
SPONSOR
The International Association of Science and Technology for Development (IASTED)

- Technical Committee on Power and Energy Systems

EDITOR
I. Ngamroo – King Mongkut’s Institute of Technology Ladkrabang, Thailand

KEYNOTE SPEAKER
Y. Mitani – Kyushu Institute of Technology, Japan

INVITED SPEAKERS
M. Park – Changwon National University, Korea
E. Ortjohann – South Westphalia University of Applied Sciences, Germany

SPECIAL SESSION ORGANIZERS
S. Kaitwanidvilai – King Mongkut’s Institute of Technology Ladkrabang, Thailand
M. Watanabe – Kyushu Institute of Technology, Japan
A. Ngaopitakkul – King Mongkut’s Institute of Technology Ladkrabang, Thailand
J. Dayou – Universiti Malaysia Sabah, Malaysia
T. Soubdhan – Université Amilcs Guyane, France

TUTORIAL PRESENTER
H. Bevrani – University of Kurdistan, Iran

INTERNATIONAL PROGRAM COMMITTEE
V.G. Agelidis – University of New South Wales, Australia
M. Al-Nimr – Jordan University of Science and Technology, Jordan
P. Balaya – National University of Singapore, Singapore
H. Bevrani – University of Kurdistan, Iran
J.P. Catulio – University of Beira Interior, Portugal
Y. Chen – Pacific Northwest National Laboratory, USA
J. Choi – Chungbuk National University, South Korea
J. Darkwa – The University of Nottingham Ningbo, PR China
J. Dayou – Sabah University of Malaysia, Malaysia
S. Dechanupaprittha – Kasetsart University, Thailand
A. Firas Ismail – International Islamic University Malaysia, Malaysia
L. Goel – Nanyang Technological University, Singapore
R. Gong – Siemens Energy, USA
W. Grega – AGH University of Science and Technology, Poland
Q. Guo – Tsinghua University, PR China
R. Hara – Hokkaido University, Japan
T. Hashiguchi – Kyushu University, Japan
M. Hojo – The University of Tokushima, Japan
K. Hongesombut – Kasetsart University, Thailand
K. Ibrahim – University of Science Malaysia, Malaysia
S. Jangnabhani – Basaveshwar Engineering College, India
P. Jirutitijaroen – National University of Singapore, Singapore
C. Kang – Thammasat University, Thailand
D.N. Ketjoy – Naresuan University, Thailand
J. Krope – University of Maribor, Slovenia
A. Kumar – National Institute of Technology Kurukshetra, India
V.I. Kuprianov – Thammasat University, Thailand
C.F. Lu – Chung Chou University of Science and Technology, Taiwan
N.S. Nasri – University of Technology, Malaysia
A. Ngaopitakkul – King Mongkut’s Institute of Technology Ladkrabang, Thailand
S. Nuchprayoon – Chiang Mai University, Thailand
S. Okamoto – Shimane University, Japan
E. Ortjohann – South Westphalia University of Applied Sciences, Germany
J. Pahasa – University of Phayao, Thailand
U. Palk – Hanyang University, South Korea
T. Phung – University of New South Wales, Australia
C. Rakpenthai – University of Phayao, Thailand
H. Sugihara – Osaka University, Japan
V. Tarateerasath – Srinakharinwirot University, Thailand
T. Tayjannant – Chulalongkorn University, Thailand
D. Thukaram – Indian Institute of Science, India
N.A. Vovos – University of Patras, Greece
M. Watanabe – Kyushu Institute of Technology, Japan
W. Wu – Tsinghua University, PR China
A. Zahedi – James Cook University, Australia
F. Zare – Queensland University of Technology, Australia
Y. Zhou – Tepco System Corporation, Japan

ADDITIONAL REVIEWERS
P. Chiradeja – Thailand
I. Ngamroo – Thailand
C. Jettanase – Thailand
A. Supasuteekul – Thailand
S. Zabihi – Australia
I. Ziari – Australia
# TABLE OF CONTENTS

## AsiaPES 2012

### SPECIAL SESSION ON WIDE AREA MEASUREMENTS FOR POWER SYSTEM SMART MONITORING AND CONTROL

768-111: Power System Controller Design based on Model Identification with Phasor Measurements  
Masayuki Watanabe, Masaru Fukushima, Tomohiro Maeda, and Yasunori Mitani ............................. 1

768-112: Hilbert-Huang Transform and FFT Analysis of Oscillation Characteristics for Japan Power System Based on Campus WAMS  
Qing Liu, Masayuki Watanabe, and Yasunori Mitani ............ 7

768-113: Synchrophasor based Tuning of Damping Controllers for Interconnected Smart Grids with V2G Systems  
Sanchai Dechanupapritth and Yasunori Mitani ............ 13

768-110: PMU based Monitoring and Estimation Power System Dynamic Stability Developed on 50-Hz Power System  
Dikpride Despa, Yasunori Mitani, Masayuki Watanabe, Yaser S. Qudaih, Taro Fujita, Qing Liu, and Michael Bernard ........................................ 18

768-109: Equal-Area Criterion Applied on Power Transfer Corridors  
Emil Hillberg and Trond Toftevaag ..................................... 26

### POWER SYSTEM ANALYSIS

768-038: Effect of Electrode Type on Arc Flash Testings for AC Systems  
Aytug Font, Alper Kara, and Ozcan Kalenderli ............ 34

768-032: New Combined Model of High Impedance Arcing Fault in Overhead Transmission System  
Abdulhamid A. Abohagar and Mohd W. Mustafa ............ 38

768-045: AC Flashover Performance of Porcelain Insulators in Distribution Systems  
Wichit Thippresert and Peerapol Jirapong ...................... 43

Amos O. Anele, John T. Agee, and Adisa A. Jimoh ........ 50

768-030: Optimisation of Power Connections for More Efficient Power Grids in the MENA Region  
Sebastian Dreier and Sören Müller ........................................ 56

Worawat Nakawiro, Istvan Erlich, and Yodsaya Nithipattrarat ........................................ 65

### POWER SYSTEM OPERATION

768-028: A Power Flow Generating Method for Power System Day-Ahead Operation Schedule Validation  
Yi Lin, Hong-bin Sun, Wen-chuan Wu, Jun Yu, and Bo-ming Zhang ........................................ 72

768-063: Predictive Maintenance System for Hydro-Generators  

768-033: Real and Reactive Power Forecast Model for Long Term Demand in Peninsular Malaysia  
Syakirah W. Abdullah, Atishah M. Isa, and Mizzaina Osman ........................................ 85

768-025: Multi-Period Co-Optimization of Energy and Reserves using an Optimal Power Flow Formulation  
Robin Naidoo and Rajendran Naidoo ........................................ 93

768-067: Developing a Dynamic Economic Dispatch Model: The West Doha Power Station Case in Kuwait  
Jamal S. Alsumait ........................................ 101

768-034: Distributed Generator Sizing via Evolutionary Particle Swarm Optimization  
Mohd W. Mustafa, Jasril Jamani Jamian, Muhammad Ariff Baharudin, and Hazlie Mokhlis ........ 108

768-052: Transient Prediction and Small-Signal Stability Analysis using PMU-based Power System Identification  
Pavel V. Chusovitin ........................................ 114

768-059: Largest Normalized Residual Test Analysis for Measurements Gross Errors Processing in the WLS Estimator  
Breno E.B. Carvalho and Newton G. Bretas .............. 121
768-064: Load Model Derivation based on Load Response to Actual Disturbances in Malaysia Power System
Azlan A. Rahim, Mohd F. Hashim, and Mohd F. Mohd Siam ........................................ 128

APPLIED ENERGY

768-062: Energy Savings by Variable-Speed Control of Commercial Pumps
Somchart Chantasiriwan ........................................ 134

768-082: Comparison of Single- and Double-Sided Exciting Linear AC MHD Power Generation
Intani Pattima and Nobuhiro Harada ........................................ 139

768-050: Exergy Analysis and Efficiency in a Ladle Preheating Process
Chatchawas Wuttisirisart, Jakrawat Jaroonsurat, and Pongthorn Charunyakorn ........................................ 145

768-070: Analysis on Streaming Electrification of Vegetable Oil Exposed to Accelerated Aging
Chang-Su Huh and Sun-Ho Choi ........................................ 151

768-065: Simulation of Desulphurization of Synthesis Gas with Aspen Plus
Peter Trop, Jurij Krope, Danijela Dobersek, and Darko Goricanec ........................................ 155

768-069: Processes for Water Scale Elimination in District Heating Systems
Danijela Dobersek, Darko Goricanec, Brina Dojer, Peter Trop, and Dorde Kozic ........................................ 160

SPECIAL SESSION ON ARTIFICIAL INTELLIGENCE IN SMART POWER AND ENERGY SYSTEMS

768-092: PSO-based Learning of Support Vector Machines for Adaptive TCSC
Jonglak Pahasa, Komsan Hongesombut, and Issarachai Ngamroo ........................................ 164

768-098: PSO based Decentralized Robust Power System Stabilizer for a Multi-Machine Power System
Somoyt Kaitwanidvilai, Chanchai Ussawapsitkul, and Worrakun Limeharoen ........................................ 170

768-094: Electrical Line Losses in Distribution System with the Inclusion of Very Small Power Producer
Pathomthai Chiradeja and Chaichan Pothisarn ........................................ 176

768-096: Discriminating Among Inrush Current, External Fault and Internal Winding Fault using Coefficient of DWT
Chaiyan Jettanasen, Jitiphipong Klonjiti, Apichart Yodkhuang, Athapol Ngaopitakkul, and Chaichan Pothisarn ........................................ 182

768-095: Bidirectional Power Controller Design of PHEV for Robust Frequency Control
Issarachai Ngamroo and Chalotorn Rattanapornchay ........................................ 187

768-099: Hybrid P&O-Current Sweep Maximum Power(Point Tracking for Solving Partial Shading Problem in PV System
Surawich Kasempong and Somoyt Kaitwaniidvilai ........................................ 193

SPECIAL SESSION ON INNOVATIVE COMPUTING AND CONTROL IN SMART GRID AND ENERGY SYSTEMS

768-100: Fault Analysis in Wind Power using Discrete Wavelet Transform
Athapol Ngaopitakkul and Apichart Yodkhuang ........................................ 199

768-102: Robust Load Frequency Control in a Smart Microgrid with PHEV-based V2G Control
Sitthieth Vachirasricirikul and Issarachai Ngamroo ........................................ 206

768-104: Development of Low Cost Circuit for ESD/Lightning Counter for Industrial Applications
Somoyt Kaitwanidvilai, Chaiyan Jettanasen, Athapol Ngaopitakkul, and Anuwat Jangwanitlert ........................................ 211

768-107: An Environmental Controlled System for the Flying Height Measurement
Siridech Boonsang, Wittaya Niltarach, and Wanchai Aroonjarernchay ........................................ 214

768-101: Behaviour of Internal Fault and External Fault in Power Transformer using Discrete Wavelet Transform
Athapol Ngaopitakkul and Chaichan Pothisarn ........................................ 218

768-103: Microgrid Stabilization by Electrolyzer with Optimal Fuzzy Gain Scheduling PID Control
Theerawut Chaiyatham and Issarachai Ngamroo ........................................ 226

768-105: Smart “On the Fly Vision” for Smart Manufacturing Inspection System
Somoyt Kaitwanidvilai, Anuwat Jangwanitlert, and Anakkapon Saenthon ........................................ 232

768-108: Uncertainty Analysis of Polarization Interferometric Measurements of Hard-Disk Drive Recording Head-Media Dynamic Spacing
Siridech Boonsang and Wanchai Aroonjarernchay ........................................ 236
SMART GRID

768-017: Empowering the Decentralized Power Systems with Multi-Level Clustering Power Systems Strategy
Wirasanti, Egon Ortjohann, Marius Hoppe, A Schmelter, and Danny Morton ................................. 240

768-060: Demand Side Management for Microgrids through Smart Meters
Kullappu T.M.U. Hemapala and Asitha L. Kulasekera .............................................................. 248

768-066: Dual Layered Multi Agent System for Load Management during Islanded Operation of a Microgrid
Asitha L. Kulasekera, Kullappu T.M.U. Hemapala, and Ranathunga A.R.C. Gopura ........................................... 255

768-024: Status and Future Power Grid using HTS Applications in KEPCO
Kyungsoon Lee, Sungwook Lee, Kyoung Jeong, and Bong-soo Moon .............................................. 260

768-089: Intelligent Systems for the Detection of Internal Faults in Power Transmission Transformers
Ivan N. da Silva and Rogerio A. Flauzino .................................................................................. 263

768-056: RTDS-based Modeling and Simulation of a Microturbine Generation System for Microgrids
Ju-Han Lee, Serim Heo, Gyeong-Hun Kim, Minwon Park, In-Keun Yu, and Jeong-Do Park ............ 270

768-047: Development of Smart Grid in Bangladesh: Challenges and Opportunities
Taskin Jamal, Weerakorn Ongskul, Molla S.H. Lipu, Md. Masum Howlader, and Aziz-Un-Nur I. Saif ............................................................ 275

768-117: Analysis of Fluctuations of Global Sunshine in Guadeloupe
Maina Andre and Jean-Louis Bernard ....................................................................................... 283

PV AND WIND POWER

Van-Tan Tran, Tsai-Hsiang Chen, and Ting-Yen Hsieh ............................................................... 291

768-055: Design and Implementation of a Digital Power Converter for Wind Generator
Zong-Han Liou and Chih-Chiang Hua .................................................................................. 296

768-049: Comparative Analysis of 10 MW Class Superconducting Wind Turbine Generators with Different Types of Drive-Trains
Hae-Jin Sung, Gyeong-Hun Kim, Kwangmin Kim, Minwon Park, and In-Keun Yu ......................... 304

768-029: Performance Evaluation of a Micogrid Including Wind and PV Generation
Mohammed T. Hussain and Abu H.M.A. Rahim .................................................. 309

768-042: Assessment of Renewable Energy Potential at Hengchun in Taiwan
Van-Tan Tran, Tsai-Hsiang Chen, and Ting-Yen Hsieh ......................................................... 316

768-054: A Hybrid Maximum Power Point Tracking Control based on P&O Method for PV Systems
Jin-Yu Zeng, Chih-Chiang Hua, and Tsung-Sum Lee ......................................................... 321

POWER ELECTRONICS

768-074: Derivation of Insertion Loss Equations for EMI Filter Design
Vuttipon Tarateeraseth ........................................................................................................ 326

768-027: Analysis of the Effects of Inverter Ripple Current on the Photovoltaic Power System
Woobin Choi, Wook Kim, and Van-Huan Duong .................................................................. 334

768-051: A Contactless Electromagnetic Induction Charger for Li-Ion Battery
Hung-Ting Hsu and Chih-Chiang Hua ................................................................................ 343

768-053: Design and Implementation of Charge Equalization Circuit for LiFePO4 Batteries
Chih-Chiang Hua, Bo-Yi Li, and Yi-Hsiung Fang .................................................................. 348

768-023: Model Order Reduction of Grid Connected Inverter Model based on System Identification
Nopporn Patcharaprakiti, Jatturit Thongprong, Krisanapong Kirikara, and Jeerawan Saelao ................................................. 355

768-046: Fabrication and Simulation Analysis of a 5 kW Grid-Connected Three-Phase PV-AF-Statcom Power Generation System
Tae-Hun Kim, Hae-Jin Sung, Ju-Han Lee, Serim Heo, Hye-Geun Lee, Gyeong-Hun Kim, Minwon Park, and In-Keun Yu ................................................................. 363

SOLAR AND ENVIRONMENT

768-015: A Solar Concentrator for an Autonomous Heat Production
Jean-Louis Canaletti, Christian Cristofari, and Gilles Notton ............................................. 370

768-091: Solar Desiccant Cooling and Indoor Air Quality for Institutional Building in Subtropical Climate (Review)
Ali M. Baniyounes, Gang Liu, Mohammad G. Rasul, and Masud K. Khan ........................................... 375
768-048: Fluorescent Solar Concentrator with Compound Parabolic Lens for Electricity Generating Application
Chatchai Damkham and Wattana Ratismith 382

768-084: Comparative Analysis of Pneumatic Grippers for Handling Operations of Crystalline Solar Cells
Jan Schmitt, Matthias Bruhn, and Annika Raatz 386

768-081: Review of CO₂ Capture Technologies for Power Plant Application
Rasel Mahamud, Masud K. Khan, Mohammad G. Rasul, and Malcolm G. Leinster 393

768-009: Improved of TPV Collector: Twintex® A Hybrid Solar Collector Patented Solution
Christian Cristofari, Jean-Louis Canaletti, and Gilles Notton 400

POWER AND ENERGY

768-013: Simulation and Implementation of Micro Hydro Generation for Small Rural Loads
Kanzumba Kusakana, Herman Vermaak, and Galu P. Yuma 407

768-022: Wing-In-Ground Effect Oscillating Foil Turbine: From Concept to Innovation
Pengfei Liu 413

768-073: The Algorithm and Application of Variable Condition Calculation on Condenser Pressure
Wei Wang, Taihua Chang, Jizhen Liu, and Deliang Zeng 420

768-068: Regulation of EU Energy Market Followed by Efficiency Plan
Viljem Pozeb, Jurij Krope, Tina Krope, and Darko Goricancic 428

768-071: Feasibility Study of Hydrokinetic Power for Energy Access in Rural South Africa
Kanzumba Kusakana and Herman Vermaak 433

768-106: Distributed Generator Sizing: An Iteration Particle Swarm Optimization Approach
Jasrul Jamani Jamian, Mohd W. Mustafa, Hazlie Mokhlis, and Jafaru Usman 439

AUTHOR INDEX 445