

Preface

Intelligent and efficient electrical systems have been the topic of discussion and intense debate among electrical engineering professionals and academics worldwide. This edited volume on “Intelligent and Efficient Electrical Systems” is an outcome of the selected papers presented in the Second International Conference on Intelligent and Efficient Electrical Systems, (ICIEES’17) held on 20–21 January 2017 in Coimbatore, Tamil Nadu, India. This conference organized by the department of Electrical and Electronics Engineering, PSG College of Technology since 2001, occurs every four years. This conference brings together researchers in industry and academia to exchange their ideas, applications and innovative techniques in the area of intelligent and efficient electrical systems.

This year’s conference had three keynote addresses and six technical paper sessions. The technical paper sessions were on Smart Grid Systems, Power Converters and Drives, Power Systems, Data Communication & Signal Processing, Renewable Energy Systems and Embedded & Control Systems.

Chapter “[Multi-Objective Optimization of Stand-alone Renewable Energy Hybrid System](#)” focuses on multi-objective optimization algorithm for hybrid systems that uses solar, wind, diesel energy systems along with battery and inverter.

Chapter “[Wind Farm Power Prediction Based on Wind Speed and Power Curve Models](#)” deals with a combined power prediction models of nonlinear autoregressive wind speed model together with the wind turbine power curve model for very short-term forecasting of wind power.

Chapter “[Integration of Wind Power Generators for the Enhancement of Profit by Optimal Allocation of SVC](#)” presents an optimal allocation of static VAR compensator (SVC) for wind power generators with IEEE 6 bus system, and a Grey Wolf Optimizer (GWO) algorithm is used to solve optimal power flow (OPF) problem.

Chapter “[Block-Random Access Memory-Based Digital Pulse Modulator Architecture for DC–DC Converters](#)” deals with digital pulse mode architecture using FPGA to control the DC–DC converters with high degree of resolution to provide accurate output voltage.

Chapter “[Fractional-Order Controller Design and Analysis for SEPIC Converter](#)” focuses on the optimized genetic algorithm-based fractional-order PI (FOPI) controller for a single-ended primary inductance converter (SEPIC) to get better transient performance.

Chapter “[Advanced Energy Management of a Micro-grid Using Arduino and Multi-agent System](#)” presents the optimization of distributed energy management of solar micro-grid system with a multi-agent system approach using Java Agent Development Environment.

Chapter “[Sustain the Critical Load in Blackout Using Virtual Instrumentation](#)” deals with blackout power system restoration process to handle critical loads using LabVIEW.

Chapter “[Optimal Single and Multiple DG Installation in Radial Distribution Network Using SLPSO Algorithm](#)” deals with an efficient social learning particle swarm optimization (SLPSO) algorithm for sizing and location of distributed generation (DG) units in radial distribution network.

Chapter “[Dynamic Modeling and Control of Utility Interactive Microgrid Using Fuzzy Logic Controller](#)” deals with the application of fuzzy logic-based PQ control technique for micro-grid system consisting of photovoltaic (PV) and solid oxide fuel cell (SOFC).

Chapter “[A Novel Method of Power Quality Improvement in BLDC Motor Using Cascaded H-Bridge MLI Topology](#)” presents a modelling and simulation of BLDC motor using cascaded H-bridge multi-level inverter (MLI).

Chapter “[Tuning of Fractional Order Proportional Integral Derivative Controller for Speed Control of Sensorless BLDC Motor using Artificial Bee Colony Optimization Technique](#)” deals with a GA and a novel Artificial Bee Colony (ABC)-based tuning methods of fractional-order proportional integral derivative (FOPID) controller for BLDC motor.

Chapter “[Torque Ripple Minimization of a FOC-Fed PMSM with MRAS Using Popov’s Hyper-Stability Criterion](#)” presents a Popov’s hyper-stability criterion-based model reference adaptive control system (MRAS) for torque and flux ripples reduction technique in PMSM.

Chapter “[Effectual Particle Swarm Optimization Algorithm for the Solution of Non-convex Economic Load Dispatch Problem](#)” deals with effectual particle swarm optimization EPSO to solve the convex and non-convex economic load dispatch (ELD) problems.

Chapter “[Differential Evolution with Parameter Adaptation Strategy to Economic Dispatch Incorporating Wind](#)” presents an efficient, reliable and powerful population-based real parameter optimization algorithm for economic load dispatch of wind forms.

Chapter “[Application of Cuckoo Search Algorithm in Deregulated Economic Load Dispatch](#)” deals with the economic load dispatch problems in deregulated power system network using meta-heuristic and stochastic search methods.

Chapter “[An Investigation of Small-Signal Stability of IEEE 14 Bus System with AVR, PSS and Performance Comparison with FACTS Devices](#)” focuses to improve transient stability margin, increased power transfer capability, real and reactive power

compensation and good power oscillation damping using FACTS devices like SVC and UPFC.

Chapter “Investigation on the Properties of Natural Esters Blended with Mineral Oil and Pyrolysis Oil as Liquid Insulation for High Voltage Transformers” explains the investigation methods to develop and analyze the properties for the applications in high voltage transformers as alternate liquid insulation using natural esters and blended oil for high voltage transformers.

Chapter “A Novel Approach to Using Energy-Efficient LED-Based Visible Light Communication in Hospitals” presents a novel approach in the transmission of healthcare information using the up-and-coming wireless visible light communication technology.

Chapter “Implementation of Mesh Network Using Bluetooth Low Energy Devices” focuses on developing BLE mesh network for the wireless environment to implement the data transfer in the BLE devices.

Chapter “Online Static Security Assessment Module Using Radial Basis Neural Network Trained with Particle Swarm Optimization” deals with modelling of online static security analysis module with neural network for contingency analysis of IEEE-30 bus system.

Chapter “Ocular Artifact Suppression in Single Trial EEG Using DWT-Combined ANC” presents an effective ocular artefact suppression using discrete wavelet transform (DWT) combined recursive least square (RLS) adaptive noise canceller (ANC) method for the signal obtained in the fronto-polar region where the ocular artifact is dominant.

Chapter “Egomotion Estimation Using Background Feature Point Matching in OpenCV Environment” describes an algorithm of feature based high frame rate ego-motion estimation with Gradient projection and Gabor wavelet transform, which is capable of computing real-time computer vision applications.

Chapter “Performance Analysis of Wavelet Function Using Denoising for Clinical Database” reports various wavelet filter coefficients for image de noising suitable for clinical database image processing.

Chapter “Influence of PWM Waveform on Breakdown in Twisted Pairs” reports the effect of PWM converter switching frequency on the life of the motor winding insulation.

Chapter “Diagnosis of Cardiovascular Diseases (CVD) Using Medical Images” deals with Support Vector Machine (SVM) and Radial Basis Function (RBF) based classifier in image processing methods for ultrasound images.

We wish to place on record our sincere thanks and appreciation to all the experts and contributions to these selected proceedings of ICIEES’17. We wish to thank Springer for publishing these proceedings in the area of intelligent and efficient electrical systems.

Coimbatore, India
Plano, USA

M.C. Bhuvaneswari
Jayashree Saxena

Intelligent and Efficient Electrical Systems

Selected Proceedings of ICIEES'17

Bhuvaneswari, M.C.; Saxena, J. (Eds.)

2018, XVIII, 268 p. 156 illus., 122 illus. in color.,

Hardcover

ISBN: 978-981-10-4851-7