

EDITORIAL

Dear reader,

You have at your desk the issue no. 2/2015 of the journal AUTOMATIKA, which contains 10 original scientific papers in the fields of signal processing, power electronics, electrical drives, control systems and communications.

In the first paper, **Improved Pose Estimation for Vehicle Navigation using Frame Alignment and Forward Smoothing**, Rok Juhant et al. present an application of a modified extended Kalman filter on a device intended to provide accurate position and velocity output for land vehicles. The device automatically discovers its orientation and aligns itself during the first stage of the test period. The developed algorithm is tested in real-world experiments. The following paper entitled **New Computing Method for Techno-Economic Analysis of the Photovoltaic Water Pumping System Using Fuzzy based NSGAII Optimization Approach** by Mohammad Mohammadi, presents an optimization of photovoltaic water pumping system considering the reliability criteria and economic aspects. In the proposed algorithm, an external archive of non-dominated solution is kept and updated during iteration, while for preserving the diversity in the archive of Pareto solutions, the crowding distance operator is used. In the end, a fuzzy based NSGAII method is applied to select the favored solution among non-dominated solutions. In the third paper, **Combined Reconfiguration and Capacitor Placement for Distribution System Volt/Var Control through Opposition based Differential Evolution Algorithm**, Nandha Kumar and Muthukumar Ramraj present a method which combines both reconfiguration and optimal capacitor placement for the effective optimization. Furthermore, it utilizes opposition based differential evolution algorithm for efficient searching for the optimal solution. The proposed approach is demonstrated by employing the feeder switching operation scheme to IEEE-33 bus power distribution systems. The paper entitled **Fuzzy Energy Management Optimization for a Parallel Hybrid Electric Vehicle using Chaotic Non-dominated sorting Genetic Algorithm** by Junyi Liang et al. presents a parallel hybrid electric vehicle equipped with a hybrid energy storage system, where to handle complex energy flow in the powertrain system, a fuzzy-based energy management strategy was established and a chaotic multi-objective genetic algorithm was also proposed to improve fuel economy and HC, CO, and NO_x emissions. Simulation results and comparisons demonstrated that chaotic operators can enhance searching ability for optimal solutions. In the following paper, **Dynamic Response of Novel Adaptive Modified Recurrent Legendre Neural Network Control for PMSM Servo-Drive Electric Scooter**, Chih-Hong Lin presents a novel adaptive modified recurrent Legendre neural network control system, which has fast convergence and provide high accuracy, to control permanent magnet synchronous motor servo-driven electric scooter under the external disturbances and parameter variations. Comparative studies are demonstrated by experimental results in order to show the effectiveness of the proposed control scheme. Eşref Emre Özsoy et al. present in their paper entitled **A Novel Current Controller Scheme for Doubly Fed Induction Generators** a current control methodology for grid connected doubly-fed induction generator based wind energy conversion systems. The results in simulations and experimental test bed are used to demonstrate the decoupled control of active and reactive power without the necessity of additional machine parameter. The paper entitled **Performance Evaluation of Space Division Output Buffered Switches** by Fayza Ahmed Nada and Medhat A. Rakha presents performance analysis of space division output buffered switches operating in an ATM multimedia environment. The authors state that the main

contribution of this work is in using multiserver case and geometric service time. Performance measures such as System occupancy, Queuing time, Unfinished work and Waiting time are analysed in this paper. In the eight paper, **Novel Third-Order Quadrature Oscillators with Grounded Capacitors**, Jie Jin et al. present two current differencing transconductance amplifiers (CDTA)-based current-mode resistors-less variable frequency third-order quadrature oscillators (TOQO). The proposed TOQOs consist of a minimum number of active and passive components, especially the first TOQO, where only two CDTAs and three capacitors are used in it. Cadence IC Design Tools 5.1.41 post-layout simulation results and experimental evidence are included to corroborate the results presented in the paper. The ninth paper entitled **Permanent Magnet Synchronous Machine Parameters Identification for Load Characteristics Calculation** by Zdeněk Čeřovský and Miroslav Lev present the evaluation of the generator steady state regime of the machine where the generator works with different loads consisting of capacitance, inductance or arbitrary impedance or resistance. When the generator transfers from no load to load regime the rotor is shifting and the load angle changes, which is then measured. Authors state that the proposed measurement methods are simple in the special cases of loads. Results of measurements and their experimental verification are given in the paper. The last paper entitled **A New Approach Based on Instantaneous Power Theory for Improving the Performance of UPQC Under Unbalanced and Distortional Load Conditions** by Mahmoud Ebadian et al. presents a new control method for a four-wire three-phase unified power quality conditioner based on instantaneous power p-q theory in order to deal with power quality problems under distortional and unbalanced load conditions. The performance of the proposed control approach is evaluated in terms of power factor correction, source neutral current mitigation, load balancing and mitigation of the current and voltage harmonics of distortional and unbalanced loads in a three-phase four-wire system. The proposed method is compared to the conventional p-q method in Matlab/Simulink simulations.

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