

# EDITORIAL

**Dear reader,**

You have at your desk the issue no. 2/2013 of the journal AUTOMATIKA, which contains eleven original scientific papers in the fields of power electronics, control systems, digital and analog signal processing and computing.

In the first paper, **State Variables Estimation of Fuel Cell – Boost Converter System Using Fast Output Sampling Method**, Toni Bjažić et al. describe estimation of state variables of a peak current mode controlled DC-DC boost converter supplied by a PEM fuel cell by using fast output sampling method. The estimated variables are suitable for model reference adaptive and sliding mode based control techniques. The following paper entitled **Adaptive Estimation of Difficult-to-Measure Process Variables** by Dražen Slišković et al. presents methods for estimation in the vein of an appropriate mathematical model of the process which, based on information about easy-to-measure process variables, estimates the current value of the difficult-to-measure variables. In order to deal with time-varying process parameters several methods for estimator parameter update are presented. In the third paper, **High Power Soft-Switching IGBT DC-DC Converter**, Neven Čobanov et al. propose a soft-switching topology for high power buck converter, where zero-current turn-on and zero-voltage turn-off is achieved without auxiliary switches. A built full-scale 38 kW laboratory prototype with 1700 V IGBT modules is described for railway application where experimental results show efficiency of 97%. The paper entitled **Improved Algorithms of Direct Torque Control Method** by Marek Tomasz Korzeniewski and Andrzej Sikorski discusses a new way of direct torque control method analysis to explain flux and current distortion at a low speed of motor operation. The authors assess that the dynamical properties of the new algorithm are similar to the conventional direct torque control method. In the following paper, **Analysis of DoA Estimation Algorithms in SDMA System**, Tanuja Satish Dhope et al. compare in a simulation scenario the performance of three direction of arrival estimation algorithms: MUSIC, root-MUSIC and Capon applied on the uniform linear array in the presence of uncorrelated white noise. Labonnah Farzana Rahman et al. propose in their paper entitled **Design and Implementation of a Low Supply Voltage Voltage Type Sense Amplifier with Low Current Consumption for RFID Transponder** a voltage-type sense amplifier compatible with the low power applications like an RFID transponder, where CEDEC 0.18  $\mu\text{m}$  CMOS process was employed within the temperature range from  $-25^{\circ}\text{C}$  to  $125^{\circ}\text{C}$  to diminish the power indulgence. The paper entitled **A Novel Third-Order Leap-Frog Active Filter** by Neven Mijat et al. presents the realization of third-order low-pass active-RC filters using a new Leap-Frog topology, where the proposed filter is a simplified Leap-Frog structure with the elements calculated directly from the transfer function coefficients. Furthermore, the authors perform comparison to other common third-order filter sections. In the eight paper, **Functional Observers for Motion Control Systems**, Eray Abdurrahman Baran et al. present a novel functional observer for motion control systems with aim to provide higher accuracy and less noise. The novelty of the observer is based on its functional structure that can intrinsically estimate and compensate the un-measured inputs using the measured input current. The following paper entitled **Automatic Enlarge and Deployment of Computer Cluster Using Dual-Boot Approach** by Tibor Skala et al. presents a method for creating computer clustering and obtaining high performance computing clusters using computers in the classroom, Ethernet facilities and open source software. The main aim of the paper is to present a solution

that will use existing resources in the computer classroom, for applying complex computer services/jobs under the Linux operating system, like the image programming, simulations and volume rendering. The tenth paper, **Impact of the Context Relevancy on Ratings Prediction in a Movie- Recommender System**, by Ante Odić et al. proposes a methodology based on statistical testing for detecting which pieces of contextual information contribute to explaining the variance in the ratings and inspect the impact of the detected relevant pieces of contextual information on the ratings prediction based on the matrix-factorization algorithm. The last paper entitled **Emotion Recognition System by a Neural Network Based Facial Expression Analysis** by Damir Filko and Goran Martinović proposes a system for human emotion recognition by analyzing key facial regions using principal component analysis and neural networks. The proposed system was trained and tested on the FEEDTUM database and its score of correct recognition analyzed.

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