

News

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Identification and System Parameter Estimation

Symposium sponsored by International Federation of Automatic Control, Technical Committee on Applications and Technical Committee on Theory, fourth Symposium on this subject, held in Tbilisi, USSR, September 21–27, 1976. Preprints in three volumes, total 1722 pp., printed by Institute of Control Sciences, Moscow 1976.

The Symposium was organized by the National Organizing Committee of the Academy of Sciences of the USSR and by the Local Organizing Committee of the Academy of Sciences of Georgian SSR.

In the program of the Symposium there were included all types of communications, i.e. invited tutorials, survey papers and case studies, round table discussions, comparison of identification methods and contributing papers devoted to new scientific results and to significant applications. Altogether 170 papers were selected from 267 offered contributions. Except tutorials the full text of all other presentations is included in preprints.

From the total number of 514 participants there were 218 experts from 28 foreign countries.

Three introductory tutorial lectures concerning the Standard-Type Identification based on correlation functions and Dispersion-Type of Identification Procedures presented by N. S. Rajbman (USSR), Model Building, Parameter and State Estimation delivered by P. Eykhoff (The Netherlands) and Least-Squares Estimation read by V. Strejc (ČSSR) were preferable organized before the official opening of the Symposium. Remaining three tutorial lectures were read the day after the official closing of the Symposium: Prediction Error Methods and Maximum Likelihood Estimation by K. J. Aström (Sweden), Comparison of Different Identification Methods by R. Isermann (GFR) and Models of Nonlinear Systems by M. A. Krasnosel'sky (USSR).

All lectures were well prepared and have shown in an easy intelligible and concise form

the basic and up to date possibilities and tools of identification methods.

There were ten invited survey papers included in the program: Some Recent Advances in System Identification by R. K. Mehra (USA), Identification of Biological and Medical System by G. A. Bekey (USA), Identification of Process in Closed Loop-Identifiability and Accuracy Aspects by I. Gustavsson, L. Ljung and T. Söderström (Sweden), Identification of Nonlinear Dynamic System by R. Haber and L. Keviczky (Hungary), Random Search in Identification Problems by L. A. Rastrigin (USSR), Random Process Simulation and its Application in Identification Problems by J. Havel and M. Barviř (ČSSR), Identification Methods in Environmental Pollution Problems by Y. Sawaragi and S. Ikeda (Japan), Identification in Large Scale Systems by A. P. Sage (USA — not presented due to absence of the author), Robust (Noiseproof) Identification by B. T. Polyak and Ya. Z. Tsyppin (USSR) and Identification Hardware and Instrumentation by A. van den Bos (The Netherlands).

The topics of these survey papers demonstrate the wide variety of mastered fields of identification. The well instructive content contributed to the enlightenment of the selected subjects and pointed out the significant achievements on the one hand and the open problems on the other one.

Five invited case studies were included into the program of the symposium: Distributed Parameter Systems by A. V. Balakrishnan (USA), Applications of Parameter and State Identification Methods in Traffic Control Systems by H. Strobel (GDR), On-line Identification of a Steam Heated Exchanger with a Process Computer by U. Baur and R. Isermann (GFR), Applications of Various Techniques to Chemical Plant Identification by K. Damert, H. Greeske, G. Reining and B. Werner (GDR), Rectification Column Dynamics by J. Závorka (ČSSR — not presented due to absence of the author).

The main attention of these case studies was focused to the state-of-the-art of the respective areas.

Four papers dealt with comparison of identification methods. Practical results as well as different kinds of approaches were analysed in order to verify the ability of identification procedures for the given problem.

The round table discussions were oriented to identification in closed loop systems, to identification software, to identification, modelling and adaptation and to identification and control.

The contributing papers concerning different kinds of applications were divided into following sessions: Biological and Medical Systems, Economic Systems, Ecological and Environmental Systems, Power Systems, Vehicles, Metallurgical Processes, Chemical-Physical Processes and Various Processes.

It may be stressed that the 69 papers dealing with applications prove that the practice takes advantage of theoretical research results and achievements successively in a more and more significant extent and that the theory really helps to solve problems appearing in man-made as well as natural systems.

Altogether 82 papers devoted to theoretical tasks were included in the following sections: Least-Squares Technique, Maximum Likelihood Technique, Model Structure Determination, On-Line Identification, Distributed Parameter Systems, Feedback Systems, Adaptive Systems, Multivariable Systems and Test Signals.

It is not possible to summarize briefly the ideas of all contributions to the theory of identification. In comparison with the past symposium on identification, more attention was paid to non-white and non-gaussian noise corrupting the information about the dynamics of systems. The tools of probabilistic theory were widely modified to identification problems, the concept of subjective probability density functions seems to be a prospective approach. A considerable interest was focused to the identification of nonlinear systems. For identification of linear multidimensional systems applicable procedures were presented. A good deal of papers solved the problem of adaptive control showing that the future development of this area is definitely closely connected to identification tasks. On the other hand a success-

ful closed loop adaptive control need not be necessarily based on parameter identification of the respective differential equation if experience is updated in another useful form. Nearly all papers assumed to apply digital computers for the evaluation of data obtained by measurements on the real systems. This is the explanation for the endeavour to improve the known numerical methods needed for this purpose or to propose new ones.

Finally it is worth to mention that except technical visits and social events realised during the symposium there was organized one post-symposium visit of Metallurgical Works Rustavi. The aim of this excursion was to show real time operating adaptive control realised by digital computer for a very heavy metallurgical process of tube-rolling mills. It was an extremely interesting application of the advanced theory of identification and adaptive control.

Vladimír Střežec

Bionika 77

Vychádzajúc z dohôd Komplexného programu krajín RVHP usporiada Elektrotechnická fakulta SVŠT, Lekárska fakulta UK, Výskumný ústav lekárskej bioniky, Slovenská kybernetická spoločnosť a Slovenská lekárska spoločnosť v spolupráci s Domom techniky SVTS v Bratislave v septembri 1977 konferenciu BIONIKA 77.

Náplňou jednotlivých sekcií budú tieto oblasti bioniky:

- I. Teoretické základy (teória systémov, teória učenia, matematické modelovanie biologických systémov, teória rozoznávania, problemovo orientované jazyky a iné).
- II. Metodické a klinické aspekty (lekárska bionika — metódy experimentálnej bioniky, meracia a prístrojová technika pre snímanie biologických signálov, aplikácie v diagnostike a terapii).
- III. Aplikácie (lokácia, orientácia, rozoznávanie obrazcov, technické modely a zariadenia).

170 IV. Informačné systémy — DATAMED 77 —
konané pri príležitosti 10. výročia založe-
nia Výskumného ústavu lekárskej bioniky
(spracovanie informácií snimaných z orga-
nizmu počítačom, automatizované systé-
my riadenia v NSP, spracovanie informácií
z laboratórií, z klinických, administratív-
nych a ekonomických oddelení, počítačové
a programové systémy pre ASR v zdravot-
níctve).

Podrobnejšie informácie o podmienkach
pasívnej i aktívnej účasti spolu s predbežnou
prihláškou si záujemci môžu vyžiadať na adre-
se:

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