PREFACE

In midst December last year the *Intelligent Control and Signal Processing Group* of the European Project *PELINCEC* (`http:/pelincec.isep.pw.edu.pl`) organised a workshop on *Bridges through Time: Intelligent Control, Signal Processing and Real-Time Process Control*. The aim of this workshop was to review and analyse several concepts and methods developed during the last decades in the field of control and signal processing. At this workshop, history reflection and influence were visibly present.

In the late 1970s and in the 1980s the Control Division of the Institute of Control and Industrial Electronics of the Warsaw University of Technology organised in Poland a series of workshops entitled *Real-Time Process Control*. These events were truly international meetings of researches from many European countries as well as Japan, Canada, India and the USA. During the last year's workshop, several plenary sessions were organised and more than 20 regular papers were presented.

We have selected for publication in this issue of AMCS six papers. Three of them concern the control field, the other three are related to signal processing.

Stefen Hui and Stanisław H. Żak present *Observer design for systems with unknown inputs*. Design procedures are proposed for two different classes of observers for systems with unknown inputs. In the first approach, the state of the observed system is decomposed into known and unknown components. The other approach combines sliding modes and the second method of Lyapunov resulting in a nonlinear observer.

Tadeusz Kaczorek in his paper entitled *Realization problem for a class of positive continuous-time systems with delays* states and solves the realization problem for a class of positive, continuous-time linear single-input, single-output systems. He gives necessary and sufficient conditions for the existence of positive realizations of a given proper transfer function.

The third paper related to control is focused on robust stability of adaptive systems and it sets up a general framework for the investigation of a continuous-time state-space system required to track a reference model. It is demonstrated that the problem of model following control may be tackled using the differential inequalities approach. The paper is written by Andrzej Dzieliński and is entitled *Stability of a class of adaptive nonlinear systems*.

Three papers from the field of signal processing are about nonuniform sampling, old movies restoration and Gabor filters used in image retrieval processing.

Andrzej Tarczyński and Dongdong Qu in their paper *Optimal random sampling for spectrum estimation in DASP applications* analyse a class of Digital Alias-free Signal Processing (DASP) methods for spectrum estimation of sampling signals. These methods rely on sampling the processed signals at randomly selected time instants. Fourier transform estimators constructions are presented.

Tomasz Andrysiak and Michał Choraś apply Gabor filters to content-based image retrieval in their paper *Image retrieval based on hierarchical Gabor Filters*.

Finally, Sławomir Skoneczny presents a paper related to the enhancement of old movies by filters with motion detection. These filters are nonlinear and they are based on the concept of multistage median filtering or mathematical morphology. The paper is entitled *Image processing from old movies by filters with motion detection*.

I would like to express my gratitude to the Editorial Board of AMCS to give us opportunity presenting in this issue selected our workshop achievements and to the authors who prepared extended versions of the workshop papers.

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