GUEST EDITORIAL

This volume is a collection of papers by authors who started their professional careers at the Institute of Control Sciences, Moscow, Russia. Although now they live in different countries, they still maintain their allegiance to their *Alma Mater*.

Founded in 1939, the Institute was the first scientific organization in the world devoted to the problem of control. Over the years, the Institute produced corner-stone contributions to control theory and related fields. The first generation of the Institute researchers included such world-renown scientists as A. Andronov (nonlinear systems), A. Fel'dbaum (optimal and dual control), B. Petrov (invariant systems), M. Aizerman (stability and pattern recognition), Ya. Tzypkin (adaptation and learning), and M. Krasnosel'skii (mathematical system theory). Representatives of the second generation are E. Braverman (pattern recognition), L. Rozonoer (maximum principle), A. Butkovsky (distributed parameter systems), S. Emelyanov (variable structure systems) and others.

The authors of the papers included in this volume belong to the third generation. They were students of those mentioned above or their co-workers. After completing their degrees, they worked at the Institute – from 10 to over 30 years – and these were the most formative years of their careers. Due to various circumstances, they are now scattered around the world, but still are influenced by the ideas and techniques developed at the Institute of Control Sciences.

The authors invited to contribute to this volume were free to select the scope of their papers: either a survey or a new result. In either case, they were asked to present material obtained after leaving Russia. So, the paper by G. M. Adelson-Velsky, A. Gelbukh and E. Levner (*Israel and Mexico*) describes fast path-finding algorithms in AND-OR graphs. V. A. Bondarenko, J. Mustard and A. V. Pokrovskii (*Russia and Ireland*) consider a combinatorial optimization problem arising in chaotic control. The paper by Y. Eun, U. Gokçek, P. T. Kabamba, and S. M. Meerkov (*USA*) extends the LQG design methodology to systems with saturating actuators and shows that resulting linear controllers do not require the anti-windup implementation. Y. Kogan (*USA*) describes asymptotic expansions for large closed and loss queuing networks. In the paper by A. G. Loukianov (*Mexico*), a robust block decomposition method is offered for sliding mode control in uncertain nonlinear systems. Yu. Orlov (*Mexico*) presents a study of Schwartz distributions in nonlinear setting with applications to filtering and optimal control. The paper by A. Poznyak (*Mexico*) develops a version of Robust Stochastic Maximum Principle applied to the Mini-max Mayer Problem. A. V. Sarychev (*Portugal*) considers higher-order techniques for optimal control based on differential geometric control theory. The paper by K. E. Starkov (*Mexico*) proposes necessary and sufficient observability conditions for linear time-varying systems with polynomial coefficients. The paper by V. I. Utkin and H. C. Chang (*USA*) is directed towards applications of sliding mode control in the automotive industry. The formalism for cluster analysis based on the “Rank of Links” theory is developed in the paper by O. Verulava and R. Khurodze (*Georgia*).

We hope that this volume is another testimony to the vitality of approaches, ideas, and techniques fostered at the Institute of Control Sciences.

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