2021 IEEE Texas Power and Energy Conference (TPEC 2021)

College Station, Texas, USA 2 – 5 February 2021



IEEE Catalog Number: CFP21J90-POD ISBN: 978-1-7281-7345-0

Copyright © 2021 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:
 CFP21J90-POD

 ISBN (Print-On-Demand):
 978-1-7281-7345-0

 ISBN (Online):
 978-1-7281-8612-2

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

Distributed Multi-Period DCOPF via an Auxiliary Principle Problem Algorithm	1
Temperature-Triggered Failure Hazard Mitigation of Transformers Subject to Geomagnetic Disturbances	7
Simulation of Polymeric Insulators Ageing Induced by the Impact Energy of Electrons During Partial Discharge Activity	13
An Efficient Direct Torque Control Strategy for a Doubly Fed Induction Generator	19
A White-Box Decision Tree-Based Preventive Strategy for Real-Time Dynamic Security	24
Selective Harmonic Elimination PWM for Cascaded H-bridge Multilevel Inverter with Wide Output Voltage Range Using PSO Algorithm	30
Determining Inertia of 60 Hz Japan Power System using PMUs from Power Loss Event Thongchart Kerdphol, Masayuki Watanabe, Rintaro Nishikawa, Takahiro Tamaki and Yasunori Mitani	36
A Generalized Model For Unified Ac-Dc Load Flow Analysis	41
A Precise Analytical Model of the Grid Connected Cascaded Doubly Fed Induction Machine	47
Brushless Doubly-Fed Induction Machine with Feed-Forward Torque Compensation Control	53
Real-time Power System Simulation with HardwareDevices through DNP3 in Cyber-Physical Testbed	59
Robust Energy Management of Residential Energy Hubs Integrated with Power-to-X Technology	65

Enhanced Finite Control Set Model Predictive Control for a Diode-Clamped Indirect Matrix Converter
Arman Farhadi, Ali Zakerian and Mohammad Tavakoli Bina
Dynamic Cloud and ANN based Home Energy Management System for End-Users with Smart-Plugs and PV Generation
Kumar Nunna
Detecting Behind-the-Meter PV Installation Using Convolutional Neural Networks 83 Sadegh Vejdan, Karl Mason and Santiago Grijalva
A Laboratory Set-Up for Cyber Attacks Simulation Using Protocol Analyzer and RTU Hardware Applying Semi-Supervised Detection Algorithm
Time Disciplined Non-PLL Active Synchronization for Grid Forming Inverters
On the Power Flow Solution in AC Distribution Networks Using the Laurent's Series Expansion
A Scalable Multi-Timescale T&D Co-Simulation Framework using HELICS
Optimal Device Sizing for Zero Energy Buildings: Sensitivity of Nonlinear Model to Uncertainties
Investigation of Limitations in Active Damping Control of LCL Filter Resonance using Inverter Side Current Feedback in Grid Connected Voltage Source Converter
Does Pakistan have enough electricity generation to support massive penetration of electric vehicles?
Monopolar operation of Modular Multilevel DC-DC Converter Based Hybrid Bipolar HVDC Links
Saurav Dey and Tanmoy Bhattacharya
A Comparison Between Conventional Buck and 2-pscB DC-DC Converters
Ecological Uniqueness for Understanding Line Importance in Power Grids
Investigating the Effects of ESS Technologies on High Wind-Penetration Power Grids Considering Reliability Indices

A Novel Methodology to Validate Cyberattacks and Evaluate Their Impact on Power Systems Using Real Time Digital Simulation
Shahbaz Hussain, Atif Iqbal, Stefano Zanero, S. M. Suhail Hussain, Abdullatif Shikfa, Enrico Ragaini, Rashid Alammari and Irfan Khan
Comparative Analysis of Double-Tuned Harmonic Passive Filter Design Methodologies Using Slime Mould Optimization Algorithm
Discrete Fréchet Distance Algorithm-Based Faulty Feeder Selection Method for Flexible Grounding System in Distribution Networks
A High Gain 9L Switched-Capacitor Boost Inverter (9L-SCMI) With Reduced Component Count
Life Cycle Energy Analysis of a Microalgal Based Bioreactor
The Use of Geographic Data Views to Help With Wide-Area Electric Grid Situational Awareness
Design and Control of Bidirectional DC-DC Converter for Active Power Decoupling 190 Varunkumar Rai, Pushkar Saraf and V. S. S. Pavan Kumar Hari
ANN based binary backtracking search algorithm for virtual power plant scheduling and cost-effective evaluation
Impacts Analysis & Field Implementation of Plug-in Electric Vehicles Participation in Demand Response and Critical Peak Pricing for Commercial Buildings
Application of AGPSO Algorithm in Frequency Controller Design for Isolated Microgrid 208 Mahendra Kumar, Seema Agrawal and Tarek Hassan Mohamed
Optimal energy dispatch based on zero bus load flow in microgrid having multiple sources using Fuzzy-Particle Swarm Optimization approach
Computing the Load Margin of Power Systems Using Particle Swarm Optimization 220 Murilo E. C. Bento and Rodrigo A. Ramos
Selecting the Input-Output Signals for Fault-Tolerant Wide-Area Damping Control Design
Conceptualization of Unified Automation Architecture for Photovoltaic based Greenhouse

Bearing Failure Prognostic Method Based on High Frequency Inductance Variation in Electric Railway Traction Motors
, ,
Probabilistic State of Health and Remaining Useful Life Prediction for Li-ion Batteries 24 Antonio Bracale, Pasquale De Falco, Luigi Pio Di Noia and Renato Rizzo
Design and Development of a Portable High Voltage Variable Pulsed Power Source using Flyback Converter and Rotary Spark Gap from a 12V Battery
Reversible Substation Modelling with Regenerative Braking in DC Traction Power Supply Systems
Fulin Fan, Yafang Li, Smail Ziani and Brian Stewart
A Novel Pulse Width Amplitude Modulation for Elimination of Multiple Harmonics In Asymmetrical Multilevel Inverter
Salman Ahmad, Irfan Khan, Atif Iqbal and Syed Rahman
Structural Learning Techniques for Bayesian Attack Graphs in Cyber Physical Power Systems
An Interleaved High Step-Up DC-DC Converter Based on Combination of Coupled Inductor and Built-in Transformer for Photovoltaic-Grid Electric Vehicle DC Fast Charging Systems
Ramin Rahimi, Saeed Habibi, Pourya Shamsi and Mehdi Ferdowsi
PIDD2 Controller Design Based on Internal Model Control Approach for a Non-ideal DC-DC Boost Converter
Mahendra Kumar and Yogesh V. Hote
A Dual-Switch Coupled Inductor-Based High Step-Up DC-DC Converter for Photovoltaic-Based Renewable Energy Applications
A PMU-based Data-Driven Approach for Estimating the Injection Shift Factors
Indirect IMC based PID Controller Design for Single Area LFC System in the Presence of Uncertainty and Communication delay
Optimal Placement and Sizing of Capacitor Banks in Harmonic Polluted Distribution Network
A Data-Driven Solar Irradiance Forecasting Model with Minimum Data
Design of STATCOM Damping Controller Using Teaching Learning Based Optimization 31 Saad Abdul Basit and Mohammad Abido

Reactive Power Compensation and Power Loss Reduction using Optimal Capacitor Placement
M. Hossein Mehraban Jahromi, Pooria Dehghanian, Mohammad Reza Mousavi Khademi and Mehdi Zareian Jahromi
Cross-Platform Real-Time Simulation Models for Li-ion Batteries in Opal-RT and Typhoon-HIL
Xilan Jia, Prottay Adhikari and Luigi Vanfretti
A Mobile Test-Bed for Synchrophasor Technologies Teaching and Demonstration
Modeling and Implementation of Percentage Bias Differential Relay with Dual-Slope Characteristic
Jigneshkumar Desai and Vijay Makwana
Load Frequency Control for Power Systems with I/O Time Delays Via Discrete-Time Prediction-Based Event-Triggered control
Sumant Anand, Ark Dev and Mrinal Kanti Sarkar
Single-Phase Five-level Transformerless Inverter for Multi-String Photovoltaic Applications
Sateesh Kumar Kuncham, Raghavendran Srinivasan, Kirubakaran A and Umashankar Subramaniam
Peer-to-Peer Bundled Energy Trading with Game Theoretic Approach
Daryn Negmetzhanov, H. S. V. Sivanand Kumar Nunna, Pierluigi Siano and Suryanarayana Doolla
Blockchain-based Decentralized Transactive Energy Auction Model with Demand
Response
Impact of EV charging Station Penetration on Harmonic Distortion Level in Utility Distribution Network: A Case Study of Qatar
Abdellahi Ahmed, Atif Iqbal, Irfan Khan, Abdulla Al-Wahedi, Hasan Mehrjerdi and Syed Rahman
Experimental Implementation of PLL for Free-Piston Engine Application
Improved Dual Switch Non-Isolated High Gain Boost Converter for DC microgrid
Application
Fuzzified PaCcET for Economic-Emission Scheduling of Microgrids

Outdoor Performance of crystalline silicon PV modules in Bogotá - Colombia
A Review on Optimal Planning of Distributed Generation in Distribution system and Key Issues
Transient Stability Assessment of a Power System Using Multi-layer SVM Method403 **Qilin Wang, Chengzong Pang and Hashim Alnami**
Low-order Moment Relaxation of ACOPF via Algorithmic Successive Linear Programming
A Primal Dual based Approach to Social Welfare problem for Electric Vehicle Charging 414 $Deepak\ Tiwari\ and\ Vishal\ Verma$
Sequence-to-Sequence Forecasting-aided State Estimation for Power Systems
Attack Resilient Distributed Control for AC Microgrids with Distributed Robust State Estimation
Analysis of Conventional Non-isolated Bidirectional Converters with Smooth Transient Operation
Coordination of Spatially Distributed Electric Vehicle Charging for Voltage Rise and Voltage Unbalance Mitigation in Networks with Solar Penetration
A Novel Sliding Mode Control Method of Interior-Mounted PMSM
Design of an Adaptive Sliding Mode Controller for Rapid Earth Fault Current Limiters in Resonant Grounded Distribution Networks to Mitigate Powerline Bushfires
LMI-Based Optimal Linear Quadratic Controller Design for Multiple Solar PV Units Connected to Distribution Networks
On the Analysis and Design of High-Frequency Transformers for Dual and Triple Active Bridge Converters in More Electric Aircraft
Robust Partial Feedback Linearizing Excitation Controller Design for Higher-Order Synchronous Generator in SMIB Systems to Improve the Transient Stability

Robust Feedback Linearizing Controller Design for DC Microgrid Connected DC-DC	
Converter	473
Md Rasel Mahmud and Hemanshu Pota	
Synthetic, Realistic Transmission and Distribution Co-Simulation for Voltage Control	
Benchmarking	479
Nadia Panossian, Tarek Elqindy, Diana Wallison and Bryan Palmintier	