

2016 IEEE/PES Transmission and Distribution Conference and Exposition (T&D 2016)

**Dallas, Texas, USA
3-5 May 2016**

Pages 1-574



**IEEE Catalog Number: CFP16TAD-POD
ISBN: 978-1-5090-2158-1**

**Copyright © 2016 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 publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP16TAD-POD
ISBN (Print-On-Demand):	978-1-5090-2158-1
ISBN (Online):	978-1-5090-2157-4
ISSN:	2160-8555

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

TD 2016

Table of Contents

(Filenames used are shown)

Panel Session

Session Type: Panel Session
Chair: Ning Lu, North Carolina State University
Co-Chair: Pengwei Du, ERCOT
Sponsored by: Energy Development and Power Generation

Overview: Cost Benefit Study of GHG Mitigation
& Adaptation Technologies

Pengwei Du TD2016-000513.PDF....N/A

Cost-Effective Energy Storage Applications

Michael Kintner-Meyer TD2016-000516.PDF....N/A

Cost Benefit Study: SST Powered DC/AC Hybrid
Microgrid

Mesut Baran TD2016-000515.PDF....N/A

Cost benefit study: Operation of High PV
Penetration Distribution Systems

Matthew Rylander TD2016-000514.PDF....N/A

Cost Benefit Study: VVO and FLSR Applications

Frederic dubois TD2016-000517.PDF....N/A

Cost-Effective Home/Building Energy
Management Systems

Ning Lu TD2016-000512.PDF....N/A

Panel Session

Session Type: Panel Session
Chair: Bob Uluski, Utility Integration Solutions
Sponsored by: Transmission and Distribution

Requirements for DERMS integration with
Microgrids

Jianhui Wang TD2016-000505.PDF....N/A

Grid Interactive Microgrid Controllers

Arindam Maitra TD2016-000506.PDF....N/A

Status of industry efforts to standardize DMS
DERMS Efforts

Jim Reilly TD2016-000507.PDF....N/A

Forecasting & mitigating intermittent DER
impacts on electric distribution systems

Tom Bialek TD2016-000508.PDF....N/A

Panel Session

Session Type: Panel Session
Chair: Brian Johnson, University of Idaho
Sponsored by: Transmission and Distribution

Planning for HVDC Projects

Michael Henderson TD2016-000489.PDF....N/A

Overview of VSC HVDC

Neil Kirby TD2016-000490.PDF....N/A

Overview of LCC HVDC

Brian Johnson TD2016-000491.PDF....N/A

Changing/Optimizing Electric Power Networks by Using Flexible HVDC Technologies

Alex Wang TD2016-000492.PDF....N/A

Paper Forum

Session Type: Paper Forum
Chair: Manuel Avendano, ComEd
Sponsored by: PSACE

A Novel Newton-Raphson Algorithm for Power Flow Analysis in the Presence of Constant Current Sources

Nazila Rajaei; Mohammed Ahmed and TD2016-000030.PDF....1

Magdy Salama

geolocation of utility assets using omnidirectional ground-based photographic imagery

Andrea Mammoli; Hisham Tariq; Thomas TD2016-000136.PDF....6

Caudell and John Simmins

Distribution System Low-Voltage Circuit Topology Estimation using Smart Metering Data

Jouni Peppanen; Matthew J. Reno; Robert TD2016-000142.PDF....11

J. Broderick and Santiago Grijalva

Distributed Energy Management for Supply- Demand Coordination in a Smart Grid

Yihe Zhang; Ling Gao and Yinliang Xu TD2016-000213.PDF....16

Weighted sum approach using Parallel Particle Swarm Optimization to Solve Multi-objective Energy Scheduling

Nuno Borges; Joao Soares; Zita Vale and TD2016-000233.PDF....21

Bruno Canizes

Distributed Control for Multiple Battery Energy Storage Systems in a Microgrid

Qiang Wan; Wenping Zhang; Yinliang Xu TD2016-000239.PDF....26

and Irfan Khan

A Robust Load Shedding Strategy for Microgrid Islanding Transition

Guodong Liu; Bailu Xiao; Michael Starke; TD2016-000312.PDF....31

Oguzhan Ceylan and Kevin Tomsovic

PMU-based Reduced-order Modeling of Power System Dynamics via Selective Modal Analysis

Benjamin Wiseman; Yang Chen; Le Xie TD2016-000313.PDF....36

and P. R. Kumar

Improving Robustness and Modeling Generality for Power Flow Analysis

Marko Jereminov; David Bromberg; Xin TD2016-000381.PDF....41

Li; Gabriela Hug and Larry Pileggi

<u>Accuracy of Clustering as a Method to Group Distribution Feeders by PV Hosting Capacity</u> Robert Broderick; Karina Munoz-Ramos and Matthew Reno	TD2016-000402.PDF....46
<u>Critical Line Identification for Hypothesized Multiple Line Attacks against Power Systems</u> Ming Wang; Yingmeng Xiang; Lingfeng Wang; David Yu and Jie Jiang	TD2016-000431.PDF....51
<u>Effects of Solar and Wind Generation Integration on Feeder Hosting Capacity</u> Dimitra Apostolopoulou; Kyriakos Anastasopoulos and Shay Bahramirad	TD2016-000435.PDF....56

Paper Forum

Session Type: Paper Forum
Chair: Julio Romero, Quanta Technology
Sponsored by: Power System Operations

<u>Dynamic Economic Dispatch for Microgrids: A Fully Distributed Approach</u> Weiye Zheng; Wenchuan Wu; Boming Zhang; Hongbin Sun; Qinglai Guo and Chenhui Lin	TD2016-000010.PDF....61
<u>A Comprehensive Comparison of Current Operating Reserve Methodologies</u> Ibrahim Krad; Eduardo Ibanez and Wenzhong Gao	TD2016-000043.PDF....64
<u>Wind Power Ramping Product for Increasing Power System Flexibility</u> Mingjian Cui; Jie Zhang; Hongyu Wu; Bri-Mathias Hodge; Deping Ke and Yuanzhang Sun	TD2016-000056.PDF....69
<u>Experimental Study of Battery Energy Storage Systems Participating in Grid Frequency Regulation</u> Youngjin Kim	TD2016-000111.PDF....74
<u>Impacts of Short-Term Solar Power Forecasts in System Operations</u> Eduardo Ibanez; Ibrahim Krad; Erik Ela and Bri-Mathias Hodge	TD2016-000120.PDF....79
<u>A New Co-optimization Model for Grid Scale Storage Units in Energy and Frequency Regulation Markets</u> Amirsaman Arabali; Babak Asghari and Ratnesh Sharma	TD2016-000137.PDF....84
<u>Outage Evaluation Integrated with Multi-time Network Study in Energy Management Systems</u> Song Zhang; Wei Qiu; Weiguo Wang; Davis Hwang; Ferdinand Furigay and Jose Casanova	TD2016-000179.PDF....89
<u>Impacts of Rooftop Solar Panels on Network Reconfiguration Problem</u> Gokturk Poyrazoglu	TD2016-000188.PDF....94
<u>Managing Uncertainties in Multi-Market Environment: A Risk-Related Approach</u> Yuqian Song and Jin Zhong	TD2016-000277.PDF....99
<u>Chance Constraint Based Risk-Aware Optimal Power Flow for Cascading Failure Prevention</u> Chao Luo; Jun Yang; Yufei Tang; Haibo He and Mingsong Liu	TD2016-000309.PDF....104

<u>Probabilistic Impact of Transmission Line Switching on Power System Operating States</u> Payman Dehghanian and Mladen Kezunovic	TD2016-000380.PDF....109
<u>Stochastic Unit Commitment basec on ARIMA Scenario Generation and Reduction</u> Guangyuan Zhang and Wanning Li	TD2016-000385.PDF....114

Paper Forum

Session Type: Paper Forum
Chair: Dimitra Apostolopoulou, ComEd
Sponsored by: Transmission and Distribution

<u>43 km Double-Circuit AC 380 kV Submarine-Land Cables in Italy between Sicily and Calabria</u> Roberto Benato; Sebastian Dambone Sessa; Riccardo De Zan; Maria Rosaria Guarniere; Giuseppe Lavecchia and Paolo Sylos Labini	TD2016-000012.PDF....119
<u>Sequence Impedances for High Phase Order Power Transmission Systems</u> G. Heydt and Brian Pierre	TD2016-000035.PDF....124
<u>A Categorization of Converter Station Controllers Within Multi-terminal DC Transmission Systems</u> Roni Irnawan; Filipe Faria da Silva; Claus Leth Bak and Tom Chresten Bregnhøj	TD2016-000128.PDF....129
<u>Assessment of Distributed Generation Influences on Fuse-Recloser Protection Systems in Radial Distribution Networks</u> Keaton Wheeler; Mohamed Elsamahy and Sherif Faried	TD2016-000148.PDF....134
<u>Analysis of Fault-Induced Delayed Voltage Recovery Using EMTP Simulations</u> Krishnanjan Gubba Ravikumar; Scott Manson; John Undrill and Joseph Eto	TD2016-000171.PDF....139
<u>LIGHTNING OUTAGE TRANSMISSION LINE RELIABILITY IMPROVEMENT WITH SURGE ARRESTERS</u> Carlos ROMUALDO TORRES; Miguel RAMIREZ GONZALEZ and Antonio ESCAMILLA PAZ	TD2016-000242.PDF....144
<u>Improved Method for Locating Faults Upstream from Distributed Generation</u> Kyung Woo Min; Swagata Das and Surya Santoso	TD2016-000244.PDF....149
<u>An Approximate Method for Voltage Sensitivity Calculation in Unbalanced Distribution Systems</u> Reza Jamalzadeh and Mingguo Hong	TD2016-000283.PDF....154
<u>Resiliency Testing of Overhead Distribution Components and Systems</u> Joe Potvin and Tom Short	TD2016-000302.PDF....159
<u>Automatic Subtransmission Fault Location System using Power Quality Monitors</u> Daniel Sabin; Andrew Dettloff and Paul Golden	TD2016-000329.PDF....164
<u>Power Flow Solution for Multi-Frequency AC Power Systems</u> Quan Nguyen	TD2016-000369.PDF....169

Grid Edge Control: A New Approach for
Volt-VAR Optimization

Rohit Moghe; Damien Tholomier; Deepak
Divan; Joe Schatz and Dexter Lewis

TD2016-000460.PDF....174

Panel Session

Session Type: Panel Session
Chair: Mark Halpin, Auburn University
Sponsored by: Transmission and Distribution

Statistical Harmonic Limits: 95th and 99th
Percentiles

Math Bollen

TD2016-000475.PDF....N/A

Application Principles of IEEE Std 519-2014

Mark Halpin

TD2016-000476.PDF....N/A

Measurement Techniques and Parameters for
Harmonics and Interharmonics

Rich Bighma

TD2016-000477.PDF....N/A

Applying Harmonic Limits

David Mueller

TD2016-000478.PDF....N/A

Interharmonic Limits in 519-2014

Erich Gunther

TD2016-000479.PDF....N/A

Panel Session

Session Type: Panel Session
Chair: Jeff Wang, Engineering & Technology Solutions, Inc.
Sponsored by: Transmission and Distribution

Transmission Line Asset Management through
Conductor Motion Management

Jeff Wang

TD2016-000488.PDF....N/A

Panel Session

Session Type: Panel Session
Chair: Robert Nelson, Siemens
Sponsored by: Transmission and Distribution

Proposed Advanced Grid Interconnection
Requirements for Distributed Energy Resources in
IEEE 1547 Revision

Animul Huque

TD2016-000481.PDF....N/A

Finding a Balance - Bulk Power System
Performance and Mandates

Jessica Bian

TD2016-000482.PDF....N/A

ERCOT Practices for Voltage Support for Wind
Generation Resources

Fred Huang

TD2016-000483.PDF....N/A

CAISO's Proposed Reactive Power Requirements
for Renewable Resources

Clyde Loutan

TD2016-000484.PDF....N/A

Ontario IESO Requirements for Voltage and
Reactive Regulation for Renewable Power Plants

Stephen Burns

TD2016-000487.PDF....N/A

Coordination of Controls of Renewable Power
Plants to Meet Steady State and Dynamic
Response Requirements for Voltage Control and
Reactive Power Supply

James Feltes

TD2016-000485.PDF....N/A

<u>Advanced Concepts in Volt/Var Control of GE Renewables Plants</u>	
Matthew Richwine	TD2016-000486.PDF....N/A
<u>Summary of Best Practices for Voltage Regulation in Renewable Power Plants</u>	
Robert Nelson	TD2016-000480.PDF....N/A

Poster Session

Session Type: Poster Session
Sponsored by: Energy Development and Power Generation

<u>Microgrid Load Management and Control Strategies</u>	
William Moran	TD2016-000130.PDF....179
<u>Generation and Evaluation of photovoltaic Forecasts based on freely available Weather Data</u>	
Alexander Zeh; Christoph Hainzinger and Rolf Witzmann	TD2016-000132.PDF....183
<u>Multi-Objective Reconfiguration of Radial Distribution Systems using Reliability Indices</u>	
Nikolaos G. Paterakis; Andrea Mazza; Sergio F. Santos; Ozan Erdinc; Gianfranco Chicco; Anastasios G. Bakirtzis and Joao Catalao	TD2016-000166.PDF....188
<u>Locational Sensitivity Investigation on PV Hosting Capacity and Fast Track PV Screening</u>	
Fei Ding; Barry Mather; Nathan Ainsworth; Peter Gotseff and Kryi Baker	TD2016-000169.PDF....189
<u>Allocation of Plug-In Vehicles' Parking Lots in Distribution Systems considering Network-Constrained Objectives</u>	
Nilufar Neyestani; Maziar Yazdani-Damavandi; Miadreza Shafie-Khah; Javier Contreras and Joao Catalao	TD2016-000195.PDF....194
<u>Modeling Operational Behavior of Plug-in Electric Vehicles' Parking Lot in Multi-Energy Systems</u>	
Maziar Yazdani-Damavandi; Mohsen Parsa Moghaddam; Mahmoud-Reza Haghifam; Miadreza Shafie-khah and Joao Catalao	TD2016-000198.PDF....195
<u>Stochastic Modeling of Multi-Energy Carriers Dependencies in Smart Local Networks with Distributed Energy Resources</u>	
Nilufar Neyestani; Maziar Yazdani-Damavandi; Miadreza Shafie-khah; Gianfranco Chicco and Joao Catalao	TD2016-000199.PDF....196
<u>Risk Constrained Offering Strategy of Wind Power Producers considering Intraday Demand Response Exchange</u>	
E. Heydarian-Forushani; M. Parsa Moghaddam; M. K. Sheikh-El-Eslami; M. Shafie-khah and Joao Catalao	TD2016-000200.PDF....197
<u>Dimensioning and Control of Energy Storage Systems for Renewable Power Leveling</u>	
Stefan Henninger; Johann Jaeger and Hubert Rubenbauer	TD2016-000252.PDF....198
<u>Optimal Wind Reversible Hydro Offering Strategies for Midterm Planning</u>	

Agustín A. Sánchez de la Nieta; Javier Contreras; José Ignacio Muñoz and Joao Catalao

TD2016-000331.PDF....203

Poster Session

Session Type: Poster Session
Sponsored by: Electric Machinery

Dynamic Performance of Residential Motor Loads

richard bravo

TD2016-000349.PDF....204

Dynamic Performance of Air Conditioners with Variable Frequency Drive

richard bravo and Matthew Norwalk

TD2016-000350.PDF....209

Poster Session

Session Type: Poster Session
Sponsored by: Emerging Technologies Coordinating

Investigate the Impacts of PEV Charging Facilities on Integrated Electric Distribution System and Electrified Transportation System

Jingwei Xiong; Kuilin Zhang; Yi Guo and Wencong Su

TD2016-000066.PDF....214

Compact Gas-insulated Systems for High Voltage Direct Current Transmission: Design and Testing

Uwe Riechert; Ueli Straumann; Robin Gremaud and Magnus Callavik

TD2016-000260.PDF....215

Compact Gas-insulated Systems for High Voltage Direct Current Transmission: Basic Design

Uwe Riechert; Ueli Straumann and Robin Gremaud

TD2016-000264.PDF....220

Frequency Behavior of Variable Renewable Energy Sources during Power Deficiency Events

A. Rahouma, R. El-Azab, M. Adma, A. Amin

TD2016-000333.PDF....225

Understanding Grid Parity - A look into the future of Solar PV

Austin Rosenbaum and Wenzhong Gao

TD2016-000434.PDF....231

Panel Session

Session Type: Panel Session
Chair: Daniel Sullivan, Mitsubishi Electric Power Products Inc
Sponsored by: Substations

Planning and Specification of Dynamic Reactive Compensation

Doug Mader

TD2016-000500.PDF....N/A

Dynamic Reactive Compensation Technology and Specification

Gregory Reed

TD2016-000501.PDF....N/A

FACTS Applications and Experiences at First Energy

Joe Browning

TD2016-000499.PDF....N/A

FACTS Applications and Experiences at Dominion Virginia Power

Mark McVey

TD2016-000498.PDF....N/A

FACTS Applications and Experiences at Oncor Electric

Todd Rosenberger

TD2016-000510.PDF....N/A

Poster Session

Session Type: Poster Session
Sponsored by: Intelligent Grid Coordinating

The Design and Implementation of the Enterprise
Level Data Platform and Big Data Driven
Applications and Analytics

Hesen Liu; Jiahui Guo; Wenpeng Yu; Tao
Xia; Rui Sun; Matthew Gardner; Lin Zhu
and Yilu Liu TD2016-000016.PDF....236

Two-Stage Economic Operation of
Microgrid-Like Electric Vehicle Parking Deck

Yi Guo; Jingwei Xiong; Shengyao Xu and
Wencong Su TD2016-000065.PDF....241

Distributed Load Shedding over Directed
Communication Networks with Time Delays

Tao Yang and Di Wu TD2016-000306.PDF....242

Smart Grid Testbed for Wide-Area Monitoring
and Control Systems

Aaron St. Leger; Jeremy Spruce; Thomas
Banwell and Michael Collins TD2016-000332.PDF....247

Resilient Operation of Multiple Energy Carrier
Microgrids

Saeed Manshadi and Mohammad
Khodayar TD2016-000375.PDF....252

A Decision Tree Based Approach for Controlled
Islanding of Microgrids

Riyasat Azim and Fangxing Li TD2016-000382.PDF....253

A Preliminary Communication-Assisted Hybrid
Control Strategy for Maximum Reliability and
Efficiency in Smart Grids

Ahsan Shahid TD2016-000384.PDF....258

Advanced Inverter Functions and Communication
Protocols for Distribution Management

Adarsh Nagarajan; Bryan Palmintier and
Murali Baggu TD2016-000406.PDF....263

Neuro-Fuzzy Based UPQC Controller for Power
Quality Improvement in Micro Grid System

Udaya Kishan Renduchintala and
Chenzong Pang TD2016-000414.PDF....268

Optimal Planning of Urban Microgrids with an
Energy Management System

Mike Quashie and Geza Joos TD2016-000430.PDF....273

Predictive Scheduling for Electric Vehicles
Considering Uncertainty of Load and User

Behaviors TD2016-000432.PDF....278

Bin Wang; Rui Huang; Yubo Wang;
Hamidreza Nazaripouya; Charlie Qiu;
Chi-cheng Chu and Rajit Gadh

Poster Session

Session Type: Poster Session
Sponsored by: Insulated Conductors

Optimization of a very low frequency (VLF)
high-voltage cable test system

Stefan Eberharter; Wolfgang
Kemmetmueller and Andreas Kugi TD2016-000090.PDF....283

Ethylene Alkene Elastomers for Cable Insulation
Applications

Paul Brigandi; Paul Caronia; Stephen
Cree; Morgan Hughes and Colin Li Pi
Shan TD2016-000107.PDF....288

<u>A Next Generation Advanced Water Tree-Retardant Crosslinked Polyethylene Insulation for Long Life Power Cables</u> Paul Caronia; Paul Brigandi; Timothy Person and Stephen Cree	TD2016-000110.PDF....293
<u>Technical Considerations for Applying Trenchless Technology Methods to Underground Power Cables</u> Earle C. (Rusty) Bascom, III; James Williams and Mark Kwilinski	TD2016-000133.PDF....298
<u>Crosslinked Polyethylene Insulation Materials Technology for Reduction of Cable Degassing Time</u> Yabin Sun and Timothy Person	TD2016-000288.PDF....303
<u>Localized PRPD Pattern for Defect Recognition on MV and HV Cables</u> Daniel Götz; Hein Putter; Frank Petzold; Sacha Markalous and Marco Stephan	TD2016-000340.PDF....307
<u>Early Warning of Water Tree Presence in Long Distance Underground Cable Through Extrapolation-Comparison Method</u> Qi Chen and Xufeng Xu	TD2016-000443.PDF....311

Poster Session

Session Type: Poster Session
Sponsored by: Marine Systems Coordinating

<u>Stability Analysis of a Grid-Connected Tidal Power-Generation System</u> Li Wang; Jian-Ming Pan and Anton V. Prokhorov	TD2016-000071.PDF....316
--	--------------------------

Panel Session

Session Type: Panel Session
Chair: Aleksi Paaso, ComEd
Sponsored by: Transmission and Distribution

<u>DELETE ME</u> Aleksi Paaso	TD2016-000520.PDF....N/A
----------------------------------	--------------------------

Paper Forum

Session Type: Paper Forum
Chair: Mehdi Ganji, Willdan Energy Solutions
Sponsored by: Intelligent Grid Coordinating

<u>Solving Distribution Feeder Reconfiguration and concurrent DG Installation problems for Power loss Minimization by Multi Swarm Cooperative PSO algorithm</u> Soumitri Jena and Sushil Chauhan	TD2016-000027.PDF....321
<u>A Fog Computing Solution for Advanced Metering Infrastructure</u> Yu Yan and Wencong Su	TD2016-000067.PDF....330
<u>Micro-Synchrophasor Data for Diagnosis of Transmission and Distribution Level Events</u> Anna Liao; Emma Stewart and Emre Kara	TD2016-000201.PDF....334
<u>Novel Approach to Voltage Control in Microgrid for Optimizing the Active Power Consumption</u> Aisha Pasha and Hatem Zeineldin	TD2016-000212.PDF....339

<u>Univariate Time Series Prediction of Solar Power Using a Hybrid Wavelet-ARMA-NARX Prediction Method</u>	
Hamidreza Nazaripouya; Bin Wang; Yubo Wang; Peter Chu; Hemanshu Pota and Rajit Gadh	TD2016-000224.PDF....344
<u>Optimal Electricity Pricing in a Microgrid Network</u>	
Mosaddek Tushar and Chadi Assi	TD2016-000232.PDF....349
<u>Intelligent System for MV Overhead Feeders Load Control</u>	
WALTER PINHEIRO; Simone Cristina Nunes Araujo; Geraldo Roberto De Almeida; Luis Carlos Casagrande; Alessandro Pedro Dadam; Ayslan De Souza Ferreira and Neissan De Alencastro	TD2016-000285.PDF....354
<u>Simultaneous Participation of Demand Response Aggregators in Ancillary Services and Demand Response Exchange Markets</u>	
M. Shafie-khah; D. Z. Fitiwi; E. Heydarian-Forushani; M. E. H. Golshan and Joao Catalao	TD2016-000310.PDF....358
<u>Dynamic Performance of Residential Electronic Loads during Voltage Deviations</u>	
richard bravo	TD2016-000348.PDF....363
<u>Reference Architecture for Self Healing Distribution Networks</u>	
YVES CHOLLOT and TOM BERRY	TD2016-000390.PDF....368
<u>Cyber Physical Simulation and Remote Testing of Remedial Action Schemes</u>	
Arvind Mallikeswaran; Tanvi Ashwarya; Shwetha Niddodi; Anurag Srivastava; David Bakken and Patrick Panciatici	TD2016-000420.PDF....373
<u>Investigating the Necessity of Distribution Markets in Accomodating High Penetration Microgrids</u>	
Sina Parhizi and Amin Khodaei	TD2016-000427.PDF....378

Paper Forum

Session Type: Paper Forum
Chair: Sahar Hendabadi, CRS Group
Sponsored by: Substations

<u>Challenges of Implementing Substation Hardware Upgrades for NERC CIP Version 5 Compliance to Enhance Cybersecurity</u>	
Joseph Cole	TD2016-000190.PDF....383
<u>Technical Requirements and Design of the Indianapolis Power & Light 138 kV Southwest Static Var Compensator</u>	
Gregory Reed; Brandon Grainger; Mark Kempker; Phillip Bierer; Al Such; Robert Grubb; Daniel Sullivan; Donald Shoup; Bryan Buterbaugh and Jan Paramalingam	TD2016-000192.PDF....388
<u>Architecture Design and Implementation of Substation Dashboard Oriented to O&M Center</u>	
Li Peng; Xu Aidong; Guo Xiaobin; Chen Bo; Chen Haomin; Xi Wei; Yao Hao; Peng Xiangang and Liu Yi	TD2016-000266.PDF....393
<u>New non-conventional instrument transformer (NCIT) - a future technology in gas insulated switchgear</u>	

Patrice Guenther; Holger Heine and Farel Becker <u>Underground Transmission Lines for High Power AC and DC Transmission</u>	TD2016-000318.PDF....398
Michael Tenzer; Hermann Koch and Denis Imamovic <u>345-138 KV Substation Upgrade Project</u>	TD2016-000392.PDF....403
Edward Crockett; James Kerkhoven; Douglas Eakins; Brian Smith and Carl Formento <u>A Topology-Based Model for Two-Winding, Shell- Type, Single-Phase Transformer Inter-Turn Faults</u>	TD2016-000419.PDF....407
Liman Zhuang; Brian Johnson; Xusheng Chen and Edward William <u>Investigation on Frequency Response Analysis Measurement Method for Power Transformer Impedance</u>	TD2016-000033.PDF....412
Tadashi Koshizuka <u>Understanding DGA Techniques and Interpretations</u>	TD2016-000143.PDF....417
Jeff Golarz <u>Vibration Response Analysis of Transformer Winding by Finite Element Method</u>	TD2016-000158.PDF....422
Guochao Qian; Fenghua Wang; Yong Lu and Miaozhong He <u>A Comprehensive Diagnostic Evaluation of Power Transformers via Dissolved Gas Analysis</u>	TD2016-000160.PDF....427
Chris Rutledge and Randy Cox <u>Life Time Analysis of Distribution Transformer Using Experimental Design</u>	TD2016-000423.PDF....432
mohammad heidari kapourchali; Amin Mohsenzadeh; Mojtaba Sepehry; visvakumar aravinthan and chengzong pang	TD2016-000453.PDF....437

Paper Forum

Session Type: Paper Forum
Chair: John McDaniel, National Grid
Sponsored by: Energy Development and Power Generation

<u>Long-Term Solar Generation Forecasting</u> Mohana Alanazi; Abdulaziz Alanazi and Amin Khodaei <u>A Method for Determining the Relationship between Solar Irradiance and Distribution Feeder Loading</u>	TD2016-000008.PDF....442
Phillip Anderson; Brett Efaw and Ellen McKinney <u>Non-frequency sensitive all-pass filter based single-phase PLLs</u>	TD2016-000165.PDF....447
Malek Ramezani; Saeed Golestan and Shuhui Li <u>Asymmetric Fault Ride through Capability Enhancement of DFIG Based Variable Speed Wind Generator by DC Resistive Fault Current Limiter</u>	TD2016-000168.PDF....452
Md Maruf Hossain and Mohd. Hasan Ali <u>Analytical Solution of Dynamic Economic Dispatch Considering Wind Generation</u>	TD2016-000180.PDF....457

Juan M. Lujano-Rojas; Gerardo J. Osório; Miadrez Shafie-khah and Joao Catalao <u>Control of Voltage Source Converters in Wind Farm Based Multi-Terminal HVDC Transmission Systems</u>	TD2016-000197.PDF....462
Mohammad Khenar; Edris Pouresmaeil and Joao Catalao <u>Key Considerations for Deploying Storage at the Edge of the Grid</u>	TD2016-000220.PDF....467
Clifton Black <u>A Probabilistic-based PV and Energy Storage Sizing Tool for Residential Loads</u>	TD2016-000314.PDF....472
Xiangqi Zhu; Jiahong Yan and Ning Lu <u>Transient Stability Enhancement of DFIG Based Variable Speed Wind Generator by Resistive Type Solid State Fault Current Limiter</u>	TD2016-000363.PDF....477
Md Enrad Hossain and Thomas Edgar Wyatt <u>Classification of the Status of the Voltage Supply in Induction Motors Using Support Vector Machines</u>	TD2016-000376.PDF....482
Ramón Pérez; Alexander Aguila and Carmen Vásquez <u>Online Parameter Estimation of Synchronous Generators from Accessible Measurements</u>	TD2016-000051.PDF....487
Taylon Landgraf; Elmer Pablo and Luís Alberto <u>Control of Permanent Magnet Synchronous Motor (PMSM) using Vector control approach</u>	TD2016-000341.PDF....492
NAVONITA SHARMA and AJOY CHAKRABORTY	TD2016-000399.PDF....497

Poster Session

Session Type: Poster Session
Sponsored by: Power & Energy Education

<u>The Impacts of Electric Power Market Simulation on Engineering Education</u> Gokturk Poyrazoglu and HyungSeon Oh <u>Laboratory Experiments to Meet the Educational Needs for the Future Smart Grid Workforce</u>	TD2016-000246.PDF....502
Preetham Goli; Michael Umeano; Wajiha Shireen and Ray Cline	TD2016-000449.PDF....507

Panel Session

Session Type: Panel Session
Chair: Francisc Zavoda, IREQ
Sponsored by: Transmission and Distribution

<u>New mwasurement techniques</u> Francisc Zavoda <u>Changes in probability of interference</u>	TD2016-000493.PDF....N/A
Math Bollen <u>PQ mitigation in Smart Grids</u>	TD2016-000494.PDF....N/A
Jan Meyer <u>DG and PQ in Smart Grids</u>	TD2016-000495.PDF....N/A
Dave Mueller and David Mueller <u>Microogrids and PQ</u>	TD2016-000496.PDF....N/A
Erich Gunther	TD2016-000497.PDF....N/A

Poster Session

Session Type: Poster Session
Sponsored by: Power System Communications

Considerations on the Application of PTPv2 over a PRP network

Gustavo Silvano; Marcelo Dalmas; Higor Rachadel; Carlos Dutra and Marcelo Zapella

TD2016-000289.PDF....512

Protecting the Communication Network at Layer 2

Vivek Umasuthan

TD2016-000337.PDF....517

Poster Session

Session Type: Poster Session
Sponsored by: PSACE

Heuristic Detection of One Type of Erroneous Dynamic Models in Power System Stability Simulations

Mikhail Borodulin

TD2016-000039.PDF....522

Two-Tier Prediction of Solar Power Generation with Limited Sensing Resource

Yubo Wang; Bin Wang; Rui Huang; Chi-Cheng Chu; Hemanshu Pota and Rajit Gadh

TD2016-000060.PDF....527

Nonparametric Regression-Based Failure Rate Model for Electric Power Equipment Using Lifecycle Data

Jian Qiu; Huifang Wang; Dongyang Lin and Benteng He

TD2016-000105.PDF....532

Evaluation of the Adjustable-Speed Pumped Hydro Storage in Systems with Renewable Resources

Nan Li and kory hedman

TD2016-000115.PDF....533

Service Restoration of Distribution Networks Considering Switching Operation Costs and Actual Status of the Switching Equipment

Srdjan Dimitrijevic and Nikola Rajakovic

TD2016-000119.PDF....538

Application of Distributed Series Reactors in Relieving Congestion Costs

Kaveh Rahimi; Himanshu Jain and Robert Broadwater

TD2016-000139.PDF....539

Common Rank Approximation – A new method to speed up probabilistic calculations in distribution grid planning

Marco Lindner and Rolf Witzmann

TD2016-000145.PDF....544

A Real-Time Electricity Price Forecasting Based on the Spike Clustering Analysis

Dawei He and Wei-Peng Chen

TD2016-000150.PDF....549

Economic Dispatch of Wind-Thermal Power System with MW and Ramp Rate Dependent Generator Costs

Mingyang Li; Xuhuan Zou; Wei Wang; Yuguang Niu and Jizhen Liu

TD2016-000186.PDF....554

Real-Time Simulation of Renewable Energy Transactions in Microgrid Context Using Real Hardware Resources

Omid Abrishambaf; Luis Gomes; Pedro Faria; Joao Afonso and Zita Vale

TD2016-000230.PDF....559

<u>An Equivalent Circuit Formulation for Three-Phase Power Flow Analysis of Distribution Systems</u>	
Marko Jereminov; David Bromberg; Amritanshu Pandey; Xin Li; Gabriela Hug and Larry Pileggi	TD2016-000354.PDF....564
<u>Development of a multi stress chamber applied to polymeric equipment of electrical distribution networks</u>	
Sebastião Ribeiro; Marcell A. Brenner; FRANCYELE I. Carvalho; Diego B. Araujo; Albari S. Mendes; Marilda Munaro and Alessandro P. Dadam	TD2016-000410.PDF....569
<u>Application of New Method for Distribution-Wide Assessment of Distributed Energy Resources</u>	
Matthew Rylander	TD2016-000439.PDF....570
<u>Optimal Battery Operation in Frequency Regulation Markets considering its Health Factors</u>	
Parth Pradhan and Rakesh Patil	TD2016-000455.PDF....575
<u>Analyzing Variable Time between N-1-1 Contingencies in Assessing NERC TPL-001-4 Multiple Events Reliability</u>	
Muthanna Al-sarray; Mahmood Saadeh and Roy McCann	TD2016-000457.PDF....580
<u>Reactive Power Compensation for Reliability Improvement of Power Systems</u>	
Mohammed Benidris; Samer Sulaeman; Yuting Tian and Joydeep Mitra	TD2016-000462.PDF....585
<u>Modeling and Evaluating the Capacity Credit of PV Solar Systems Using An Analytical Method</u>	
Samer Sulaeman; Mohammed Ben-Idris; Yuting Tian and Joydeep Mitra	TD2016-000465.PDF....590

Poster Session

Session Type: Poster Session
Sponsored by: Power System Dynamic Performance

<u>An Adaptive Under Frequency Load Shedding Scheme for a Small Island Power System</u>	
Sanjay Bahadoorsingh; Courtney Powell; Arvind Singh and Chandrabhan Sharma	TD2016-000019.PDF....595
<u>Atypical Numerical Effects in Stability Simulations of Large Power Systems</u>	
Mikhail Borodulin	TD2016-000022.PDF....600
<u>Generator Parameter Validation and Calibration Process based on PMU Data</u>	
Neeraj Nayak	TD2016-000151.PDF....605
<u>Implementation of the WECC Composite Load Model for Utilities using the Component-Based Modeling Approach</u>	
Anish Gaikwad; Pouyan Pourbeik and Penn Markham	TD2016-000154.PDF....610
<u>LFC Model for Multi-Area Power Systems Considering Dynamic Demand Response</u>	
Seyyed Ali Pourmousavi Kani; Mehdi Behrangrad; Mohammad Hashem Nehrir and Ali Jahanbani Ardakani	TD2016-000204.PDF....615
<u>Improving Proportional-Resonant Controller for Unbalanced Voltage and Frequency Variation Grid</u>	
Tuan Ngo	TD2016-000218.PDF....620

<u>Estimation of the Bus Admittance Matrix for Transmission Systems from Synchrophasor Data</u> Mahmood Saadeh; Muthanna Al-sarray and Roy McCann	TD2016-000344.PDF....625
<u>Fault Induced Delayed Voltage Recovery (FIDVR) Model Validation</u> richard bravo and David Chassin	TD2016-000351.PDF....630

Poster Session

Session Type: Poster Session
Sponsored by: Power System Instrumentation and Measurements

<u>Eco-Efficient Instrument Transformer</u> Zuoqing (David) Xu; Jonas Oliveira; JinYong Chen; Roberto Cameroni ; Ennio Errico and Worawut Sae-Kok Worawut Sae-Kok	TD2016-000238.PDF....634
<u>Estimating LV Secondary Voltage Drop Using AMI Data for Improved Distribution Management</u> Olivia Leitermann; Vince Martinelli and James Simonelli	TD2016-000273.PDF....639
<u>Analysis and Simulation of Dynamic Performance of PMU According to IEEE C37.118.1-2011 Standard</u> Lucas Barcelos de Oliveira; Marcelo Neujahr Agostini; Adriano Oliveira Pires; Marcelo Dalmas and Sérgio Zimath	TD2016-000286.PDF....644
<u>Application of Wide Area Power System Measurement for Digital Authentication</u> Jidong Chai; Jiecheng Zhao; Wenxuan Yao; Jiahui Guo and Yilu Liu	TD2016-000307.PDF....649
<u>Advanced Metering Infrastructure: Technology and Challenges</u> AJAY KUMAR CHAKRABORTY and NAVONITA SHARMA	TD2016-000400.PDF....654
<u>A Novel Real-Time Based Phasor and Frequency Estimator Capable of Measurements Under Transient Conditions</u> Abouzar Rahmati	TD2016-000471.PDF....659

Poster Session

Session Type: Poster Session
Sponsored by: Power System Operations

<u>Real-time Power System Electromechanical Mode Estimation Implementation and Visualization Utilizing Synchrophasor Data</u> Jiahui Guo; Hesun Liu; Dao Zhou; Jidong Chai; Ye Zhang and Yilu Liu	TD2016-000017.PDF....670
<u>Ground Fault Detection Using Pole Ground Monitoring</u> Mike Cannon	TD2016-000054.PDF....675
<u>Scheduling Maintenance for Reliable Transmission Systems</u> Gokturk Poyrazoglu and HyungSeon Oh	TD2016-000103.PDF....678
<u>Sensitivity Analysis - A Key Element for the Operation of a Flexible Distribution Grid</u> Marco Wagler and Rolf Witzmann	TD2016-000106.PDF....683
<u>Meta-heuristic Reconfiguration for Future Distribution Networks Operation</u> Miguel Hernandez and Gustavo Ramos	TD2016-000116.PDF....688

<u>An Efficient Preprocessing Approach for Uncertainty Consideration in Microgrids</u> Hossein Lotfi and Amin Khodaei	TD2016-000121.PDF....693
<u>Real World Applications for Synchrophasors in the Control Room</u> Dan Brancaccio and Michael Cassiadoro	TD2016-000164.PDF....698
<u>Voltage Stability of Low Frequency AC Transmission Systems</u> Tuan Ngo	TD2016-000193.PDF....703
<u>Integrating Model Based OMS with Ancillary Systems</u> Priyam Chakravarty; Vijayasekar Rajsekar and William Ostrum	TD2016-000208.PDF....708
<u>Integrating Customer Interruption Costs into Outage Management Systems</u> Josh Schellenberg; Barney Speckman and Joseph H. Eto	TD2016-000221.PDF....713
<u>Economic Analysis Optimal Sizing and Management of Energy Storage for PV Grid Integration</u> Bananeh Ansari; Di Shi; Ratnesh Sharma and Marcelo Simoes	TD2016-000299.PDF....717
<u>Centralized Voltage Control Method using Voltage Forecasting by JIT Modeling in Distribution Networks</u> Shunsuke Kawano; Shinya Yoshizawa and Yasuhiro Hayashi	TD2016-000301.PDF....722
<u>Managing the Microgrid Net Load Variability</u> Abdulaziz Alanazi; Mohana Alanazi and Amin Khodaei	TD2016-000319.PDF....727
<u>Tertiary Reactor and Switcher Design Advancements Result in Improved Grid Reliability</u> Joe Rostron; Thomas Speas; Alexander Gaun and Bernhard Froehlich	TD2016-000353.PDF....732
<u>NSMOOGSA for Solving Combined Economic and Emission Dispatch Problem</u> Arup Ratan Bhowmik and Ajay kumar Chakraborty	TD2016-000356.PDF....737
<u>Measuring Concentrated Photovoltaic Impact on Grid Flexibility and Required Storage Based on Analytical Hierarchy Process</u> Ahmed Shetaya; Rasha El-Azab and Amr Amin	TD2016-000367.PDF....742
<u>Financial Compensation Analysis for Voltage Deviation in Power Generation Market</u> Ke Li; Nengling Tai and Shenxi Zhang	TD2016-000372.PDF....747
<u>A Hierarchical Electricity Market Structure for the Smart Grid Paradigm</u> Saeed Manshadi and Mohammad Khodayar	TD2016-000383.PDF....752
<u>K-Means Clustering with a New Initialization Approach for Wind Power Forecasting</u> Mahmoud Ghofrani; Maïke De Rezende; Rasool Azimi and Mohadesseh Ghayekhlou	TD2016-000409.PDF....753
<u>Probabilistic Wind Power Forecasting based on the Laplace Distribution and Golden Search</u> Duehee Lee and Ross Baldick	TD2016-000417.PDF....758

<u>Fast Evaluation of Probabilistic Total Transfer Capability Considering Multiple Wind Farms</u> Xiaochen Zhang; James Thomas and Santiago Grijalva	TD2016-000428.PDF....763
<u>Utilizing Relay Event Reports to Identify Settings Error and Avoid Relay Misoperations</u> Swagata Das and Surya Santoso	TD2016-000441.PDF....768
<u>Improving Operational Planning Study Models with Historical Generation and Load Data</u> Aftab Alam; Jun Zhu; Vincent Frey; Ruili Zhao; Trong Hoang; Sara Larson; Sumit Mundade; Salvador Ruelas and Anastasiya Herasimava	TD2016-000472.PDF....773

Poster Session

Session Type: Poster Session
Sponsored by: Power System Planning and Implementation

<u>Variable Bandwidth Computation for Tap Changer Control in Distribution Grids</u> Eva-Maria Baerthlein; Luca Parolini; Marianne Hartung; Ara Panosyan; Eva Bernal Serra and Rolf Witzmann	TD2016-000044.PDF....778
<u>Incorporating PV Inverter Control Schemes for Planning Active Distribution Networks</u> Sultan Alkaabi; Vinod Khadkikar and Hatem Zeineldin	TD2016-000080.PDF....783
<u>Optimal Energy Management for Microgrid with Stationary and Mobile Storages</u> Yubo Wang; Bin Wang; Tianyang Zhang; Hamidreza Nazari Pouya; Chi-Cheng Chu and Rajit Gadh	TD2016-000222.PDF....784
<u>Multi-temporal Optimal Power Flow for Assessing the Renewable Generation Hosting Capacity of an Active Distribution System</u> Etta Grover-Silva; Robin Girard and Georges Kariniotakis	TD2016-000377.PDF....789
<u>Coordinated planning of distributed energy resources and microgrid network</u> xian guo; He Guo and Haozhong Cheng	TD2016-000424.PDF....794
<u>Distributed Energy Storage Sizing for Microgrid Applications</u> Ibrahim Alsaïdan; Amin Khodaei and Wenzhong Gao	TD2016-000436.PDF....799
<u>Ground Fault Over-Voltage on Sub-Transmission and Distribution Circuit with High Penetration of PV</u> Li Yu and Farid Katiraei	TD2016-000442.PDF....804
<u>From High-resolution Data to High-resolution Probabilistic Load Forecasts</u> Jingrui Xie; Tao Hong and Chongqing Kang	TD2016-000447.PDF....808
<u>Comparison among Series Compensating devices for Transient Stability Enhancement of DFIG Based Variable speed Wind Generator</u> Md Emrad Hossain and Thomas Edgar Wyatt	TD2016-000468.PDF....813

Poster Session

Session Type: Poster Session

Sponsored by: Power System Relaying

Investigation of Naturally Aged Timing Relays’
Service Life by Employing Thermally
Accelerated Aging

Saeed Mohajeryami; Mouna Nagisetty;
Milad Doostan and Zia Salami

TD2016-000059.PDF....818

Detection of cell-level fault conditions within a
photovoltaic array system

Aniemi Umana and A. P. Sakis
Meliopoulos

TD2016-000118.PDF....823

A High-Level Framework for Implementation and
Test of IEC 61850-based Microgrid Power
Management Systems

Keith Gray; John Kumm and Jared Mraz
Hybrid Distance Protection Relay with Rotating
Magnetic Field

TD2016-000196.PDF....828

Boris Korobeinikov; Alexey Ishchenko;
Gennady Zakharov and Dmitry Ishchenko

TD2016-000308.PDF....832

The IEC 60255-121:2014 standard and its impact
on performance specification, testing and
evaluation of distance protection relays

Andrea Bonetti; Murty V.V.S. Yalla and
Stig Holst

TD2016-000458.PDF....837

Poster Session

Session Type: Poster Session

Sponsored by: Stationary Battery

Application of Battery Energy Storage for
Network Vulnerability Mitigation

Ali Moeini

TD2016-000167.PDF....843

Poster Session

Session Type: Poster Session

Sponsored by: Substations

Innovative Approach to the Substation Design
using Building Information Modeling (BIM)
Technology

Mario Kokorus; Wolfgang Eyrich and
Randy Zacharias

TD2016-000015.PDF....848

Experiences in Refurnishing 500kV HeChi Fixed
Series Capacitor Protection and Control System

dechang Wang; qiwen Zhou; fengfeng
Ding; yuanjun Chen; jian Sun; changyin
Zhu; guiping Hu; taixun Fang; qiang Huo;
shuo Xiang; lei Li; hongtao Yang; lingyun
Weng and guangtai Zhang

TD2016-000023.PDF....853

Resolving the Challenges of Multi-Vendor 61850
Vendor Implementations

Anthony Eshpeter

TD2016-000174.PDF....858

An Evolution in Cost Effective Power Utility
Grounding Asset Management: Plan, Design, Build,
Assess & Operate

Darren Woodhouse; Matthew Bale;
Stephen Palmer and William Tocher
Grounding grids break diagnosis with
consideration of underground pipe

TD2016-000214.PDF....864

Cigong Yu; Zhihong Fu; Xiaorui Hu;
Minghui Bao; Yongliang Ji and Shenwu Yu

TD2016-000249.PDF....869

<u>Perimeter Substation Physical Security Design Options for Compliance With NERC CIP 014-1</u> Brian Kelley	TD2016-000293.PDF....874
<u>Strategies of Designing A Large EHV Station Ground Grid with Drastically Different Soil Structures</u> Xuan Wu; Vinod Simha and Ronald Wellman	TD2016-000352.PDF....878
<u>Residual Current Method of Grounding Resistance Measurement in Transmissions Towers with Earth Wire – Part 1: Study of Residual Current in Transmission Towers</u> Rafael Bee; Fabio Retorta; Pedro Block; Henry Salamanca; Diogo Dahlke; Luis Gamboa and Tiago Aquino	TD2016-000401.PDF....883

Poster Session

Session Type: Poster Session
Sponsored by: Transmission and Distribution

<u>An Adaptive Reclosure Scheme for Parallel Transmission Lines with Shunt Reactors</u> Da Lin; Huifang Wang; Shaofei Shen and Benteng He	TD2016-000038.PDF....889
<u>Conductor Corrosion Inspection of Aluminum Conductor Steel Reinforced Transmission Lines</u> Neal Murray; Fabien Besnard; Drew McGuire and Kuni Scisum	TD2016-000055.PDF....890
<u>Probabilistic Approach in Evaluation of Backflashover in 230kV Double Circuit Transmission Line</u> Saeed Mohajeryami and Milad Doostan	TD2016-000058.PDF....895
<u>DC Circulating Fault Current Suppression using a Series Resonant Circuit for a 1000 MW, +/- 500 kV Modular Multilevel Converter Based HVDC System</u> Brandon Grainger; Patrick Lewis and Gregory Reed	TD2016-000074.PDF....900
<u>Converting HVAC to HVDC Grids: A Novel Switched Conductor HVDC Scheme</u> Chang Peng and Alex Huang	TD2016-000082.PDF....905
<u>A Wavelet Entropy Approach for Detecting Lightning Faults on Transmssion Lines</u> Ahmad Abdullah	TD2016-000104.PDF....910
<u>Harmonic Resonance Assessment for Transmission Class Shunt Capacitors</u> G. Heydt; Hardik Patil; Jeffrey Loehr and Thomas LaRose	TD2016-000123.PDF....915
<u>Fault Location Identification of a Hybrid HVDC-VSC System Containing Cable and Overhead line Segments Using Transient Data</u> Hashim Al Hassan; Brandon Grainger; Thomas McDermott and Gregory Reed	TD2016-000138.PDF....920
<u>Different configurations of spacer cable system under multiple stress tests</u> Guilherme da Silva; Marilda Munaro; Sebastião Ribeiro Jr.; Diego Buriti Araujo; Alessandro Pedro Dadam; Felipe d'Aquino and Marcelo H. Oka	TD2016-000147.PDF....925

<u>Application of Parallel Resonance Fault Current Limiter for Fault Ride Through Capability Augmentation of DFIG Based Wind Farm</u> Gilmanur Rashid and Mohd Hasan Ali	TD2016-000149.PDF....930
<u>Electrical Validation of a New Arrangement of Composite Insulators for Series Compensation Platforms</u> Ibrahima Ndiaye; Robert Sellick; Phil Cioffi; Paul Marken; John Kern and Erik Hanson	TD2016-000153.PDF....935
<u>Is Fault Location Killing Our Cable Systems?</u> Benjamin Lanz and Eugene Sanchez	TD2016-000209.PDF....940
<u>An Automated Model Based Fault Locating Method for Distribution Systems</u> Yue Shi and Mesut Baran	TD2016-000231.PDF....945
<u>A Tool for Analysis of Fault Location in Transmission Lines Based in Estimated Transients</u> Cristiano Venturi; Thair Mustafa; Luiz H. Meyer; Sergio H. Cabral; Leandro B. Puchale and Eduardo Freitas	TD2016-000240.PDF....950
<u>Modeling and Control Design of Hybrid – LCC and VSC based – HVDC Systems</u> Christoph Hahn; Andreas Geuß and Matthias Luther	TD2016-000258.PDF....955
<u>Multiple Model Based Fault Localization for HVDC Transmission Systems: Robustness and Real-World Performance</u> Ali Al Hage Ali; Dominic Buchstaller; Bernhard Piepenbreier and Markus Engel	TD2016-000269.PDF....961
<u>Metal Hardware Overhead Networks Selection for Use in Critical Regions at Coastal Aereas using a Simplified Physical Model</u> WALTER PINHEIRO; Simone Cristina Nunes Araujo; Geraldo Roberto De Almeida; Alessandro Pedro Dadam; Lilian Lacerda de Almeida and Sandro Ricardo Levandoski	TD2016-000287.PDF....966
<u>Investigating the Lightning Effect on Compact Transmission Lines by Employing Monte Carlo Method</u> Saeed Mohajeryami and Milad Doostan	TD2016-000346.PDF....971
<u>The Operation of a High Phase Order Transmission System with One Phase Open</u> Nriya Guru; Mohammed Zahid Hussain; Gerald Heydt and Parag Mitra	TD2016-000358.PDF....976
<u>PV Source Integrated Micro-Grid for Power Quality Improvement</u> Pradeep Anjana; VIKAS GUPTA; HARPAL TIWARI and Nitin Gupta	TD2016-000393.PDF....981
<u>Analysis of Power Factor Over Correction in a Distribution Feeder</u> Alvaro Furlani Bastos; Surya Santoso and Levent Biyikli	TD2016-000412.PDF....986
<u>Determination of Switching Sequence of Service Restoration in Distribution Systems: application and analysis on a real and large-scale radial system</u> Marcos Camillo; Rodrigo Fanucchi; Telma Woerle; Leandro Marques; Julio Massignan; Carlos Maciel; Anderson Soares; Alexandre Delbem; Marcel Romero; Michel Bessani and João Bosco	TD2016-000452.PDF....991

London Junior

Poster Session

Session Type: Poster Session

Sponsored by: Transformers

Thermodynamic Estimation of Transformer Fault Severity

James Dukarm and Fredi Jakob

TD2016-000011.PDF....996

Cold Start of a 240 MVA Generator Step-up Transformer Filled with Natural Ester Fluid

Robert Delvecchio and Kevin Rapp

TD2016-000122.PDF....997

Mitigation of Adverse Effects of GICs on Transformers Using Look-Up Table Controlled Ground Resistance

Ahmed AbuHussein and Mohd. Hasan Ali

TD2016-000155.PDF....998

HiDry72: Short-Circuit Withstand Test upon the biggest ever Dry-type Power Transformer

Mariano Berrogain; Rafael Murillo;

TD2016-000234.PDF....1003

Antonio Nogues; Juan Maorad; Martin

Carlen; Miguel Cuesto Gonzalez; Tomas

Gonzalez Garcia; Félix Royo Gimeno and

Flavio Mauri

Acoustic tap-changer analyses using continuous wavelet transformation

Karsten Viereck and Anatoli Saveliev

TD2016-000261.PDF....1008

Minimizing Dielectric Frequency Response

Measurement Time by using Multiple Frequency Signals

Jill Duplessis and Matz Ohlen

TD2016-000300.PDF....1013

Noise Recognition of Transformers Based on

Improved MFCC and VQ

Guochao Qian; Fenghua Wang; Bing Yan and Song Chen

TD2016-000325.PDF....1018

Transformer Oil DGA Monitoring Technology Study 2015

Jason Dennison

TD2016-000359.PDF....1023

Impact of Smart Home Management Strategies on Expected Lifetime of Transformer

Amin Mohsenzadeh; Mohammad Heidari

TD2016-000456.PDF....1028

Kapourchali; Chengzong Pang and

Visvakumar Aravinthan

Panel Session

Session Type: Panel Session

Chair: Michael Beehler, Burns & McDonnell

Sponsored by: Transmission and Distribution

Utility Applications of Energy Storage

Gregg Lemler

TD2016-000502.PDF....N/A

Utility Applications of Energy Storage

Michael Quinn

TD2016-000503.PDF....N/A

Utility Applications of Energy Storage

Nestor Martinez

TD2016-000504.PDF....N/A

Utility Applications of Energy Storage

David Geier

TD2016-000509.PDF....N/A

Utility Applications of Energy Storage

Shay Bahramirad

TD2016-000511.PDF....N/A

Panel Session

Session Type: Panel Session
Chair: Hamidreza Zareipour, Univ. of Calgary
Sponsored by: (PSACE) Economic Systems

Energy Storage System Integration and
Deployment

Kevin Fok TD2016-000521.PDF....N/A

The practices of integrating bulk energy storage
for renewable generation in China

Zechun Hu TD2016-000522.PDF....N/A

Integrating energy storage into the grid

Roger Lin TD2016-000523.PDF....N/A

Distribution Energy Storage Systems

Michael Kleinberg TD2016-000524.PDF....N/A

Stochastic Valuation of Energy Storage Systems

Nanpeng Yu TD2016-000525.PDF....N/A

Distributed Energy Resources and Energy Storage

Andy Marshall TD2016-000526.PDF....N/A

An Economic Evaluation of BESS for Frequency
Regulation in South Korean Power System

Jong Park TD2016-000527.PDF....N/A

Paper Forum

Session Type: Paper Forum
Chair: Masood Parvania, University of Utah
Sponsored by: Power System Planning and Implementation

Comparative Stability Analysis of a DFIG-Based
Offshore Wind Farm Fed to a Multi-Machine
Power System Through an LCC-HVDC Link and
an HVAC Line

Li Wang; Quang-Son Vo and Anton V.
Prokhorov TD2016-000070.PDF....1033

Correlations of topological measures with power
systems vulnerability and identification of
potential locations to install voltage control
devices

Efrain Eduardo Tamayo Ruiz; Shinya
Ohara and Tohru Yoshihara TD2016-000075.PDF....1039

Inertial Response Study on the Year 2030 U.S.
Eastern Interconnection (EI) High Wind Scenario

Gefei Kou; Samantha White; Yilu Liu;
Stanton Hadley and Tom King TD2016-000134.PDF....1044

An Experimental Analysis of the Effect of Icing on
Wind Turbine Rotor Blades

Muhammad Imran Raja; Dil Muhammad
Akbar Hussain and Mohsen Soltani TD2016-000141.PDF....1049

Measurement-based System Reduction Using
Autoregressive Model

Jidong Chai; Yong Liu; Yilu Liu; Navin
Bhatt; Alberto Rosso and Evangelos
Farantatos TD2016-000187.PDF....1054

Automated Critical Clearing Time Calculation for
Analyzing Faults at Entergy

Sharma Kolluri; Mei Li ; Adrian Lazo;
Peng Yu; Michael Vaiman and Marianna
Vaiman TD2016-000259.PDF....1059

<u>Economic Prospects and Market Operations of V2G in Electric Distribution Network</u> Uwakwe Chukwu; Okezie Nworgu; Chika Okezie and Ngozi Chukwu	TD2016-000326.PDF....1064
<u>Investigating Heuristic Methods for Transmission System Expansion Planning</u> Zhi Chen	TD2016-000357.PDF....1069
<u>PMU Deployment Approach for Maximum Observability Considering its Potential Loss</u> Jyoti Paudel; Xufeng Xu and Elham Makram	TD2016-000397.PDF....1074
<u>Market-Based and Resilient Coordinated Microgrid Planning Under Uncertainty</u> Masoud Barati; Aida Khayatian and Gino Lim	TD2016-000411.PDF....1079
<u>Addressing Short Term Voltage Stability Problem – Part I: Challenges and Plausible Solution Directions</u> ASHUTOSH TIWARI	TD2016-000450.PDF....1084
<u>Addressing Short Term Voltage Stability Problem – Part II: A Case Study</u> ASHUTOSH TIWARI and ASHUTOSH TIWARI	TD2016-000451.PDF....1089

Paper Forum

Session Type: Paper Forum
Chair: Amin Khodaei, University of Denver
Sponsored by: Power System Relaying

<u>Including Surge Arresters in the Lightning Performance Analysis of 132kV Transmission Line</u> Saeed Mohajeryami and Milad Doostan	TD2016-000194.PDF....1094
<u>FDTD Analysis About Surge Phenomena Arising on Co-axial Cable</u> Ryoji Oshiro and Eiji Kaneko	TD2016-000241.PDF....1099
<u>An Arbitrary-Resampling-Based Synchrophasor Measurement Algorithm in Compliance with IEEE Std C37.118.1a-2014: Design, Implementation, and Validation</u> Qiao Guo	TD2016-000161.PDF....1104

Additional Papers

<u>Failure Modes in IEC 61850-Enabled Substation Automation Systems</u> Bamdad Falahati and Eric Chua	TD2016-000173.PDF....1109
<u>A Novel Algorithm to Detect Smmetrical Faults during Power Swing for a Double Circuit Multi-Terminal Transmission Line</u> P. Gawande and S. Dambhare	TD2016-000227.PDF....1114
<u>An Analysis of the Performance of Power Circuit Breakers Using a Non-Invasive System</u> T. Mustafa, C. Pitz, H. Almaguer, L. Meyer S. Cabral, F. Flores, J. Cereja, L. Puchale And J. Santos	TD2016-000237.PDF....1121
<u>Optimal Power Flow-Based Generation Shedding for Dynamic Remedial Action Scheme</u> A. Shrestha, V. Cecchi and R. Cox	TD2016-000274.PDF....1125

<u>Zone-2 Setting of Distance Relays using User Defined Time-Inverse Over Current Relay Characteristics</u> M. Singh	TD2016-000330.PDF....1130
<u>Novel Fault Location Algorithm for Transmission Line using Synchronized Measurements</u> T. Hinge and S. Dambhare	TD2016-000355.PDF....1135
<u>Non-conventional Instrument Transformers Enabling Digital Substations for Future Grid</u> R. Thomas, A. Vujanic, D. Xu, J.-E. Sjodin, H. Salazar, M. Yang and N. Powers	TD2016-000386.PDF....1141
<u>Synchrophasor Reference Algorithm for PMU Calibration System</u> C. Qian and M. Kezunovic	TD2016-000371.PDF....1146
<u>Adaptive Instantaneous Overcurrent Powered by Frequency Estimation: a Case Study Using a Real Brazilian System</u> F. Souza, H. Sanca, F. Costa, B. Souza	TD2016-000291.PDF....1151