

# EDITORIAL

*Dear reader,*

*You have at your desk the issue no. 1/2014 of the journal AUTOMATIKA, which contains ten original scientific papers in the fields of control systems, power electronics, digital signal processing and communications. In the first paper, **CPU, GPU and FPGA Implementations of MALD: Ceramic Tile Surface Defects Detection Algorithm**, Tomislav Matić et al. address adjustments, implementation and performance comparison of the moving average with local difference method for ceramic tile surface defects detection. The method was implemented on three different platforms: CPU, GPU and FPGA, in at least two different ways for each platform and the execution time was measured. The following paper entitled **Backstepping Controller Design to Track Maximum Power in Photovoltaic Systems** by Aranzazu D. Martin and Jesus R. Vazquez presents a novel control method to track the maximum power point of a grid-connected photovoltaic system. The nonlinear control is based on Lyapunov functions assuring the local stability of the system and the maximum power extraction of the generating system is guaranteed. The performance of the developed system was analyzed by means of a simulation platform. In the third paper, **Swing-Up and Stability Control of Wheeled Acrobot (WAcrobot)**, Mohsen Moradi Dalvand et al. present a novel mechanical system consisting of an underactuated double inverted pendulum robot equipped with actuated wheels. The presented system has potential applications in mobile manipulators, leg-wheeled robots and can serve also as a test-bed for researchers studying advanced methodologies in nonlinear control. The paper entitled **HBMO Based Output Feedback Damping Controller for STATCOM** by Ali Ahmadian et al. investigates an approach for output feedback damping controller design of the static synchronous compensator in order to enhance the damping of power system low frequency oscillations. The performance of the proposed algorithm is compared to a genetic algorithm. In the following paper, **Fault Tolerant Bio-Inspired System Controlled Modular Switched Reluctance Machine**, Loránd Szabó et al. propose a novel bio-inspired motion control system where all of its three components (the switched reluctance machine, the power converter and the control system) are designed with the aim to be as fault tolerant as possible. The theoretical expectations and simulation results are conducted by means of laboratory experiments. Mladen Mileusnić et al. present in their paper entitled **About Delay Loss Equiquality Characteristics in Packet Telephony** the combined influence of packet delay and packet loss on speech quality in packet telephony. The authors calculate equiquality lines, which demonstrate the joint influence of these factors on the packetized signal quality. The paper entitled **Optimal Type-2 Fuzzy Controller For HVAC Systems** by Mohammad Hassan Khooban et al. designs a novel fuzzy controller for controlling the air supply pressure of heating, ventilation and air-conditioning system. The performance of the proposed controller is compared to a non-optimal fuzzy controller in simulation experiments. In the eight paper, **Control of a Uniform Step Asymmetrical 13-Level Inverter Using Particle Swarm Optimization**, Rachid Taleb et al. present a harmonic elimination strategy of a uniform step asymmetrical multilevel inverter using particle swarm optimization. The method aims at eliminating specified higher order harmonics while maintaining the required fundamental voltage. The ninth paper entitled **Acoustical–Mechanical Modelling of Voice Tract** by Siniša Fajt et al. presents a process of producing a voice tract model which includes the usage of three different computer programs, each of them dedicated to one segment of modelling. After the analysis of recorded speakers, a two-dimensional model of the voice tract was made, which*

resulted in a mechanical model consisting of specific number of tubes. In the end, analysis was performed in order to determine whether the resulting model truly represents the voice tract of each speaker. The last, tenth, paper entitled **A New Dual Lagrangian Model and Input/Output Feedback Linearization Control of 3-Phase/Level NPC Voltage-Source Rectifier** by Majid Mehrasa et al. develops control of three-level three-phase neutral-point-clamped rectifier using its dual Lagrangian modeling. The models are based on the superposition law of the load current and the Euler-Lagrange description of the rectifier. The proposed nonlinear controller is compared to the PI controller in the Matlab/Simulink environment.

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