando de Oliveira Fiorini</i>	
Scheduling and Charging Strategies for Electric Buses with Load Profiles for Power Grid Analysis	175
<i>Francisco J. Sánchez F., Thonny E. Mota P., Luis H. T. Bandória, Madson C. de Almeida</i>	
Statistical Analysis of Insulation Leakage Currents Under Pollution Incidence in a 500 kV Substation	182
<i>João Lucas de Castro Lisboa, Johnny H. P. Oliveira, Ulisses D. E. S. Lebre, Charles A. Cordeiro George V. R. Xavier, Tarso V. Ferreira</i>	
Digital Certificate Authentication in HPC: A Technical Review	188
<i>Jaime De Melo Gama Da Silva, Daniel Chaves Café, Clóvis Neumann, Rômulo F. Dos Santos</i>	

Complementarity Analysis of Hydro, Wind, and Solar in Brazilian Hydropower Plants	193
<i>Isabella Branco Renolphi, Walquiria N. Silva, Luís Felipe N. Lourenço</i>	
Enhancing Federated Learning in Massive IoT via Contention Resolution Diversity Slotted ALOHA	200
<i>Daniel Dagostim, Jamil Farhat, Richard Demo Souza</i>	
Residential Load Labeling Using Deep Transfer Learning with MobileNet Architecture	207
<i>Juan S. Corrêa, Ricardo A. S. Fernandes</i>	
Particle Swarm Optimization Algorithm with Adaptive Inertia Applied to Energy Consumption Disaggregation	214
<i>João Paulo S. S. Silva, Juan S. Corrêa, Ricardo A. S. Fernandes</i>	
Neural Network Approaches for Papr Reduction in Ofdm Systems	221
<i>Bianca S. de C. da Silva, Pedro H. C. de Souza, Luciano L. Mendes</i>	
Forecasting Photovoltaic Power Generation with Machine Learning and Genetic Hyperparameter Optimization	228
<i>Breno A Vieira, George R S Lira, Igor M A Santos, Pedro E O Oliveira, Pablo B Vilar Giovanny M B Galdino</i>	
Evolution of the Costs of Distributed Generation Incentives and its Impacts on Energy Tariffs	233
<i>Davi Faula dos Santos, Wadaed Uturbey</i>	
Efficient LLM Tuning: A Multi-Objective Approach for Code Generation	240
<i>Frank B. Morte, Pedro Sousa, Glauco Gonçalves, Aldebaro Klautau</i>	
Development of Test Specimens for Testing the Classification of Partial Discharges Based on Electric Field Analysis	247
<i>Hellen Cléia Moura Mota, George Victor Rocha Xavier</i>	
Comparative Analysis of Vector-Current Control and Power-Synchronization Control in an MMC-HVDC Connected to a Weak Grid	253
<i>Vinícius B. Fetter, Sidelmo M. Silva</i>	
A Performance Analysis of Tree-Based and Deep Learning Models for Predicting Quality of Service in Vehicle-to-Network Communication	259
<i>Luis Alves Correia Filho, André Luiz Carvalho Ottoni, Marcela Silva Novo</i>	
Harmonic Source Identification Under Location Uncertainty: A Behavioral Analysis of the Grey Wolf Optimization Algorithm	265
<i>D. Crnkowise, R. A. S. Fernandes, D. Barbosa, F. B. Costa</i>	
Throughput-Oriented Resource Allocation for TDD NTN with per-UE Constraints	272
<i>Lucas dos S. Fonseca, Victor F. Monteiro, Diego A. Sousa, Tarcisio F. Maciel, Carlos A. M. de Pinho Fco. Rafael M. Lima, Gabriel C. M. da Silva, Abraão de C. Albuquerque, Eduardo L. de Medeiros Sebastian Euler</i>	
Educational Experiments to Demonstrate Theoretical Principles on Traveling Waves Using Low Voltage Circuits	279
<i>D. S. Sarmento, F. V. Lopes, J. S. Silva, A. G. Poma, P. G. M. Leandro, J. L. Nascimento, F. B. S. Carvalho J. M. R. S. Neto, H. D. M. Braz</i>	

Novel FAS Positioning Strategies for Ultra-Dense B5G Network Scenarios	286
<i>Valdemar Farré, José Vega-Sánchez, Juan Estrada, Daniel Riofrío, Juan A. Vásquez Peralvo</i>	
<i>Symeon Chatzinotas, Edgar Eduardo Benítez Olivo</i>	
Reinforcement Learning Approach to Decentralized Control of STATCOM	293
<i>Eric Felipe Garcia Souza, Mariana de Souza, Jonatas Boas Leite</i>	
Optimizer Equilibrium Applied to the Economic Dispatch Problem with Constraints	300
<i>Brunna dos S. Oliveira, Benemar A. de Souza</i>	
Minimization Losses on Network Through Phase Repositioning of Distributed Generation	307
<i>Josias B. Araújo Junior, Benemar A. Souza, Washington L. A. Neves</i>	
Amplified Reflection Attacks Over TCP Exploiting Middleboxes	314
<i>Paulo Victor França De Souza, João José Costa Gondim</i>	
Outage Analysis of TAS-NOMA Systems with Multi-Antenna Users Over α - μ Fading	321
<i>Fernando D. Almeida García, Maria C. Luna Alvarado, Lenin P. Jiménez Jiménez, Gustavo Fraidenraich</i>	
<i>Michel D. Yacoub, Nathaly V. Orozco Garzón, José D. Vega-Sánchez, Henry R. Carvajal Mora</i>	
The Role of Polarization Strategy for Distance Protection in Inverter-Dominated Grids	327
<i>Moisés J. B. B. Davi, Vinícius A. Lacerda, Mário Oleskovicz, Felipe V. Lopes, Oriol Gomis-Bellmunt</i>	
Low-Power AI-Based Port Selection for Fluid Antennas in Spatially Correlated Channels	334
<i>Matheus F. Silva, Pedro M. R. Pereira, Felipe L. S. S. Forza, Felipe A. P. de Figueiredo, Hugerles S. Silva</i>	
<i>Rausley A. A. de Souza</i>	
Metaheuristic Algorithm-Based Parameter Estimation of Permanent Magnet Synchronous Machine for Electric Vehicles	340
<i>Raquel Grillo, Luan Lopes Dos Santos, Rafael S. Chaves, Robson Dias</i>	
Low-Complexity Joint PB Deployment and Beamforming for Wireless Energy Transfer in IoT Networks	346
<i>Natália Pereira Batista, Victoria Dala Pegorara Souto</i>	
Evaluation of Robust Spectrum Sensing Under Correlated and Uncorrelated Impulsive Noise	353
<i>Murilo P. Dos Reis, Pedro M. R. Pereira, Luiz G. B. Guedes, André A. Dos Anjos</i>	
<i>Felipe A. P. de Figueiredo, Rausley A. A. de Souza</i>	
On the Use of Gumbel-Softmax for Differentiable Qam in Semantic Communication	360
<i>Luiz Fernando da Costa Gontijo, Paulo Cardieri</i>	
Cluster Methods Analysis for Defining Electricity Supply Continuity Indicators	367
<i>Giovane Nunes Cornelio Rêgo, Kleber Melo e Silva</i>	
Resource Allocation for Weighted Sum-Rate Maximization in Multiuser Multicarrier Systems with RSMA	374
<i>Francisco Xavier De Araújo Sobrinho, Francisco Rafael Marques Lima</i>	
Teaching Power Swing in Low-Inertia Systems via Didactic Demonstrations in ATP/ATPDraw	381
<i>J. P. Sampaio, F. V. Lopes, L. C. Grilo, A. A. Cruz</i>	
Effect of Slot Size on Inset-Fed Microstrip Patch Antenna Performance in the K-Band	388
<i>Pablo Bertrand, Benigno Rodríguez</i>	

Face Anti-Spoofing Through Perspective Distortion of Facial Landmarks	393
<i>Juan C. Martinez, Manuel Henao, Santiago Perez, Carolina Jimenez, Juan D. Vergara, Jose Gomez Christian Arcos</i>	
Structured Direction and Planning for Cyber Threat Intelligence in the Brazilian Financial System	399
<i>Pedro Henrique Silva Gontijo, Felipe Barreto de Oliveira, Robson de Oliveira Albuquerque João José Costa Gondim</i>	
Quaternion-Based Linear State-Space Approach for Symmetrical Components Estimation	406
<i>Victor do Prado Brasil, Mariana Mota Gomes, João Yoshiyuki Ishihara</i>	
Development of Test Specimens for Testing the Classification of Partial Discharges Based on Electric Field Analysis	413
<i>Hellen Cléia Moura Mota, George Victor Rocha Xavier</i>	
Lora Gateway Placement Through Genetic Algorithm for Wireless Sensor Networks	419
<i>Taciano Prudêncio, Danilo Brito Teixeira De Almeida, Fabrício Braga Soares De Carvalho</i>	
A Discussion About Achievable Data Rates of 5G Single-User MIMO Communications	426
<i>Théo S. Rocha, Roberto B. Di Renna, Victor Fernandes</i>	
Multi-Discipline Analysis of Fiber Networks for 5G Backhaul	432
<i>Renata Mataveli Viti, Jean Zanella Correia, Raphael Prizimich Vico, João Pedro Gosmin, Leandra Abreu Ivan Aldaya</i>	
Evaluation of the Impact of Distributed Energy Resources on Short-Circuit Levels in Electric Power Distribution Networks	438
<i>Leticia D. Bevilaqua Mendes, Ângelo J. Da Silva Kothe, Kleber Melo e Silva</i>	
Downlink Performance Comparison of Cell-Free Massive MIMO and Cellular Massive MIMO Systems	445
<i>Felipe Mota, Walter C. Freitas, Roberto P. Antonioli</i>	