

2015 International Conference on Power and Advanced Control Engineering (ICPACE 2015)

**Bengaluru, India
12-14 August 2015**



**IEEE Catalog Number: CFP15A65-POD
ISBN: 978-1-4799-8372-8**

Technical Papers

Technical Presentation 1

Session Title	Track 1: Renewable Energy
Date & Time	Thursday, 13 August 2015 / 11:30 AM – 1:00 PM
Chair	Dr. Uma Rao, K
Co-Chair	Dr. N.C. Mahendra Babu

- [Genetic Algorithm Based Maximum Power Tracking in Solar Power Generation](#) 1
Prakash Kumar, Gaurav Jain and Dheeraj Kumar Palwalia
- [Design, Simulation and Validation of Solar Inverter with Two Phase Interleaved Boost Converter](#) 7
B. ChandraSekhar, G. Yoganjulu Reddy, Sanjay Lakshminarayanan and R. Sudhir Kumar
- [The Multi-Input Renewable Source Inverter with Controlled DC-DC converter and The H-Bridge Inverter](#) 12
H. S. Raghavendra
- [Standalone Single Phase Photo Voltaic System as On-Grid Reactive Power Compensator](#) 18
Raghavendra Prabhu and Nagesh Prabhu
- [Integration of Grid Connected PMG Wind Energy and Solar Energy Systems Using Different Control Strategies](#) 23
N. V. Lahari and H. Vasantha Kumar Shetty
- [Modified Speed Sensor-Less Grid Connected DFIG Based Wind Energy Conversion System for Decoupled Control of Active and Reactive Power](#) 28
Subir Datta, J. P. Mishra and A. K. Roy

Session Title	Track 2: Drives in Power Systems
Date & Time	Thursday, 13 August 2015 / 11:30 AM – 1:00 PM
Chair	Dr. K. Venkateswaralu
Co-Chair	Dr. P.A. Vijaya

- [Modeling and Simulation of High Power Open End Winding based Electromechanical Actuator for Aerospace Applications](#) 36
Sanjith Mohan, T. K. Jose Sebastian, Anish Gopinath, B. Jaya and M. N. Namboothiripad
- [Polyphase Motors and Drives - The Prospects of Higher Power by Wire System for Aerospace Application](#) 42
P. Anju, Uma Syamkumar, Anish Gopinath, B. Jaya and M. N. Namboothiripad
- [A Vector Control based Shunt Current Compensation Scheme for Power Quality Improvement in High Power Radiology Applications](#) 48
R. Nanjundaswamy, Shridevi R. Angadi, N. R. Srinivas and K. U. Vinayaka
- [Design of Peak Current Mode Control for Single Input Dual Output Buck Regulator using Coupled Inductor](#) N/A
Syed Ameen Mohammed and B. Gayathri Devi

- ▶ [A Hysteresis Current Control based Shunt Current Compensation Scheme for Power Quality Improvement in High Power Radiology Applications](#) 53
Shridevi R. Angadi, R. Nanjundaswamy, N. R. Srinivas, R. S. Ananda Murthy
- ▶ [Design, Realization and Comparison of Compact Size Resonant Converters for Low Stored-Energy High Voltage Application](#) 59
N. Sunil Kumar, G. Vijay Kumar and B. K. Sachin
- ▶ [A Novel Multilevel Inverter With Reduced Count of Power Switches](#) 64
Mohd Wajahatullah Naseem and Amit Mohod

Session Title	Track 3: Energy Management
Date & Time	Thursday, 13 August 2015 / 11:30 AM – 1:00 PM
Chair	Dr. Tukaram
Co-Chair	Dr. J. Thipperudrappa

- ▶ [Comparison of Efficiencies of In Situ Induction Motor in Unbalanced Field Conditions](#) 70
G. S. Grewal and B. S. Rajpurohit
- ▶ [PLC based Intelligent Power Factor Correctors for Industrial Power Systems-A Case Study](#) 75
Naveenkumar R. Kulkarni, H. Vijay Murthy and Akhil P. Raju
- ▶ [Using the PROMETHEE and TOPSIS Multi-Criteria Decision Making Methods to Evaluate Optimal Generation](#) 80
Javeed Kittur
- ▶ [Modeling, Simulation and Comparative Study of New Compound Alloy Based P-I-N Solar Cells - An Efficient Way of Energy Management](#) 86
Rudrarup Sengupta, Vurikiti Prashant, Tapas Chakrabarti and Subir Kumar Sarkar
- ▶ [Energy Conservation using Variable Frequency Drives of a Humidification Plant in a Textile Mill](#) 90
M. B. Bhavana and Vishwanath Hegde
- ▶ [Effective Battery Usage Strategies for Hybrid Power Management](#) 95
V. Prema, Swagata Dutta, K. Uma Rao, Shriya Shekhar and B. S. Kariyappa

Technical Presentation 2

Session Title	Track 1: Transmission Systems
Date & Time	Thursday, 13 August 2015 / 2:00 PM – 3:30 PM
Chair	Dr. Nagaraja R.
Co-Chair	Dr. B.K. Jayanna

- ▶ [Tellegen theorem based Load Flow Solution of Radial Distribution Network with Laterals](#) 99
G. Pranava, Ravindranath Gurram and K. Ramesh Reddy
- ▶ [Advanced Metering Infrastructure for Real Time Load Management in a Smart Grid](#) 104
Suryatapa Roy, Biswajeet Bedanta and S. Dawnee

- [A Study on Application of Superconducting Fault Current Limiter in Transmission System](#) N/A
Ming-Tang Chen and Chi-Hung Nguyen
- [Analysis of the Impact of SFCL in a Distribution System with Dispersed Generators](#) N/A
Ming-Tang Chen and Chi-Hung Nguyen
- [A Multiple Environment Dispatch Problem Solution using Ant Colony Optimization for Micro-grids](#) 109
Indrajit N. Trivedi, Dhaval K. Thesiya, Ayman Esmat and Pradeep Jangir
- [Assessment and Evaluation of Energy Scavenging Circuits Using MFC](#) 116
P. Siva Subba Rao, S. Raja, Sonali Sharma, Brunda S, Nettem Kavya and H. R. Ramesh

Session Title	Track 2: Control Systems
Date & Time	Thursday, 13 August 2015 / 2:00 PM – 3:30 PM
Chair	Dr. Narendranath Udupa
Co-Chair	Dr. Vibha Lakshmikantha

- [Reduced Rate Adaptive Sliding Mode Control based Robust Position Tracking for Rotatory Electro Hydraulic Servo System](#) 122
Ankit Kumar and R. S. Hardas
- [PSO Tuned PID Controller for Controlling Camera Position in UAV Using 2 - Axis Gimbal](#) 128
R. J. Rajesh and C. M. Ananda
- [Voltage Stability Analysis using Lyapunov Function Obtained by Krasovskii's Method](#) 134
S. K. Bhagat, Amresh Kumar and Binod Rai
- [Synchronization of Multi-agent Robotic System: A Passivity Based Approach](#) N/A
Ravi Dudhe, Ritesh Chirde, Ashish Sharma, Faraz Deshmukh, Abhinay Jiwanekar and F. S. Kazi
- [Robust Stabilization of Inverted Flexible Beam on Cart using Sliding Mode Control](#) 139
Sanket Kailas Gorade and Shailaja Ravindra Kurode
- [Design of FPGA - Based Sliding Mode Controller for Low-voltage High-frequency Buck Converter](#) 147
K. Shubha Rao, Abhinav Prabhu and Veena S. Chakravarthi
- [Synergy of Delayed States and Missing data in Wireless Sensor Networks using Kalman Filters](#) 152
Sudarshan Adiga, H. R. Janardhan, B. Vijeth and N. Shivashankarappa
- [Implementation of a Power Quality Signal Classification System using Wavelet based Energy Distribution and Neural Network](#) 157
Praveen Sebastian and Pramod Antony D'Sa

Session Title	Track 3: Power Quality issues & Protection
Date & Time	Thursday, 13 August 2015 / 2:00 PM – 3:30 PM
Chair	Dr. Ravi Gorur
Co-Chair	Dr. S.B. Bhanuprasanth

- [A Tuned Cuckoo Search Algorithm for Optimal Coordination of Directional Overcurrent Relays](#) 162
Gaurav Darji, Mohit Patel, Vipul Rajput and Kartik Pandya
- [Interconnection of Wind - Solar Hybrid Renewable Energy Source to the 3 Phase - 3 Wire Distribution System Along with Power Quality Improvements at the Grid Side](#) 168
M. V. Gururaj, U. Vinatha and V. N. Jayasankar
- [Design of Intelligent Maximum Power Point Tracking \(MPPT\) Technique based on Swarm Intelligence based Algorithms](#) 173
Tapas Chakrabarti, Udit Sharma, Suvrajit Manna, Tyajodeep Chakrabarti and Subir Kumar Sarkar
- [Comparative Evaluation of Phasor Estimation and Fault Detection](#) 178
Pradeep Surwase, Mayank Nagendran, D. R. Patil and Francis Joseph
- [Implementation of Staircase Modulation on a Five Level Cascaded H-Bridge Multilevel Inverter and Interfacing with Photovoltaic Modules](#) 185
V. S. Kirthika Devi, Roland Henron Patrao, P. S. Sreekanth, Garima Ramole and Ashwin Sreekumar
- [Effectiveness of Current Envelope Analysis to Detect Broken Rotor Bar and Inter Turn Faults in an Inverter Fed Induction Motor Drive](#) 191
Gurmeet Singh, Ch. Anil Kumar and V. N. A. Naikan

Panel Discussion 1

Panel	Control Applications in Power & Energy Systems
Date & Time	13th August 2015 / 04:00 PM - 05:45 PM
Chair Person & Moderator	Dr. Kannan Tinnium, Chair, IEEE PES, Bangalore Chapter

Panelist:

- Dr. Uma Rao K, Professor, RVCE, & Joint Secretary, IEEE PES, Bangalore Chapter
- Dr. Shyam Vasudeva Rao, Managing Director, Forus Health Care, Bengaluru
- Dr. Ghamandilal, BHEL

Technical Presentation 3

Session Title	Track 1: Renewable Energy
Date & Time	Friday, 14 August 2015 / 9:00 AM – 10:30 AM
Chair	Dr. Krishnan V.
Co-Chair	Dr. Sahana D. Gowda

- Optimal Load Frequency Control of Hybrid Renewable Energy System using PSO and LQR 195
Gauri Shankar, Shubh Lakshmi and Nandala Nagarjuna
- Optimization of AR-Coating for $\text{In}_x\text{Ga}_{(1-x)}\text{N}$ Material based Lateral Multi-Junction Solar Cell N/A
Manoj Thosar, R. K. Khanna, Manish Mathew and Ashwini Joshi Thosar
- Design and Analysis of Ripple Current Reduction in Fuel Cell Generating Systems 200
M. Venkatesh Naik and Paulson Samuel
- Steady State and Dynamic Analysis of WRIM Employed in WECS 205
Anuradha Patil
- Active and Reactive Power Control of PV-PHEV fed 3-level Neutral Point Clamped Inverter 211
Palak Parikh and Sumit Patil
- A Novel Neem based Supercapacitor and its Modeling using Artificial Neural Network 216
Seema Mathew, Gaurav Shekhar, Parashuram B. Karandikar and Datta. S. Chavan

Session Title	Track 2: Drives in Power Systems
Date & Time	Friday, 14 August 2015 / 9:00 AM – 10:30 AM
Chair	Dr. Ashoka K.S. Bhat
Co-Chair	Dr. Divya Shree B.A.

- Simulation and Analysis of Common Mode Voltage, Bearing Voltage and Bearing Current in Two-Level and Three-Level PWM Inverter Fed Induction Motor Drive with Long Cable 221
Sharana Reddy and B. Basavaraja
- Load Frequency Control of two Area Power System with AC-DC Tie Line using PSO Optimized Controller 227
Nandala Nagarjuna and G. Shankar
- Comparative Analysis of SVPWM and SPWM Techniques for Multilevel Inverter 232
Jayaprakash Sabarad and G. H. Kulkarni
- A Feed Forward Voltage Mode Controlled ZVS Based Phase Shifted 300W Full Bridge DC-DC Converter for Military Application 238
Md Muqeet Ahmed, A. Usha, Iramma Shirsi, Bhoopendra Kumar Singh and Bhanu Prakash
- Comparison of PWM and Modified One Cycle Control for Bridgeless Zeta AC-DC Converter 244
Preethy V. Warriar and P. K. Preetha

- ▶ [A Four Switch Transformer Isolated Single Phase Push-Pull Inverter Topology: Design and Experimentation](#) 248

Praveen V. Pol, S. L. Patil and Vivek G. Zulzule

Session Title	Track 3: Distributed Generation
Date & Time	Friday, 14 August 2015 / 9:00 AM – 10:30 AM
Chair	Dr. Gaonkar D.N.
Co-Chair	Dr. Saritha Chakrasali

- ▶ [Improved State Estimation by Optimal Placement of Measurement Devices in Distribution System with DERs](#) 253
Kashyap Vasudevan, Chandra Shekhar Reddy Atla and K. Balaraman
- ▶ [Linear Regulator based Compact LED Driver for DC Distributed Lighting System](#) 258
Srikanth Tunga, RakeshBabu Panguloori and PriyaRanjan Mishra
- ▶ [Demand Response Analysis for Distribution System](#) 265
H.R. Poornima, Chandra Shekhar Reddy Atla and K. Balaraman
- ▶ [Impact of Dispersed Solar Rooftop Generation over the Voltage Profile in Distribution System](#) 270
Kashyap Vasudevan, Chandra Shekhar Reddy Atla and K. Balaraman
- ▶ [The Overvoltage of Interrupting Off-Load Transmission Line with Series-Resonant Type Fault Current Limiter](#) N/A
Hongshun Liu, Bin Li, Mingming Han, Qingquan Li, Zhenning Huang and Jiangtao Wang
- ▶ [Population Set Based Optimization Method \(PSBO\) for Economic and Emission Dispatch Problems](#) 275
P. Ajay-D-Vimal Raj, Yendeti Monica, Syed Ansaar and J. Pradeeba

Session Title	Track 4: Sensors & Instrumentation
Date & Time	Friday, 14 August 2015 / 9:00 AM – 10:30 AM
Chair	Dr. Krish Narendra
Co-Chair	Dr. L. Vijaya Shree

- ▶ [Designing of Anfis Network for Wide Area Power System Monitoring and Protection Network Using MATLAB Simulink Tools](#) 280
Ayadoure Srinivasane alias Stalin, Mohammed Shakeel, R. Revanth and D. Durairaj
- ▶ [Design of Real Time Sensor System for Detection and Processing of Seismic Waves for Earthquake Early Warning System](#) 285
Yogesh Sherki, Nikhil Gaikwad, Jayalakshmi Chandle and Anil Kulkarni
- ▶ [Design and Implementation of Mobility Aid for Blind People](#) 290
B. S. Sourab, H. S. Ranganatha Chakravarthy and Sachith D'Souza

- [A 22nm \$\pm 0.95V\$ CMOS OTA—C Front-end with 50/60 Hz Notch for Biomedical Signal Acquisition](#) 295
Rishika Sinha, Sourabh Khot and Mohd. Samar Ansari
- [Design and Implementation of Safety Armband for Women and Children using ARM7](#) 300
Glenon Toney, Fathima Jabeen and S. Puneeth
- [A Novel MEMS Sensor for Online Health Monitoring of Gas Insulated Switchgear Systems](#) 304
Suma Umesh, T. C. Balachandra and A. Usha

Technical Presentation 4

Session Title	Track 1: Fault Diagnosis in Power Systems
Date & Time	Friday, 14 August 2015 / 11:50 AM – 1:20 PM
Chair	Dr. Balaraman K.
Co-Chair	Dr. Kavitha C.

- [Advanced Monitoring and On-Line Health Diagnosis of Single-Phase Transformers](#) 308
P. A. Reddy, A. K. Sao and B. S. Rajpurohit
- [Fault Diagnosis of VSI Fed Induction Motor Drive Using Fuzzy Logic Approach](#) 315
G. J. Naveena, Murugesh Dodakundi and Anand Layadgundi
- [Experimental, Simulation and a Case Study on Electrical Energy Consumption in Mine Drive Haulage System](#) 322
Ganapathi D. Moger, Ch. S. N. Murthy and Udaykumar R. Yaragatti
- [Worst Case Circuit Analysis of a New Balancing Circuit for Spacecraft Application](#) 327
Reshma Sugathan, S. Ananda, Vinitha Ramdas, P. Satyanarayana, M. Sankaran and R. S. Ekkundi
- [Asset Management in Smart Grids Using Improved Dissolved Gas Analysis](#) 333
V. Srinivasan, B. Subathra, Seshadhri Srinivasan and S. Kannan
- [Intelligent Bearing Fault Monitoring System using Support Vector Machine and Wavelet Packet Decomposition for Induction Motors](#) 339
Hari Om Vishwakarma, K. S. Sajan, Bhaskar Maheshwari and Yougal Deep Dhima

Session Title	Track 2: Drives in Power Systems
Date & Time	Friday, 14 August 2015 / 11:50 AM – 1:20 PM
Chair	Dr. Kasivishwanatha Raj
Co-Chair	Dr. S.K. Prasad

- [Controller Design and Stability Analysis of VSC based HVDC Transmission System](#) 344
Garima Singh
- [Modeling and Analysis of 6 Pulse Rectifier used in HVDC Link](#) 350
B. R. Madhu and M. N. Dinesh

- ▶ [Field Oriented Control of IPMSM using Diode-Clamped Multilevel Inverter](#) 355
G. Sree Lakshmi, Vinod Kumar and P. Sudeepika
- ▶ [Simulation of Buck or Boost Rectifier Using Single Phase Matrix Converter with Reduced Switch Count](#) 361
B. K. Sachin, S. Madhu, G. Vijay Kumar and N. Sunil Kumar
- ▶ [Simulation and Hardware Implementation of 24Watt Multiple Output Flyback Converter](#) 366
C. Nagesha, A. Sreedevi and Muniraj Gopal
- ▶ [Speed control of BLDC Motor with Four Switch Three Phase Inverter using Digital Signal Controller](#) 371
M. S. Aspalli, Farhat Mubeen Munshi and Savitri L. Medegar
- ▶ [Sensorless Speed Estimation and Vector Control of an Induction Motor drive Using Model Reference Adaptive Control](#) 377
J. Mohanalakshmi and H. N. Suresh

Session Title	Track 3: Electrical Insulation
Date & Time	Friday, 14 August 2015 / 11:50 AM – 1:20 PM
Chair	Dr. Sumangala B.V.
Co-Chair	Dr. S. Manjunath

- ▶ [A Study on Leakage Current Characteristics of Polymeric Insulators for Different Pollution Layers](#) 383
N. S. Sunitha, K. N. Ravi, R. Prakash and Pushpanjali
- ▶ [Effect of DBDS on DC Resistance of Paper Oil Insulation System](#) 388
Faheem Ahmed Khan and M. Saritha
- ▶ [Performance of PCCC in Presence of Mercaptans in Transformer Oil using Ø-T-N Technique](#) 393
Garima Singh
- ▶ [Performance Analysis of Thresholding techniques for Denoising of Simulated Partial Discharge Signals Corrupted by Gaussian White Noise](#) 399
S. Madhu, H. B. Bhavani and S. Sumathi
- ▶ [Time Domain Analysis of a 12 Coil Section and 18 Coil Section Transformer Model Winding Subjected to a Variety of Surge Voltages](#) 405
Mohd. Zahed Ahmed Ansari and Javid Akhtar
- ▶ [Extension Theory based Partial Discharge Pattern Recognition using Statistical Operators](#) 409
V. Divyashree and S. Sumathi

Session Title	Track 4: Control Devices & Instruments
Date & Time	Friday, 14 August 2015 / 11:50 AM – 1:20 PM
Chair	Dr. Suresh Jangamashetty
Co-Chair	Dr. Mukesh Patil

- ▶ [Dimension Reduction and Controller Design for a Waste Water Treatment Plant](#) 413
Awadhesh Kumar, Bhoomika Maurya and Dinesh Chandra

- ▶ [Single Phase Inverter Control with Capacitor Current Feedback 418](#)
K. B. Bommegowda, K. Vishwas, K. Suryanarayana and N. M. Renukappa
- ▶ [Simplified Model Identification of Automatic Voltage Regulator Using Model-Order Reduction 423](#)
Shivanagouda Biradar, Sahaj Saxena and Yogesh V. Hote
- ▶ [Studies on the Electrical Characteristics of a Thermal Power Plant Electrostatic Precipitator 429](#)
M. D. Sharath Kumar and A. D. Srinivasan
- ▶ [Modeling and Output Feedback Control of Flexible Inverted Pendulum on Cart 436](#)
Sanket Kailas Gorade, Prasanna S. Gandhi and Shailaja R. Kurode
- ▶ [Development of a Simple MAGLEV System for a Low-speed Wind Tunnel 441](#)
Sumukh Surya, S. Ramyashree, Rashmi Nidhi, D. B. Singh and R. J. Aparna

Panel Discussions 2

Panel	Realizing the Dream of 100 GW Solar Power Development in India by 2022
Date & Time	14th August 2015 / 02:30 PM - 04:00 PM
Chair Person & Moderator	Dr. R. Nagaraja, Managing Director, PRDC

Panelist:

- Regulatory challenges: Dr. Rahul Tongia, Fellow (non-resident), Brookings India / Brookings Institution
- Grid acceptability challenges: Mr. V. Balaji, DGM, SRLDC, POSOCO
- Technology, Manufacturing and EPC challenges: Rajesh Bhat, Managing Director, juwi India Renewable Energies Pvt Ltd
- Manpower and capacity building challenges: Dr. Suresh H. Jangamshetti, Professor, Basaveshwar Engineering College, Bagalkot