EDITORIAL

Dear reader,

You have at your desk the issue no. 4/2015 of the journal AUTOMATIKA, which contains 12 original scientific papers in the fields of control systems, electrical drives, robotics, signal processing and communications.

*In the first paper, **Integration of Electric Vehicles into Energy and Transport Systems**, Joško Deur et al. present an overview of electric vehicle architectures, modeling, and control system optimization and design with experimental characterization of vehicle fleet behaviors and synthesis of representative driving cycles and aggregate-level modeling and charging optimization for EV fleets, with emphasis on freight transport. The following paper entitled **Constrained Reference Tracking based on Homothetic Sets** by Šandor Ileš et al., considers a problem of constrained tracking of piece-wise constant references using a set of admissible homothetic transformations of positive-invariant sets. Authors propose conditions under which a homothetic transformation can be used for a constrained reference tracking of non-linear systems using model predictive control or reference governor. In the third paper, **A Novel and Simple Hybrid Fuzzy/PI Controller for Brushless DC Motor Drives**, Adeel Sabir and Mahmoud Kassas propose a speed controller for the trapezoidal three–phase brushless DC motor drive using a hybrid fuzzy logic/proportional plus integral control. The proposed fuzzy logic controller can be used individually in applications requiring lower computation load and tolerating small steady state offset. For high performance applications, a PI controller is augmented with the fuzzy logic controller and a simple switching scheme is devised. Simulations studies using models in MATLAB/Simulink's SimPowerSystems toolbox are carried out to show the validity of proposed control. The paper entitled **Robust Adaptive Control for a DC Servomotor with wide Backlash Nonlinearity** by Oscar Salas-Peña et al. addresses the problem of driving angular position of a direct current servomotor system with unmodeled wide backlash nonlinearity. Based on a simplified model of the system, the proposed scheme increases robustness against unmodeled dynamics as backlash, as not all the parameters of the system nor the bounds of the perturbations are required to be known. In the following paper, **Improved Torque Control of High Speed Shaft-Sensorless Induction Motor Drive**, Petar R. Matić et al. present improved torque control scheme for a high speed sensorless induction motor drive. The proposed high speed torque control scheme substitutes the flux oriented control by the voltage angle control in the flux weakening regime. Experiments confirm the effectiveness of the proposed torque control algorithm. Mohamed Bahloul et al. focus in their paper entitled **TS Fuzzy Logic-Based Rotor Resistance Tuning in case of Induction Machine Vector Control** on the estimation of the rotor resistance to online tune the controllers in case of the indirect rotor field orientation control of induction machine. The proposed method is based on the development of an adaptive Takagi-Sugeno fuzzy flux observer, described in a d-q synchronous rotating frame. Simulation and experimentation are carried out to show the effectiveness of the proposed results. The paper entitled **Research on simultaneous localization, calibration and mapping of network robot system** by Peiliang Wu et al. analyze the problem of simultaneous localization, calibration and mapping in order to improve precision thereof. The coupled relations among localization, calibration and mapping are denoted as a joint conditional distribution and then decomposed into three separate analytic terms according to Bayesian and Markov properties. In the end, simulations are performed to demonstrate the validity and efficiency of the proposed solutions. In the*

eight paper, **On explicit force regulation with active velocity damping for robot manipulators**, *César Chávez-Olivares et al. present a new interaction control structure that generates a family of explicit force regulators for robot manipulators. The proposed structure includes a term of a class of proportional-type functions in terms of force error; the force error is defined as the difference between a desired force and the actual force measured with a force sensor located at the end-effector. An experimental comparison of two new explicit force regulators and the linear proportional structure, on a three degree-of-freedom, direct-drive robot, is presented. The ninth paper entitled* **Noise and Sensitivity Improvement using SC Filters** *by Ivan Volarić et al. presents designed fifth order Chebyshev low pass SC filter and compared its time and frequency performance with a performance of the active RC based filter. SC based filter has shown significant noise and sensitivity improvement, when compared with active RC based filter. In the following paper,* **Impact of Communication Timeouts on Meeting Functional Requirements for IEC 61131-3 Distributed Control Systems**, *Marcin Jamro and Dariusz Rzonca deal with the problem of meeting all functional requirements of important and responsible tasks in industry. Authors developed a concept of system tests, that includes ability to detect problems related to external factors, such as communication issues. They propose the dedicated metric that enables computation of probability that the test case has failed due to communication problems. The paper entitled* **Accurate 3D reconstruction using a turntable-based and telecentric vision** *by José-Joel Gonzalez-Barbosa et al. presents a camera and telecentric lens system that is able to obtain 3D information. The authors designed and implemented a method which can register and integrate 3D information captured from different viewpoints to build a complete 3D object model. In the end, an analysis of the uncertainty model parameters and performance reconstruction of 3D objects are discussed. The last paper entitled* **Predicting influential mobile-subscriber churners using low-level user features** *by Uroš Droftina et al. study good predictors of churn influence in a mobile service network. To this end, a procedure for determining the weak ground truth on churn influence is presented and used to determine the churn influence of prepaid customers. The results show that considerably better churn prediction results can be achieved using the proposed model together with the classical churn-prediction-model than by using the classical churn-prediction model alone.*

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