Institute of Control and Computation Engineering

1998 Annual Report

From the Director

The Institute of Automatic Control (Instytut Automatyki i Informatyki Stosowanej) was originally created as the Chair of Automatic Control and Telemechanics by Professor Władysław Findeisen in 1955. It was reorganized in 1970 to form the Institute of automatic Control. Rapid development of microprocessor technology and its impact on the field of control in recent years directed the interest of staff and students towards computational and algorithmic aspects of control, decision support, man-machine interfacing, etc. This resulted in creation of new educational profiles offered by the Institute and the change of its name: to the present one in 1994.

Professor Władysław Findeisen was the Director of the Institute until he was elected the Rector of the Warsaw University of Technology in 1981. He is the admired teacher and master of most of the actual staff of the Institute. Therefore, it was a great pleasure to us that in 1998 Professor Findeisen was honoured with the title of "Doctor honoris causa" of the Technical University of Ilmenau (Germany). It was his fourth title of this kind, the former obtained from City University London, Warsaw University of Technology, and Technical University of Gdańsk.

The Institute offers education possibilities from a broad area of control and information technology for control and decision support, at all three levels of education. At the first level (equivalent to B.Sc.) the degree programs are offered in Computer Control Systems and Decision Support Information Systems, that combine courses from areas of control and computer science. Also similar two M.Sc. degree programs are offered. We are proud to be able to offer interesting possibilities to our postgraduates to continue their study and research towards Ph.D.

Certainly, research is a very important part of our staff activities, directly affecting both Institute's recognition in Poland and abroad, and the quality of teaching. Description of numerous research programs conducted by the staff of the Institute can be found in this report. I would like to point out, among others, the University Research Program in Control, Information Technology, and Automation (Polish abbr. PATIA), coordinated by Professor Krzysztof Malinowski, with Professor Cezary Zieliński as the Program Secretary.

I express my sincere appreciation to all the staff of the Institute for their efforts and contributions to our achievements in teaching and research. I would like also to express my gratitude to all our partners from abroad, in particular those actively participating in the Tempus project co-ordinated by the Institute. We will appreciate a feedback from our partners concerning our activities and this report itself. We will be glad to try to answer any questions and we will be pleased, to send reprints of our papers and reports upon request.

Piotr Tatjewski

1 General Information

1.1 Board of Directors

Professor Piotr Tatjewski, Director
Dr. Andrzej Pacut, Deputy Director for Research
Dr. Jerzy Paczyński, Deputy Director for Academic Affairs

1.2 Organization of the Institute

Control and Systems Division

Division Head:	Professor Krzysztof Malinowski.
Faculty and staff:	
Professors:	Władysław Findeisen (part time), Krzysztof Malinowski, Piotr Tatjewski, Jacek Szymanowski;
Associate Professor:	Jerzy Pułaczewski (until 30 September 1998)
Assistant Professors:	Agnieszka Bogobowicz, Andrzej Karbowski, Ewa Niewiadomska-Szynkiewicz, Krzysztof Nowosad, Andrzej Pacut, Stefan Romicki, Krzysztof Sacha, Krystyna Szacka, Adam Woźniak, Paweł Domański (part time);
Senior Lecturers:	Jerzy Gustowski, Zygmunt Komor, Andrzej Rydzewski;
Assistant:	Michał Warchoł;
Research Associate:	Piotr Bolek;
Senior R&D Engineers:	Włodzimierz Macewicz, Piotr Misiurewicz (part-time), Jerzy Pułaczewski (part-time, from 1 October 1998).

Research of the division is conducted in 2 research groups:

Control and Optimization of Complex Systems (***K. Malinowski***, *A. Bogobowicz, W. Findeisen, A. Karbowski, E. Niewiadomska-Szynkiewicz, A. Pacut, K. Sacha, M. Warchoł, A. Woźniak, P. Bolek, and W. Macewicz*)

The main area of interest is to develop theory and methodology of model-based predictive repetitive control and hierarchical control structures for non-linear systems under uncertainty, to develop methods for solving continuous and discrete time optimization problems, and to develop software for computer aided analysis and design of complex systems. Particular attention is given to distributed and parallel, synchronous and asynchronous, computations.

Process Control (***P. Tatjewski***, *J. Szymanowski, K. Nowosad, S. Romicki, K. Szacka, P. Domański, J. Gustowski, Z. Komor, J. Pułaczewski, A. Rydzewski, and P. Misiurewicz*)

The research is concerned with industrial process control. The focus is on predictive and fuzzy control algorithms, multilayer optimizing and supervisory control, and non-linear system control and analysis. Intelligent computing methods for design and tuning of control systems are developed, including qualitative modeling, fuzzy neural nets and genetic algorithms. Theoretical considerations are combined with simulation analysis and investigations at the Computer Control Systems Laboratory which features laboratory-scale processes and is equipped with programmable controllers, industrial computers and workstations with software tools, including professional SCADA systems.

Robotics and Operations Research Division

Faculty and staff:

Professors:	Anatol Gosiewski, Eugeniusz Toczyłowski, Cezary Zieliński;
Assistant Professors:	Włodzimierz Kasprzak, Franciszek Seredyński, Krzysztof Pieńkosz, Grzegorz Płoszajski, Wojciech Szynkiewicz, Tomasz Traczyk;
Assistants:	Krzysztof Kierzenkowski;
Senior R&D Engineer:	Urszula Kręglewska.

Research of the division is conducted in 2 research groups:

Robot Control and Programming (***C. Zieliński***, *A. Gosiewski, W. Szynkiewicz, K. Kierzenkowski, and U. Kręglewska*)

The research is concerned with robot control systems and algorithms, robot programming languages, and robot manipulator dynamics. In the robot control systems area a number of new motion and force/position control algorithms have been proposed and examined, in particular for multirobot systems. Special emphasis is given to the recently implemented research-oriented controller for sensor-equipped robots.

Operations Research and Production Management (***E. Toczyłowski***, *W. Kasprzak, K. Pieńkosz, G. Płoszajski, F. Seredyński, and T. Traczyk*)

The research is concerned with structural discrete optimization methods for control and management of discrete processes, including deregulated electric power industry and flexible manufacturing and educational systems. The focus is on scheduling techniques for time-table generation and production control, efficient structural-based optimization algorithms, strategic and tactical planning, detailed scheduling, and real-time operational control. Also, the object oriented and relational database management systems and CASE methods are applied to design distributed multifunctional heterogeneous information systems.

Optimization and Decision Support Division

Division Head:	Professor Wiesław Traczyk.

Faculty and staff:

Professors:	Wiesław Traczyk, Andrzej Wierzbicki (part-time);
Assistant Professors:	Jerzy Granat, Jerzy Paczyński, Andrzej Stachurski, Kornel Wydro;
Senior Lecturer:	Tadeusz Rogowski (part-time);
Lecturer:	Jerzy Sobczyk (part-time);
R&D Engineer:	Grzegorz Wójcik (part-time).

Research of the division focuses on the following topic:

Optimization and Decision Support The main interest is to develop theory, distributed and parallel computational methods, and the software for optimization. The theory covers a wide ground of linear and non-linear, dynamic, stochastic and multiple criteria problems, and deals with such topics as the sensitivity aspects and parametric aspects. Another area covers the decision theory, including the multi-person decisions and the game theory, and deals with software building for decision support and organization and management of computer networks. Finally, a research is carried on the methods of learning and reasoning in expert systems.

1.3 Statistical Data

FACULTY and STAFF	1997		1998		difference	
	persons	FTE	persons	FTE	persons	FTE
Academic Staff	38 (+2)	35 (+2)	35 (+2)	32.05 (+2)	-3	-2.95
by titles/degrees						
Professors	6 (+1)	4.75 (+1)	5 (+2)	3.65 (+2)	-1 (+1)	-1.1 (+1)
D.Sc.-s	6	6	6	6		
Ph.D.-s	19 (+1)	18.25 (+1)	18	17.4	-1 (-1)	-0.85 (-1)
M.Sc.-s	7	6	6	5	-1	-1
by positions						
Professors	9	7.75	8 (+1)	6.65 (+1)	-1 (+1)	-1.1 (+1)
Associate Professors	1 (+1)	1(+1)	1 (+1)	1 (+1)		
Assistant Professors	19	18.25	19	17.4		-0.85
Senior Lecturers	4	3.5	4	3.5		
Lecturers	1	0.5	1	0.5		
Assistants	4 (+1)	4 (+1)	2	2	-2 (-1)	-2 (-1)
Ph.D. Students	35					
Technical Staff	10	8.75	11	8.5	+1	-0.25
Administrative Staff	6	6	6	6		

FTE – Full Time Employment units,
$+$ – corrections due to persons on long-time leave of absence

ACTIVITIES	1997	1998
Teaching activities		
standard teaching potential, hours	7622	7544
# hours taught	14925	15226
Degrees awarded		
D.Sc.	2	0
Ph.D.	1	0
M.Sc.	33	30
B.Sc.	0	2
Research projects		
granted by WUT	19	21
granted by State institutions	12	8
granted by international instutions	3	1
other	4	2
Refereed publications		
monographies	4	1
textbooks	2	0
chapters in books	10	0
papers in journals	9	17
international	9	8
local	0	9
papers in conference proceedings	54	30
international	36	24
local	18	
other publications	8	24
Reports	14	18
Conferences		
participated (# of conferences)	41	39
participated (# of part. from ICCE)	65	78

RESOURCES	1997	1998
Space (sq.m.)		
laboratories	473.6	473.6
library + seminar room	98	98
faculty offices	767.4	767.4
Computers		
workstations*	19	8
personal computers*	71	150
Library resources		
books	4018	4127
booklets	757	862
journals subscribed	4	5

*Classification into workstations and personal computers changes due to of technical standards modifications.

2 Staff

2.1 Senior Faculty

By Senior Faculty we understand Professors, Associate Professors, Assistant Professors, and Senior Lecturers. In project participation lists, the reader is referred to the project listing in Chapter 4. Project leaderships are listed in bold.

room 570
tel. 660 7648
A. Bogobowicz@ia.pw.edu.pl

Agnieszka Bogobowicz Assistant Professor, Control and Systems Division.

M.Sc. 1976 from WUT, Ph.D. 1987 from Polish Academy of Sciences. With WUT since 1998.

In 1976 she was appointed by the Institute of Meteorology and Water Management. In 1981 the team was moved to the Institute of Geophysics of the Polish Academy of Sciences.

Between 1988 and 1992 she was a Visiting Assistant Professor in the Departments o f Civil Engineering and Earth Sciences of the University of Waterloo, Canada. In 1992 she was offered a regular appointment of Assistant Professor in the Department of Systems Design Engineering of the University of Waterloo. She held the post until 1996.

She served as a consultant for the Mraz Consultants, in the USA and Canada. She was also part-time Reserach Associate at McMaster University, Canada.

In 1991 she worked at Ecole Polytechnique, France (CNRS grant obtained).

In 1994 she was granted three year NSERC Research Grant, in Canada.

From 1996-1998 she held the posts of Assistant Professor at the Polish-Japanese Institute of Computer Techniques and the Institute of Biocybernetics and Biomedical Engineering of the Polish Academy of Sciences.

She is the author or co-author of 32 papers.

She is a member of the Polish Mathematical Society, American Association for Advancement of Science and the Polish Society of Applied Electromagnetism.

Her area of specialization includes optimal control, dynamic systems, scientific computing and information modelling.

M.A.Brdys@bham.ac.uk

Mieczysław A. Brdyś Assistant Professor.

M.Sc. 1970, Ph.D. 1974, D.Sc. 1980 from WUT.

From 1974-1983, he held the posts of Assistant Professor and Associate Professor at the Warsaw University of Technology. In 1992 he became Full Professor of Control Systems in Poland.

Between 1978 and 1995, he held various visiting faculty positions at the University of Minnesota, City University, De Montfort University and University Polytecnic of Catalonia. Since January 1989, he has held the post of Senior Lecturer in the School of Electronic and Electrical Engineering at The University of Birmingham, UK.

He has served as the Consultant for the Honeywell Systems and Research Center in Minneapolis, the GEC Marconi and the Water Authorities in UK, France, Germany, Spain and Poland. His research is supported by the UK Research Council and industry and the European Commission. He is the author or co-author of about 100 refereed papers and 5 books.

His current research interests include intelligent control of nonlinear and uncertain systems, robust monitoring and operational control with application to environmental systems.

He is a Charter Engineer, a Member of the IEE and the IEEE , a Fellow of IMA and a member of IFAC Technical Committee on Large Scale Systems.

Paweł Domański Assistant Professor, Control and Systems Division.

room 572a
tel. 660 7673
P. Domanski@ia.pw.edu.pl

M.Sc. 1991, Ph.D. 1996 from WUT.

With WUT since 1991, half time since 1997

Interests: adaptive control, intelligent control, fuzzy logic

Publications: [IC1], [O1]

Władysław Findeisen Professor Emeritus (part-time), Control and Systems Division.

room 524
tel. 660 7397
W.Findeisen@ia.pw.edu.pl

M.Sc. 1949, Ph.D. 1954, the titles of Professor awarded in 1962 and 1971.

Founder and Director of ICCE (1955–1981), elected and re-elected Rector of WUT (1981–1985). Member of Polish Academy of Sciences (PAN) since 1971. Doctor Honoris Causa of The City University in London (1984), Warsaw University of Technology (1996), Gdańsk University of Technology (1997). Chairman of the Social Council to the Primate of Poland (1986–90), Vice-President of PAN (1990–1992), Senator of the Republic of Poland (1989–93) President of "Kasa Mianowskiego", a foundation which sponsors foreign scientists in Poland since 1991

Publications: [L2]

Presentations: [Pr5]

Anatol Gosiewski Professor, Robotics and Operation Research Division.

room 565
tel. 660 7397
A.Gosiewski@ia.pw.edu.pl

Ph.D. 1959, D.Sc. 1964 from WUT; the titles of Professor of Technical Sciences awarded in 1972 and 1992.

With WUT since 1951. Post-Doctoral Fellow at Case Institute of Technology, Cleveland, Ohio (1961), Visiting Prof. at the Dept. of Electrical Eng. of University of Minnesota, Minneapolis, Minnesota (1975), Visiting Prof. at the Dept. of Mechanical and Aerospace Eng., of University of Delaware, Newark, Delaware (1979). Member of the State Committee for the Scientific Title and Scientific Degrees (1993–1996), member of the Committee on Automation and Robotics of Polish Academy of Sciences (PAN). Member of Scientific Council s of Institute of System Research (IBS PAN) (since 1985), and of the Industrial Institute for Automation and Measurements (PIAP) (since 1983). Chairman of the Section of Automation and Robotics T11A of

the State Committee for Scientific Research (KBN) (1991–1996), Member of Scientific Society of Warsaw (TNW) (since 1993). Head of ICCE Robotics Group (1986–1996) and then Robotics and Operation Research Division, Director of the Ph.D. Program in Automatic Control and Computer Science at EIT

Interests: control theory, optimal control, robot dynamics and robot control

Project participation: [P4], [P11], [P12]

room 25
tel. 6607297,
J.Granat@ia.pw.edu.pl

Janusz Granat Assistant, Optimization and Decision Support Division.

M.Sc. 1986, Ph.D. 1997 from WUT.

With WUT since 1987

Interests: decision support systems, multicriteria decision analysis, graphical user interfaces, UNIX system

Project participation: [P16]

Presentations: [Pr6], [Pr7], [Pr8]

room 525
tel. 660 7699
J.Gustowski@ia.pw.edu.pl

Jerzy Gustowski Senior Lecturer, Control and Systems Division.

M.Sc. 1979 from WUT.

With WUT since 1979

Interests: low level software for computer control, interfacing, single-chip microcomputers

Project participation: **[P23]**, **[P28]**

Publications: [IC5], [LC1]

Reports: [R3]

room 573
tel. 660 7632
A.Karbowski@ia.pw.edu.pl

Andrzej Karbowski Assistant Professor, Control and Systems Division.

M.Sc. 1983, Ph.D. 1990 from WUT.

With WUT since 1983. Research visitor, Politecnica di Milano and Universita di Genova, 1992. Member of IFAC

Interests: large scale systems, distributed computations, optimal control and management in risk conditions, decision support systems, neural networks, environmental systems management, control and decision problems in integrated services digital telecommunication networks

Project participation: [P6], [P7], [P14], [P15], [P16], **[P27]**, [P27]

Publications: [IC6], [IC7]

Reports: [R4]

Presentations: [Pr9]

room 554
tel. 660 7866
W.Kasprzak@ia.pw.edu.pl.

Włodzimierz Kasprzak Assistant Professor, Robotics and Operation Research Division.

M.Sc. 1981, Ph.D. 1987 from WUT, D-Ing. 1997 from Univ. of Erlangen-Nuremberg.

Univ. of Erlangen-Nuremberg. With WUT since 1997. Doctoral candidate at WUT(1981-84), research staff member of Industrial Inst. of Mathematical Machines and ICS PAS in Warsaw (1986-89), FORWISS Erlangen(Germany) (1990-95) and Institute RIKEN, Wako near Tokio(Japan) (1996). Alexander von Humboldt research fellow at the Univ. of Erlangen-Nurenberg (1988-89) Member of Polish Section of IAPR

Interests: computer vision, neural networks, knowledge-based systems, autonomous

Publications: [I4]

Reports: [R2]

Zygmunt Komor Senior Lecturer, Control and Systems Division.

room 571
tel. 660 7861
Z.Komor@ia.pw.edu.pl

M.Sc. 1964, Ph.D. 1976 from WUT.

With WUT since 1964

Interests: control instrumentation design and implementation, computer aided electronic equipment design

Publications: [O8]

Krzysztof Malinowski Professor and Head, Control and Systems Division. Dean of the Faculty of Electronics and Information Technology.

room 517
tel. 660 7397
K.Malinowski@ia.pw.edu.pl

M.Sc. 1971, Ph.D. 1974, D.Sc. 1978, the titles of Professor of Technical Sciences awarded in 1989 and 1994.

With WUT since 1971. Director of ICCE (1984–1996), Dean of the FEIT (since Sept. 1996), Member of the Senate of Warsaw University of Technology (since 1993), Chairman of the Senate Committee on Academic Staff (until Sept. 1996), Chairman of the Senate Committee on Research (from Sept. 1996), Director of the University Priority Research Program in Control, Information Technology, and Automation (PATIA). Member of the Technical Sciences Group of the Ministry of National Education Expert Committee, Member of the Committee of Automation and Robotics of Polish Academy of Sciences (PAN). Member of the Scientific Society of Warsaw (TNW). Head of ICCE Control and Systems Division since its creation in 1996

Interests: hierarchical control, model-based predictive control of nonlinear systems, applications of optimization

Project participation: [P6], [P7], [P16], [P30], **[P31]**

Publications: [IC19], [IC23], [OC1], [OC5]

Presentations: [Pr10]

Ewa Niewiadomska-Szynkiewicz Assistant Professor, Control and Systems Division.

room 573
tel. 660 7632
E.Niewiadomska@ia.pw.edu.pl

M.Sc. 1986, Ph.D. 1995 from WUT.

Research Assistant at the Institute of Geophysics of Polish Academy of Sciences in (1987–88), with WUT since 1988

Interests: large scale systems, hierarchical control, control systems analysis, computer aided control systems design, environmental systems management, decision support systems, distributed computations, global optimization

Project participation: [P6], **[P7]**, **[P14]**, **[P15]**, [P16]

Publications: [IC10], [OC2], [OC3], [OC12]

Krzysztof Nowosad Assistant Professor, Control and Systems Division.

rooms 567 and 036
tel. 660 7860 and 660 7757
K.Nowosad@ia.pw.edu.pl

M.Sc. 1973, Ph.D. 1979, D.Sc. 1997 from WUT.

With WUT since 1978

Interests: stability and performance analysis of predictive regulators, programmable logic controllers, industrial electronics

Project participation: [P7], [P9], [P10], [P32]

Publications: [I5]

Reports: [R6]

room 522
tel. 660 7733
A.Pacut@ia.pw.edu.pl

Andrzej Pacut Assistant Professor, Control and Systems Division

M.Sc 1969, Ph.D. 1975 from WUT.

With Warsaw University of Technology since 1969, first with the Institute of Mathematics (until 1978) then with ICCE. Visiting Assistant Prof. at Lefschetz Center for Dynamical Systems of Brown University, Providence, RI (1980–1981), Visiting Associate Prof at Oregon State University, Corvallis, OR (1984 and 1986–1991) Deputy Director of ICCE 1985–1986 and 1993 to present. Member of IEEE and INNS (Int. Neural Networks Society)

Interests: system identification, neural modeling, neural networks, learning systems, probability, statistics

Project participation: [P11], [P12], **[P18]**, **[P30]**, **[P31]**

Publications: [I2], [I6], [L1], [IC11], [IC12], [IC13], [IC14], [IC15]

Reports: [R7]

room 22/23
tel. 660 7750 and 255280
J.Paczynski@ia.pw.edu.pl

Jerzy Paczyński Assistant Professor, Optimization and Decision Support Division.

M.Sc. 1963, Ph.D. 1974 from WUT, M.Sc. in Mathematics 1973 from Warsaw University.

With WUT since 1963. Deputy Director for Academic Affairs (since Sept. 1996)

Interests: application of computer algebra and logic programming to systems theory and optimization

Project participation: **[P16]**, [P30], **[P31]**

Publications: [OC4]

room 560a
tel.660 7864
K.Pienkosz@ia.pw.edu.pl

Krzysztof Pieńkosz Assistant Professor, Robotics and Operation Research Division.

M.Sc. 1984, Ph.D. 1992 from WUT.

With the Research Institute of Polish Gas and Oil Company 1984–1986, with WUT since 1986

Interests: Operations Research, in particular discrete optimization, combinatorial algorithms, production planning and scheduling in manufacturing systems. Other interests: sport (football, swimming, windsurfing, skiing).

Project participation: [P2], **[P5]**

Publications: [I3], [L6], [IC16], [IC17]

Presentations: [Pr11]

room 560a
tel. 660 7864
G.Ploszajski@ia.pw.edu.pl

Grzegorz Płoszajski Assistant Professor, Robotics and Operation Research Division.

M.Sc. 1968, Ph.D. 1974 from WUT, M.Sc. in Mathematics 1974 from Warsaw University.

With WUT since 1969. Deputy Director for Information of the Main Library of WUT since 1996

Interests: control and simulation of discrete production systems, e.g assembly lines, production management, quality management

Tadeusz Rogowski Senior Lecturer (part time), Optimization and Decision Support Division.

rooms 530, 319GG
tel. 660 7922, 660 5392
T.Rogowski@ia.pw.edu.pl

M.Sc. 1972.

Optimization and Decision Support Division. With WUT since 1972, Director of University Computer Center since 1989

Interests: computer network, programming languages, operating systems

Project participation: [P16]

Stefan Romicki Assistant Professor, Control and Systems Division.

room 571
tel. 660 7861
S.Romicki@ia.pw.edu.pl

M.Sc. 1962, Ph.D. 1970 from WUT.

With WUT since 1962

Interests: automatic control, design of microprocessor devices, digital servomechanisms

Andrzej Rydzewski Senior Lecturer, Control and Systems Division.

room 566
tel. 660 7649
A. Rydzewski@ia.pw.edu.pl

M.Sc. 1974 from WUT.

With WUT since 1974

Interests: design of digital systems and microprocessor-based control and measurement systems

Project participation: [P11], [P12], **[P22]**, [P26]

Publications: [L9], [IC24]

Krzysztof Sacha Assistant Professor, Control and Systems Division.

room 562
tel. 660 7756
K.Sacha@ia.pw.edu.pl

M.Sc. (1973), Ph.D. (1976), D.Sc. (1996) from WUT.

With Minicomputer Research and Development Center ERA (1973), with WUT since 1976. Software Engineering Consultant for Industrial Automation Enterprise PNEFAL (1987–90), member of IEEE

Interests: software technology for real-time applications with the emphasis on software specification and design methods, and distributed operating systems

Project participation: [P4], **[P13]**, **[P17]**, **[P20]**

Publications: [B1], [I7], [L7], [LC4]

Reports: [R11]

Andrzej Stachurski Assistant Professor, Optimization and Decision Support Division.

room 25a
tel. 660 7640
A.Stachurski@ia.pw.edu.pl

M.Sc. 1976, Ph.D. 1980 from WUT.

Senior Assistant (1979–80) and then Assistant Professor (1980–92) at the Institute of System Research (IBS PAN), with WUT since 1992. Visiting Professor at the Calabria University, Italy, 1984, Äbo Swedish Academy in Turku, 1987, Jyväskylä University, Finland, 1988, JSPS invitee at the Department of Control Engineering, Osaka University, Japan, 1988–89. Member of Polish Society of Operations and Systems Research

Interests: nonlinear programming, large-scale optimization, applications to the optimal design problems in structural engineering

Project participation: [P16]

room 571
tel. 660 7861
K.Szacka@ia.pw.edu.pl

Krystyna Szacka Assistant Professor, Control and Systems Division.

M.Sc. 1957, Ph.D. from WUT 1966.

With WUT since 1954, retired on 31 December 1998.

Interests: robot trajectory planning, robot control systems

Project participation: **[P24]**, **[P25]**

Reports: [R12]

room 530
tel. 660 7922
J.Szymanowski@ia.pw.edu.pl

Jacek Szymanowski Professor, Control and Systems Division.

M.Sc. 1962, Ph.D. 1966, D.Sc. 1983 from WUT.

With WUT since 1968. Visiting Professor, Laboratoire d'Automatique de Nantes, Ecole Centrale de Nantes, France, 1992, 1994, 1995, 1996, 1997

Interests: simulation of control systems, linear and nonlinear programming, control applications of optimization techniques, operating systems

Project participation: [P16], **[P19]**

Reports: [R14]

Presentations: [Pr14]

room 554
tel. 660 7866
W.Szynkiewicz@ia.pw.edu.pl

Wojciech Szynkiewicz Assistant Professor, Robotics and Operation Research Division.

M.Sc. 1985, Ph.D. 1996 from WUT.

With WUT since 1985

Interests: multiple robots coordination, robot motion space analysis and trajectory planning

Project participation: [P4], [P11], [P12], [P22], **[P26]**

Publications: [L9], [IC24]

Reports: [R17]

room 521
tel. 660 7397
P. Tatjewski@ia.pw.edu.pl

Piotr Tatjewski Professor, Control and Systems Division. Director of the Institute.

M.Sc. 1972, Ph.D. 1976, D.Sc. 1988 from WUT.

With Warsaw University of Technology since 1972. Ph.D. in automatic control in 1976, D.Sc. in 1988. Head of Process Control Group since 1991, Deputy Director of ICCE for Academic Affairs (1987–91), Director of ICCE since 1996. Head of the Undergraduate Degree Program in Computer Control Systems (1994-1996). DAAD scholarship in 1978 (TU Hanover), SERC research fellow at the City University, London (1986), visiting professor at the University of Birmingham (1992/93). Member of the FEIT Board for Graduate Studies, Member of the FEIT Committee on the Faculty Structure and Organization. Member of the IFAC Education Committee.

Interests: multilayer control systems, process control and optimization, decomposition methods in optimization and control, soft computing methods

Project participation: **[P9]**, [P9], **[P10]**, [P30], **[P31]**, **[P32]**, [P32]

Publications: [IC3], [IC21], [LC5]

Reports: [R15], [R16]

Eugeniusz Toczyłowski Professor, Robotics and Operation Research Division.

room 516
tel. 660 7950
E.Toczylowski@ia.pw.edu.pl

M.Sc. 1973, Ph.D. 1976, D.Sc. 1989 from WUT.

With WUT since 1973. Head of Operations Research and Production Management Group, Vice-Dean of the Faculty of Electronics at WUT (1990–1993), chairman of the Rector's Committee for University Computerization since 1993, Advisor to the Dean on Strategic Planning (1993–1996). Head of an Undergraduate Program in Information Systems for Decision Support

Interests: structural approaches to discrete optimization, operations research and management, management information systems

Project participation: **[P1]**, **[P2]**, [P5], **[P29]**, [P30], **[P31]**

Publications: [L5], [IC8], [IC17], [IC20], [IC22], [OC6]

Presentations: [Pr13]

Tomasz Traczyk Assistant Professor, Robotics and Operation Research Division.

room 561
tel. 660 7123
T.Traczyk@ia.pw.edu.pl

M.Sc. 1984, Ph.D. 1992 from WUT.

with WUT since 1984,

Interests: database management systems (DBMS), applications of DBMS in management and control, fourth generation languages, CASE methods, information systems, distributed systems

Publications: [OC7], [OC8], [OC9], [OC10], [OC11]

Wiesław Traczyk Professor and Head, Optimization and Decision Support Division.

room 523
tel. 6607791
W.Traczyk@ia.pw.edu.pl

M.Sc. 1959, Ph.D. 1964, D.Sc. 1969 from WUT, the title of Professor awarded 1983.

With WUT since 1957, Vice-Dean of the Faculty of Electronics (1971–1975), Deputy Director (1975–1981) and Director of ICCE (1981–1984). Member of the Automation and Robotics Committee of Polish Academy of Sciences (PAN). Chairman of FEIT Committee for Ph.D. Degrees in Automatic Control and Computer Sciences, Member of FEIT Committee on Academic Staff Development. Head of ICCERobotics and Operation Research Division since 1997

Interests: knowledge engineering, expert systems, artificial intelligence

Project participation: [P9], [P16]

Publications: [I8], [LC6]

Andrzej P. Wierzbicki Professor, Optimization and Decision Support Division.

room 24
tel. 660 7750
A.Wierzbicki@ia.pw.edu.pl

M.Sc. 1960, Ph.D. 1964, D.Sc. 1968 from WUT, titles of Professor of Optimization and Decision Theory awarded in 1975 and 1992.

With WUT since 1961, half time since March 1997. Deputy Director of the ICCE (1971–75), Deputy Dean and then Dean of FEIT, head of ICCERobotics and Operation Research Division since (1996-1997), member of the Senate (1975–78), member or chairman of many university commissions. Since 1978 working with the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria and served (1979–84) as the chairman of the Systems and Decision Sciences Program. Visiting prof. at the University of Minnesota, Minneapolis, MN, Brown University, Providence, RI (1970–71), and Kyoto University, Japan (1989–90). Director of the Institute of Telecommunications since 1996. Chairman of the Consulting Council of the Ministry of Telecommunications (since 1997), Chairman of the Consulting

Panel for Promotion and Policy of Science of State Committee for Scientific Research (KBN) (since 1994), Member of the Consulting Panel for Computer Infrastructure of Science KBN (since 1994). Chairman of the Scientific Council s of the Industrial Institute for Automation and Measurements (PIAP) (since 1991), Scientific and Academic Computer Network (since 1994), and Deputy Chairmen of the Scientific Council of Institute of System Research (IBS PAN) (since 1996). Member of the Committee of Automation and Robotics of Polish Academy of Sciences (PAN) (since 1970), Chairman of its Section on Decision Support Systems (since 1992), Member of the presidium of the Committee of Future Research "Poland in XXI Century" of PAN (since 1996), Member of the Panel for Cooperation with IIASA of PAN. Member of the presidium of the Polish Association for the Club of Rome (since 1995). Member of Polish Mathematical Society (PTM) (since 1975) and of Society of Polish Electrical Engineers (SEP) (since 1970). Recepient George Cantor Award of the Int. Soc. of Multi-Criteria Decision Making for his results in multicriteria optimization theory and decision support methodology (1992)

Interests: optimization theory and algorithms, decision theory, decision support systems, negotiation methods and experiences, applications in telecommunication, information society issues

Project participation: **[P16]**

room 560
tel. 660 7665
A.Wozniak@ia.pw.edu.pl

Adam Woźniak Assistant Professor, Control and Systems Division.

M.Sc. 1970, Ph.D. 1975 from WUT.

With WUT since 1970. Advisor to the Dean of Faculty for Departmental Libraries (1987–93)

Interests: Multicriteria optimization, mathematical modeling of economic systems, game theory, decision support systems

Project participation: [P7], [P11], [P12]

Presentations: [Pr16]

room 24
tel. 660 7750
K.Wydro@ia.pw.edu.pl

Kornel B. Wydro Assistant Professor, Optimization and Decision Support Division.

M.Sc. 1959, Ph.D. 1972 from WUT. Retired on 31 December 1998.

Industrial training at ASEA, Vasteras, Sweden 1958–1959, with the Planning Office for Railway Electrification 1959–1961, with the Planning Office for Industrial Works Constructing and Completing 1961–1963. With WUT since 1963. Deans's Advisor for Students Industrial Training (1978–87), Deputy Director for Teaching of ICCE (1990–93), Deans Advisor for the the Department Promotion (1993–96). Advisor to various industrial and telecommunication institutions. Member of the Supervising Board of the Polish Telecom TP S.A., the Rural Telecommunication Society RUTEL, the Rural Infrastructure Development Group (FAPA-ASAP), the Supervising Board of Telecom-Telos factory, and Telecommunications Section of the Committee of Electronics and Telecommunications of PAN. Executive Editor of monthly Przegląd Telekomunikacyjny i Wiadomości Telekomunikacyjne

Interests: remote control, information theory, transmission of information, network optimization, systems analysis, telecommunication development

Publications: [O9], [O10], [O11], [O12]

Cezary Zieliński Professor, Robotics and Operation Research Division.

room 565
tel. 660 7750, 8255280
C.Zielinski@ia.pw.edu.pl

M.Sc. 1982, Ph.D. 1988, D.Sc. 1996 from WUT.

With WUT since 1985. Research visitor at Loughborough University of Technology, UK (1992), Secretary of Priority Research Program in Control, Information Technology, and Automation (PATIA). Member of the Editorial Board of International Journal of Intelligent Mechatronics: Design and Production. Member of the Rector's Committee for Research (since Oct. 1996), Member of FEIT Committee for Awards and Distinctions (since Oct. 1996)

Interests: robot programming languages, open-structure robot controllers, robot kinematics, digital and microprocessor systems

Project participation: [P4], **[P11]**, **[P12]**, [P22], [P26], [P30], **[P31]**

Publications: [L8], [L9], [IC24]

Reports: [R17]

2.2 Supporting Faculty and Staff

Here we list Lecturers, Assistants, and Research Associates, as well as Technical Staff

Piotr Bolek Research Associate, Control and Systems Division.

room 560
tel. 660 7665
P.Bolek@ia.pw.edu.pl

M.Sc. 1991 from WUT.

With WUT since 1991

Interests: operating systems, UNIX, symbolic calculations, computer networks, parallel and distributed computing, game theory, text processing, electronic publications, TeX, perl, SGML, HTML, PDF, databases

Publications: [I1], [IC2], [O2], [O3], [O4], [O5], [O6], [O7]

Presentations: [Pr1], [Pr2], [Pr3], [Pr4]

Andrzej Grodecki Assistant, Robotics and Operation Research Division.

M.Sc. 1989 from WUT.

With WUT from 1987 to 30 August 1998

Interests: robot control

Project participation: [P4]

Krzysztof Kierzenkowski Assistant, Robotics and Operation Research Division.

room 553
tel. 660 7121
K.Kierzenkowski@ia.pw.edu.pl

M.Sc. 1992 from WUT.

With WUT since 1993

Interests: machine vision, image processing, robot control systems, parallel and distributed computation

Project participation: **[P8]**

Publications: [L3]

Urszula Kręglewska Research Associate, Robotics and Operation Research Division.

room 562
tel. 660 7756
U.Kreglewska@ia.pw.edu.pl

M.Sc. 1973.

With WUT in 1973–1993 and from 1994 to present, with Digital Equipment Poland 1993–1994,

Interests: computer-robot interfaces designing, microprocessor systems design

Project participation: [P4]

Publications: [L4]

room 525
tel. 660 7699
W.Macewicz.@ia.pw.edu.pl

Włodzimierz Macewicz Research Associate, Control and Systems Division.

M.Sc. 1983 from WUT.

With WUT since 1983

Interests: computer networks, data bases, operating systems, programming languages, text processing

Publications: [OC10]

room 566
tel. 660 7649
P.Misiurewicz@ia.pw.edu.pl

Piotr Misiurewicz Senior R&D Engineer, Control and Systems Division.

M.Sc. 1961, Ph.D. 1969 from WUT.

With WUT since 1965. Deputy Director of ICCE (1984-93)

Interests: design of digital systems and microprocessor-based control and measurement systems

room 567
tel. 660 7860
J.Pułaczewski@ia.pw.edu.pl

Jerzy Pułaczewski Associate Professor, and Senior R&D Engineer, Control and Systems Division.

M.Sc. 1958, Ph.D. 1965 from WUT.

With WUT since 1956, Deputy Director of ICCE (1972–80 and 1993–96), Deputy Dean of the Faculty of Electronics (1981–87), Chairman of the Departmental Curriculum Committee (1981–90), member of the Senate of Warsaw University of Technology (1987–90). Scholarship in Moscow Electroenergy University (1958–59), the British Council scholarship at Cambridge University, UK (1965–66), visiting researcher at Minneapolis University, Minneapolis, MN (1980–81). Member of the Scientific Council of the Institute of Radio- and Telecommunications

Interests: digital control algorithms, process modeling and simulation, process control

Project participation: [P9], [P10], [P32]

Publications: [IC9], [O8]

Reports: [R5], [R8], [R9], [R10]

room 519
tel. 660 7863
J.Sobczyk@ia.pw.edu.pl

Jerzy Sobczyk Lecturer, Optimization and Decision Support Division.

M.Sc. 1985 from WUT.

With WUT since 1984. FEIT Network Administrator

Interests: programming languages, parallel and distributed programming, multicriteria optimization, computer networks

Project participation: [P16]

room 573
tel. 120 7632
M.Warchol@ia.pw.edu.pl

Michał Warchoł Assistant, Control and Systems Division.

M.Sc. 1991 from WUT.

With WUT since 1991

Interests: predictive control, synthesis of control systems, symbolic calculations, operating systems

Project participation: [P6], [P7], [P14], [P15], [P16]

Publications: [IC10], [IC23]

Grzegorz Wójcik Research Associate, Optimization and Decision Support Division.

room 519
tel. 660 7863
G.Wojcik@ia.pw.edu.pl

M.Sc. 1994 from WUT.

With WUT since 1994, half time since Feb. 1998.

2.3 Ph.D. Students

E-mail addresses of Ph.d. students have form: *i.name*@elka.pw.edu.pl where *i* = first name initial, *name* = surname.

Baba Almadani Ahmed	
Piotr Arabas	Project participation: [P7]
Paweł Białoń	Reports: [R1]
Marek Brudka	Project participation: [P12], [P11]; Publications: [L1], [IC14]; Reports: [R7]
Rafał Cegieła	Project participation: [P13]
Ewa Figielska	Project participation: **[P3]**; Publications: [IC4]
Marcin Galwas	
Cezary Głowiński	
Artur Jaros	
Michał Jaworski	Project participation: [P12], [P11]; Publications: [L1], [IC14]; Reports: [R7]
Piotr Kaczmarczyk	
Mariusz Kamola	
Monika Kosmulska	
Tomasz Kruk	Reports: [R14]
Remigiusz Krupa	Project participation: [P5]
Bartłomiej Lewandowski	
Paweł Leśkiewicz	
Andrzej Machnacz	
Przemysław Magiera	
Krzysztof Maik	Project participation: [P1], [P5]; Publications: [L5], [IC8]
Piotr Marusak	Project participation: [P9], [P10], [P32]; Publications: [IC9], [LC3], [LC2]; Reports: [R5]
Szczepan Pacut	
Dariusz Radomski	Project participation: [P11]
Tomasz Sikorski	Project participation: [P1], [P5]
Mariusz Siomak	Project participation: [P7]; Publications: [IC19], [OC5]
Piotr Stępień	
Adam Szmigielski	
Mirosław Szpilewski	
Cezary Szwed	Project participation: [P1]; Publications: [IC20]; Reports: [R13]
Wojciech Tadej	Project participation: [P9]
Mucai Tedy	
Artur Walczak	Project participation: [P5]
Jakub Witkowski	
Karol Zadora-Przyłęcki	
Andrzej Zalewski	Project participation: [P13]
Tomasz Ładziński	
Maciej Ławryńczuk	Project participation: [P10], [P32]; Reports: [R18]
Tomasz Żabierek	

Maciej Żmuda	Project participation: [P15], [P14], [P7]; Publications: [IC10], [OC12]

2.4 Administrative and support staff

Jolanta Cieślewicz	Librarian and Office Support.
Elżbieta Głowacka	Secretary, Student Affairs.
Maria Graszka	Office support.
Elżbieta Matyjasiak	Secretary, Main Office.
Jolanta Niedbało	Office support.
Irena Olszewska	Manager, Finances. M.Sc. 1979 from Warsaw University.
Jadwiga Osowska	Deputy Manager, Finances. M.Sc. 1975 from WUT.
Ryszard Tchórz	Technical support.
Daniel Wieczorek	Technical support.
Andrzej Wiśniewski	Technical support.
Beata Woźniak	Manager, Administration. M.Sc. 1993 from Warsaw University.

3 Teaching Activities

3.1 Undergraduate and Graduate Courses 1997/98

Course Title,	Dept. Course Code	Total credits	Lecturer
Administration of UNIX and TCP/IP	ASU	4	J. Sobczyk
Application Building in UNIX Environment	TAU	4	J. Granat
Artificial Intelligence Methods	MSI	3	W. Traczyk
Arts of Negotiations	SNE	3	A. Wierzbicki
Commercial Data Bases 2	KBD2	4	T. Traczyk
Application of Programming	KPU	2	Z. Komor
Computer Architectures	ARKO	1	K. Kierzenkowski W. Macewicz W. Szynkiewicz
Computer Control 1	USK1	4	K. Sacha
Computer Control 2	USK2	4	K. Nowosad
Computer Networks	SKP2	3	J. Sobczyk T. Rogowski
Computer-Aided Control Systems Design	PURP	1	A. Woźniak
Computerized Decision Support	KWDP	1	J. Granat
Control Design	PURE	4	A. Woźniak
Control Theory	TST	4	A. Woźniak
Control and Identification	SII	4	A. Pacut
Controls Fundamentals	PRE	3	K. Nowosad
Data Bases and Information Systems	BSSI	4	T. Traczyk
Decision Support and Design	WDIP	4	J. Granat
Digital Control Algorithms	CAR	3	J. Pułaczewski
Digital Curcuits	A-13	4	C. Zieliński
Digital Servomechanisms	SCYF	3	S. Romicki
Discrete Process Scheduling	HPD	4	E. Toczyłowski
Evolutionary Algorithms	AE1	3	F. Seredyński
Fundamentals of Control Algorithms 2	PAS2	4	P. Tatjewski
Fundamentals of Control Systems	PSS	4	K. Nowosad K. Sacha R. Ładziński
Fundamentals of Operation Research	POBO	3	K. Pieńkosz G. Płoszajski
Fundamentals of Optimization	PO,POPTY,POPR	4	A. Stachurski
Fundamental of Parallel Computations	AOR	4	A. Karbowski
Information Project Management	ZPI	3	K. Pieńkosz
Introduction to Control	WAIT	3	J. Pułaczewski
Knowledge Engineering	IW	3	W. Traczyk
Logic Circuits	UKLO	4	C. Zieliński
Measurements and Control	PA	2	Z. Komor
Methods of Global Optimization	MOG	4	E. Niewiadomska-Szynkiewicz
Microprocessor Techniques	TM	5	A. Rydzewski
Modeling and Control of Robots	MPSR	4	A. Gosiewski, C. Zieliński
Numerical Methods and Simulation	MNSK	4	P. Tatjewski
Object Oriented Programming	PROO	4+2	W. Kasprzak
Operating Systems	SOP2A	4	J. Szymanowski
Optimization and Decision Support	OWD	3	A. Wierzbicki
Parallel Computing 1	OBR1	3	F. Seredyński
Process Automatisation Techniques	TAP	3	J. Pułaczewski, P. Tatjewski
Programmable Controllers	SP	4	J. Gustowski
Programming 1	A-4	4	A. Karbowski, J. Paczyński

Course Title,	Dept. Course Code	Total credits	Lecturer
Real-time Systems	SCZR	4	K. Sacha
Robot Control and Programming	SPRR	3	A. Grodecki
Selected Topics in Industrial Management	WZMP	2	G. Płoszajski
Software Specification and Design	SPOP	3	K. Sacha
Structural Programming	PROS	4	J. Paczyński
Synthesis of Decision Rules	ZSRD	4	K. Malinowski
System Simulation and Control	SSS	3	A. Karbowski, K. Malinowski E. Niewiadomska-Szynkiewicz A. Woźniak
Theory of Optimization	TOP	3	A. Wierzbicki
WWW	WWW	3	J. Sobczyk

4 Projects

[P1] KBN grant PB 1121/T11/95/09: **Selected models and algorithms for production scheduling**, granting period 01.10.1995–30.09.1998. Coordinator: ICCE. Principal investigator: Eugeniusz Toczyłowski. Investigators: Cezary Szwed, Krzysztof Maik, Tomasz Sikorski.

In this project the research topics of three Ph. D. Students (T. Sikorski, K. Maik, C. Szwed) related to scheduling models and algorithms are developed

[P2] KBN grant PB 717/T11/96/11: **Development of structural optimization methods for production scheduling**, granting period 01.07.1996–01.07.1999. Coordinator: ICCE. Principal investigator: Eugeniusz Toczyłowski. Investigators: Franciszek Seredyński, Krzysztof Pieńkosz.

The basic aim of the project is to develop and analyze composite planning and scheduling algorithms for efficient solution of large-scale decision problems for discrete processes that appear mainly in production systems. A selection of various structural discrete optimization methods and techniques for scheduling of discrete processes is investigated

[P3] KBN grant PB 1032/T11/97/12: **Models and algorithms for production scheduling with resource limitations**, granting period 01.01.1997–01.07.1998. Coordinator: ICCE. Principal investigator: Ewa Figielska.

The problem of resource constrained preemptive scheduling is considered. We are given a collection of jobs to be produced in the production cell that consists of several different parallel machines. Each job consists in producing a large number of identical parts. To produce a job there are required certain quantities of several types of resources the usage of each being constrained to some fixed number of units. The objective is to minimize the total production cost.

The following extensions of the basic problem are considered: the resource limitations are modelled by the cost which is a piecewise linear function of the resource usage, the non-zero changeover time is incurred before processing each job. The research projects include: the optimal method based on the column generation technique, approximation methods based on the aggregation and disaggregation techniques, genetic algorithms for problems with non-zero changeover times, detailed analysis to determine parameters and problem characteristics that affect the quality and the computational efficiency of the developed methods

[P4] KBN grant 1005/T11/95/09: **A fast robot without configuration constraints and a dynamically decoupled arm**, granting period 01.09.1995–28.02.1999. Coordinator: Institute of Aeronautics and Applied Mechanics (ITLIMS). Principal investigator: Kazimierz Nazarczuk. Investigators: Anatol Gosiewski, Andrzej Grodecki, Cezary Zieliński, Krzysztof Sacha, Urszula Kręglewska, Wojciech Szynkiewicz.

The goal of the research was to design and construct the arm and the control hardware and software for the fast robot. Its arm has no configuration constraints. The arm was designed by the team from ITLiMS PW, and the control hardaware and software by the team from IAIS PW. The arm is actuated by three DD and three AC motors. The control hardware consists of a three processor computer in a VME standard. Two real time operating systems, namely QNX and OS-9, are used. The control software is based on the MRROC++ system.

[P5] KBN grant PB 788/T11/97/13: **Robust methods for management and control of manufacturing systems in the case of disturbances**, granting period 01.09.1997–30.06.2000. Coordinator: ICCE. Principal investigator: Krzysztof Pieńkosz. Investigators: Artur Walczak, Eugeniusz Toczyłowski, Franciszek Seredyński, Krzysztof Maik, Remigiusz Krupa, Tomasz Sikorski.

The aim of the project is to develop planning and scheduling methods for manufacturing systems in the case when some disturbances occur due to uncertain demands, machine tools breakdowns, absence of employees, etc. Both predictive and reactive scheduling algorithms are investigated which allow to reduce the effects of disturbances. A multi-agent approach is also analysed where the manufacturing system is modelled as a distributed system with relatively independent units

[P6] KBN grant PB 1369/T11/96/10: **Methods, models and simulations for operational flood prevention control**, granting period 01.04.1996–31.03.1998. Coordinator: ICCE. Principal investigator: Janusz Żelaziński. Investigators: Andrzej Karbowski, Ewa Niewiadomska-Szynkiewicz, Krzysztof Malinowski, Michał Warchoł.

This project is concerned with modelling and analysis of flood protection systems. In particular, problems of modelling of flood events are investigated and potential damages occurring due to high water levels and large flows are assessed.

[P7] KBN grant 8T11A01115: **Control structures and algorithms for complex systems, computational methods and applications**, granting period 01.09.1998–31.08.2000. Coordinator: ICCE. Principal investigator: Ewa Niewiadomska-Szynkiewicz. Investigators: Andrzej Karbowski, Krzysztof Malinowski. Other investigators: Adam Woźniak, Krzysztof Nowosad, Maciej Żmuda, Mariusz Siomak, Michał Warchoł, Piotr Arabas.

The goal of the project is to develop and implement control structures and algorithms for large scale systems. The focus is to apply the proposed control methods (hierarchical structures, predictive control algorithms, fuzzy sets, dynamic programming, neurodynamic programming) to the selected real-life complex problems and test their effectiveness based on simulation experiments. The considered case studies are: air defence, control of oil department in petrochemical works, flood control in multireservoir systems, optimal portfolio selection.

[P8] KBN grant PB 803/T11/96/11: **Robotized 3D object segregation system**, granting period 01.10.1996–30.09.1998. Coordinator: ICCE. Principal investigator: Krzysztof Kierzenkowski.

We consider an object segregation system objects delivered on a belt conveyor flight to a robot and observed by a CCD camera. Each object is detected and make the conveyor belt to stop and make a sequence of images by the robot-driven camera. The visual data enable to make the object identification, its location within the working space, and the grip determination. The identified and located object is picked up by the robot and put onto a proper pallet

[P9] PATIA grant: **Algorithms, software and research set-ups for industrial automation**, granting period 01.08.1997–30.06.1998. Coordinator: Institute of Automatic Control and Robotics (IAR). Subcontractor: ICCE. Principal investigator: Piotr Tatjewski, J. M. Kościelny. Investigators: Jerzy Pułaczewski, Krzysztof Nowosad, Piotr Marusak, Piotr Tatjewski, Wiesław Traczyk, Wojciech Tadej.

The following tasks are performed: Algorithms and software for advanced control and set-point optimisation of industrial processes, Algorithms and modules for an industrial process diagnosis system, Algorithms and modules for identification of industrial processes for supervision,diagnosis and control, Methods of design and analysis of distributed control systems open for new applications, Design principles of expert systems using the EXSYS professional tools, Construction of a laboratory setup for digital nonlinear algorithm analysis, Development of computer monitoring system for Half-Scale Technology Room of the Laboratory of Technological Processes.

[P10] PATIA grant: **Algorithms and software for advanced control and diagnostics of industrial processes**, granting period 01.08.1998–01.07.1999. Coordinator: Institute of Automatic Control and Robotics (IAR). Subcontractor: ICCE. Principal investigator: Piotr Tatjewski, Jan M. Koscielny. Investigators: Jerzy Pułaczewski, Krzysztof Nowosad, Maciej Ławryńczuk, Piotr Marusak.

The goal of the project is a further development of algorithms and software modules for upper-layer (supervisory) control of industrial processes, i.e., advanced control (multistep predictive control with constraints, nonlinear predictive control), set-point optimisation, identification and diagnostics. Pilot industrial implementation of the diagnostic system DIAG in the power plant Siekierki (Warsaw) is planned. Control systems for a new pilot production line in the Laboratory of Technological Processes (Faculty of Chemistry) will be designed and control equipment purchased. The installation is planned to be used in the future as a process for testing new control algorithms, and for training purposes. Software for distant alarm signalling in plants and for modelling behaviour of distributed upper-layer control and data acquisition from industrial plants will be completed.

The tasks will be performs by a team of researchers and PhD students from four collaborating institutes from different faculties of Warsaw University of Technology.

[P11] PATIA grant: **Control in complex robotic and adaptive systems**, granting period 01.08.1998–31.05.1999. Coordinator: ICCE. Participation: Institute of Automatic Control and Robotics (IAR), Institute of Aeronautics and Applied Mechanics (ITLIMS), Institute of Manufacturing Technology (ITM). Principal investigator: Cezary Zieliński. Investigators: Adam Woźniak, Anatol Gosiewski, Andrzej Pacut, Andrzej Rydzewski, Dariusz Radomski, Marek Brudka, Michał Jaworski, Wojciech Szynkiewicz.

The project consists of the following tasks: - improvement and investigations of a laboratory stand containing the RNT robot equipped for machining soft materials -

improvement and investigations of the RNT robot control system (electronic module controlling the rotational velocity of the machining tool, electronic module with digital inputs and outputs, improvement of robot axis control algorithms, new robot motion trajectory generators) - adaptive control utilising non-linear models (application of ultrasonic imaging to robot grasping, utilisation of probobilistic fields and wavelet transforms in image reconstruction, inverse model adaptive control)

[P12] PATIA grant: **Utilization of MRROC and MRROC++ systems in complex robotic tasks**, granting period 01.07.1997–30.06.1998. Coordinator: ICCE. Principal investigator: Cezary Zieliński. Investigators: Adam Woźniak, Anatol Gosiewski, Andrzej Pacut, Andrzej Rydzewski, Dariusz Radomski, Marek Brudka, Michał Jaworski, Wojciech Szynkiewicz.

The goal of the research is to analyse ultra-sonic images in such a way that they can be applied to grasping objects by robots. More overa robotised laboratory work-cell for machining of plastic objects is being constructed. This includes the design of the robot controller and an elaboration of a robot-task programming method. This work is suplemented by a calibration procedure for the robot subjected to different loads

[P13] PATIA grant: **Safety and Reliability Analysis for the Software Domain**, granting period 05.08.1998–31.05.1999. Coordinator: ICCE. Participation: Institute of Computer Science (II). Principal investigator: Krzysztof Sacha. Investigators: Andrzej Zalewski, Rafał Cegieła.

Safety and reliability are among the most important issues which must be addressed in the development of any dependable software system. The methods which can be applied to produce safe and reliable software remain still an open research problem. The subject of this project is an evaluation of the current practices and methods which are used within the software lifecycle in order to improve software safety and reliability. An important part of the research is focused on the application of Petri net-based models to the analysis of safety. The other part of the work relates to the analysis of various aspects of testing, which is considered an important factor of the software reliability.

[P14] PATIA grant: **Optimization in complex systems - methods and applications**, granting period 01.08.1998–31.05.1999. Coordinator: ICCE. Participation: Institute of Agricultural Machinery and Facilities, Institute of Electronic Systems (ISE), Institute of Environmental Engineering Systems (ISIS), Institute of Aeronautics and Applied Mechanics (ITLIMS). Principal investigator: Ewa Niewiadomska-Szynkiewicz. Investigators: Andrzej Karbowski, Maciej Żmuda, Michał Warchoł.

The objective of the project is to implement the selected methods of linear and nonlinear optimization and apply them to decision making process concerning planning and controlling of complex systems. The research is divided into several tasks. The main are: software environment and library of methods for global optimization, linear programming in optimal synthesis, parallel algorithm for time-domain aeroelastic analysis, parallel version of Greengard-Rokhlin algorithm, optimal strategy for water quality improvement.

[P15] PATIA grant: **Distributed hierarchical methods of control and optimization**, granting period 01.08.1997–31.05.1998. Coordinator: ICCE. Participation: Institute of Environmental Engineering Systems (ISIS), Faculty of Power and Aeronautical Engineering (MEL). Principal investigator: Ewa Niewiadomska-Szynkiewicz. Investigators: Andrzej Karbowski, Maciej Żmuda, Michał Warchoł.

The goal of the project is to develope and implement the distributed versions of hierarchical methods for control and optimization. The focus is on multilevel control structures with periodic coordination and iterative hierarchical methods for large optimization tasks. Two complex control systems for controlling of two multireservoir water systems located in Poland were developed and will be implemented under CSA&S. CSA&S (Complex Systems Analysis & Simulation) is the result of the previous PATIA projects from years 1995/96 and 1996/97.

Simultaneously the parallel version of the method for time-domain aeroelastic analysis was developed and is tested now

[P16] TEMPUS grant S-JEP-11253-96: **Information Technology for Decision Support and Computer Networks – Curriculum Development**, granting period 01.09.1996–31.08.1999. Coordinator: ICCE. Principal investigators: Andrzej Wierzbicki, Jerzy Paczyński. Investigators: Andrzej Karbowski, Andrzej Stachurski, Ewa Niewiadomska-Szynkiewicz, Grzegorz Wójcik, Jacek Szymanowski, Janusz Granat, Jerzy Sobczyk, Krzysztof Malinowski, Michał Warchoł, Tadeusz Rogowski, Wiesław Traczyk.

The objective of the project is to introduce new courses and restructure the existing ones in the relevant area, with a clear separation of subjects taught at Bachelor of Engineering, Master of Engineering, and Doctoral levels. Another goal is to modernize the teaching laboratories relevant for the new and restructured courses and to produce teaching materials. The courses include: Distributed Computer Operating Systems, Parallel and Distributed Computations, Foundations of Optimization, Foundations of Decision Support, Expert Systems and Knowledge Engineering, Advanced Modeling Languages, and Computer Networks

[P17] Rector's grant: **The evaluation of Profibus DP standard**, granting period 21.05.1998–31.05.1999. Coordinator: ICCE. Principal investigator: Krzysztof Sacha.

Fieldbus systems influence greatly the overall dependability of modern computer control systems. The architecture of fieldbuses differ significantly from the architecture of popular LANs. One of the most broadly used fieldbus system is Profibus, which was standardized in 1991. A few years ago the standard has been updated and much faster Profibus DP has been introduced to the market. The goal of this project is to instal Profibus DP in the laboratory of real-time systems, integrate the fieldbus within the programming environment of the laboratory and to evaluate the real speed of the network communication.

[P18] Rector's grant: **Reinforcement learning**, granting period 21.05.1998–31.05.1999. Coordinator: ICCE. Principal investigator: Andrzej Pacut.

The project is directed into modeling of learning systems with special attention paid to reinforcement learning. In the project we analyze biological reinforcement models on the cell and on the neural system level.

[P19] Rector's grant 503/006/8: **An optimal differential model for antipersistent fractional motion**, granting period 30.05.1998–30.05.1999. Coordinator: ICCE. Principal investigator: Jacek Szymanowski.

Tis work deals with the study of fractional brownian motion (fbm) and fractional gaussian noise (fgn). It is quite impossible to get simulation algorithm which satisfies all the properties of (fbm). The model of BARNES and ALLAN has been used, which fits very well the (fbm) for fractal dimension less than 0.5. This model

leads to an infinite dimension state model. It is shown that each state is solution of a first order equation with time-varying parameter. The simulation is thus transformed into the solution of this non-stationary model. The discretisation problem is not evident. The solution which has been proposed is on non uniform sampling period. This sampling function is the result of an optimisation of the multi-criteria function. This optimisation takes also into account seach for the “optimal” finite dimension model used in the simulation. At last, the performances of this algorithm has been presented for several values of the fractal dimension

[P20] Rector’s grant: **A testbed for Profibus network**, granting period 01.06.1997–30.05.1998. Coordinator: ICCE. Principal investigator: Krzysztof Sacha.

The main goal of the project is to design and implement a high-level application layer interface (ALI) for Profibus network on VM42 industrial computer system. The results of the project will be used in the laboratory of Real-Time Systems.

[P21] Dean’s grant: **Synthesis of multivariable control systems using algebraic methods — On reducing the order of stabilizing compensator**, granting period 01.09.1997–31.12.1998. Coordinator: ICCE. Principal investigator: Radosław Ładziński.

The considered problem is related to the order of compensator applied in a feedback system for stabilization of linear time-invariant multivariable plants. It is shown that all such compensators evolve from a structure depicted in two forms. The results include the reduced and subreduced order compensators as well as a statistic output feedback, i.e. the compensator of order zero. All theoretical considerations are supported by examples, in which various types of compensators are synthesized

[P22] Dean’s grant: **Axis controllers for the IRp–6 robot**, granting period 01.09.1997–31.03.1998. Coordinator: ICCE. Principal investigator: Andrzej Rydzewski. Investigators: Cezary Zieliński, Wojciech Szynkiewicz.

The goal of the research was to design and construct new hardware axis controllers for the IRp–6 robot. The ones used had a closed structure that did not allow the modification of control algorithms. The new controllers enable software implementation on an IBM-PC compatible computer of any control algorithms or the utilisation of the on-board integrated circuit control processor to implement an extended class of PID control algorithms. Moreover controller testing software was be implemented and tested.

[P23] Dean’s grant: **Control algorithms of strongly nonlinear objects with bounds**, granting period 01.11.1997–30.05.1998. Coordinator: ICCE. Principal investigator: Jerzy Gustowski.

The main goal of this grant is to propose, develop and test some algorithms especially designed for the nonlinear objects with various boundaries. Algorithms could be based on fuzzy logic and neural networks ideas. These algorithms could be tested on a laboratory rig which consists of the linear DC motor driving the movable cart to which the rotarily fixed arm is mounted. The object has strongly nonlinear statics and dynamics and all the state variables has to fulfill various limitations. The object could be treated as a model of a servomechanism itself, an inverted pendulum or an overhead crane. This means that the object is good for testing several control strategies

[P24] Dean's grant 503/012/8: **Two step, upperlevel controller for some nonlinear systems**, granting period 01.07.1998–31.12.1998. Coordinator: ICCE. Principal investigator: Krystyna Szacka.

The control system proposed deals with nonlinear processes, those control performance can be evaluated by means of a distance between the reference trajectory and the realized trajectory in the task space. Two steps upper level controller improves the accurancy of controlled processes

[P25] Dean's grant: **Analysis of a higher level control system for some nonlinear process**, granting period 01.09.1997–30.05.1998. Coordinator: ICCE. Principal investigator: Krystyna Szacka.

A new higher level control system is investigated. A quality of the control is based on a distance between the reference and the actual trajectories in the output variables space. The control system is realized in a "n-line" structure. The problem of such a structure is the balance between the accuracy and the stability of the system

[P26] Dean's grant 503/011/8: **MRROC++ controller for the IRp-6 robot mounted on a track**, granting period 01.07.1998–31.05.1999. Coordinator: ICCE. Principal investigator: Wojciech Szynkiewicz. Investigators: Andrzej Rydzewski, Cezary Zieliński.

In the design process of the controller for the IRp-6 robot mounted on a track it was assumed that it will be only one of the effectors working within the controlled system, so a formalized approach to structuring the controller of a multi-robot system has been adopted. The resulting structure renders programming multi-robot systems, on the one hand, relatively simple and, on the other hand, does not limit the hardware configuration that can be controlled and programmed. An open system has been produced. The adopted strategy is especially well suited to research-oriented robot controllers which have to facilitate the execution of often changing complex tasks requiring different hardware configurations (e.g. diverse sensors, varying number of robots and cooperating devices). An object-oriented approach to the implementation of a software library (MRROC++), which contains building blocks for the construction of multi-robot system controllers tailored to meet specific demands of a task at hand, has been used.

The overall structure of the MRROC++ system is dictated by theoretical considerations which resulted in the division of the system into independent processes running concurrently either on separate computers connected into a network or on a single computer in a time-sharing fashion or both. The choice is made by the programmer implementing a specific task. With each of the effectors an Effector Control Process (ECP) is associated. The coordinating process is called the Master Process (MP). Each virtual sensor is implemented as a Virtual Sensor Processes (VSP) running concurrently to the other VSPs and ECPs. Each ECP creates or kills Virtual Sensor Processes according to the needs of control of motion. The ECPs in each step obtain data from the VSPs. Both kinds of processes can be treated as device dependent drivers. In this way, if only one component of the system is changed the remaining components remain unaltered. A more elegant structure of the software component of the system can be obtained, if each ECP is partitioned into ECP proper and the Effector Driver Process (EDP).

[P27] Dean's grant 503/010/8: **Theory and computational methods of the optimal synthesis in multicriteria case**, granting period 01.07.1998–31.05.1999. Coordi-

nator: ICCE. Principal investigator: Andrzej Karbowski. Investigators: Andrzej Karbowski.

The aim of the project is elaboration of a unified theory and effective numerical methods of optimal control of dynamic systems in the case of multiple performance criteria. They may have the form of optimized indices or constraints of functional type.

[P28] Dean's grant 503/013/8: **Adaptive control algorithms of strongly nonlinear objects with bounds**, granting period 01.07.1998–31.05.1999. Coordinator: ICCE. Principal investigator: Jerzy Gustowski.

Project is a continuartion of the previous one. The main goal is to prepare neural network control algorithms combining the analitycal knowledge of the object and the data derived from real experiments.

[P29] Grant: **Analysis and Simulation of the Planning Model for the Polish Deregulated Electric Energy Industry**, granting period 01.11.1997–28.02.1998. Coordinator: ICCE. Principal investigator: Eugeniusz Toczyłowski.

Project granted by Polskie Sieci Elektroenergetyczne S.A.

The aim of the research was to perform a simulation analysis of a planning model for the Polish electric energy market, currently under developmen

[P30] Statutory grant 504/036: **Developement of control, decision support and production management**, granting period 01.06.1998–15.04.1999. Coordinator: ICCE. Principal investigator: Andrzej Pacut. Investigators: Cezary Zieliński, Eugeniusz Toczyłowski, Jerzy Paczyński, Krzysztof Malinowski, Piotr Tatjewski.

[P31] Statutory grant: **Developement of control, optimization and production management**, granting period 01.06.1997–30.05.1998. Coordinator: ICCE. Principal investigators: Andrzej Pacut, Cezary Zieliński, Eugeniusz Toczyłowski, Jerzy Paczyński, Krzysztof Malinowski, Piotr Tatjewski.

[P32] Grant 2453/NB-11/98: **Optimisation of the ethylene distillation column E-DA-303, part II**, granting period 17.12.1998–15.06.1999. Coordinator: ICCE. Participation: Industrial Chemistry Research Institute. Principal investigator: Piotr Tatjewski. Investigators: Jerzy Pułaczewski, Krzysztof Nowosad, Maciej Ławryńczuk, Piotr Marusak, Piotr Tatjewski.

The goal of the project is to design and implement an advanced control system for the ethylene distillation unit in Petrochemical Works in Płock, in order to improve economical efficiency of the plant.

5 Degrees Awarded

5.1 M.Sc. Degrees

Advisor: J. Gustowski

[D1] B. Lewandowski: *Sterowanie odwrotnego wahadła napędzanego silnikiem o ruchu liniowym przy użyciu komputera przemysłowego*

Advisor: Z. Komor

[D2] Lethanh Hai: *Wykorzystanie arkusza kalkulacyjnego do sprzęgania małych autonomicznych systemów pomiarowych i sterujących (na przykładzie implementacji w ICHP)*

Advisor: K. Kurman

[D3] D. M. Pakulski: *Projekt dwuwymiarowego układu regulacji dla obiektu absorpcyjno-desorpcyjnego, odsprzęganie i jego możliwości*

Advisor: K. Malinowski

[D4] G. Fus: *Implementacja zdalnego dostępu do zasobów serwera Netware za pomocą internetowego protokołu FTP*

Advisor: E. Niewiadomska-Szynkiewicz

[D5] D. Chilewicz: *Pakiet oprogramowania do wspomagania decyzji w zakresie bilansów wodno-gospodarczych*

Advisor: A. Pacut

[D6] A. Szmigielski: *Modele niepewności w podejmowaniu decyzji*

Advisor: K. Pieńkosz

[D7] P. Maślanka: *Wybrane algorytmy grafowe do modelowania procesów dyskretnych*

Advisor: J. Pułaczewski

[D8] A. Gottfried: *Symulacja, sterowanie i optymalizacja nieizotermicznego reaktora chemicznego*

[D9] D. Olkowski: *Lingwistyczna regulacja silnie nieliniowych obiektów przy pomocy sprzężenia od stanu*

[D10] I. Grzela: *Symulacja, sterowanie i optymalizacja produkcji roślinnej w szklarni*

[D11] M. L. Ławryniuk: *Optymalizacja i sterowanie kolumny rektyfikacyjnej*

Advisor: G. Płoszajski

[D12] M. M. Bąbski: *Koncepcja bazy danych w sieci Internet z rozproszonym wprowadzaniem i centralną taryfikacją danych na przykładzie bazy zapowiedzi konferencji*

Advisor: T. Rogowski

[D13] S. Pacut: *System ochrony sieci komputerowej na Politechnice Warszawskiej wraz z koncepcją taryfikacji ruchu*

Advisor: S. Romicki

[D14] T. Łabędzki: *Serwomechanizm cyfrowy*

[D15] W. Sarna: *Mikroprocesorowy rejestrator sygnałów i sterownik dysku*

Advisor: A. Rydzewski

[D16] A. G. Bieliński: *Sterownik sygnalizacji świetlnej SUS*

[D17] K. E. Kuliński: *System bezprzewodowej identyfikacji uprawnień dostępu z wykorzystaniem transpondera*

[D18] M. Stanisz: *Projekt i wykonanie programatora grubości rękawa do wytłaczarko-rozdmuchiwarki*

Advisor: K. Sacha

[D19] J. A. Marczewski: *Integracja środowiska systemu Transnet*

Advisor: J. Szymanowski

[D20] K. Baracz: *Analiza rozproszonego systemu plików w systemie Amoeba*

Advisor: J. Szymanowski

[D21] O. Wolski: *Mechanizmy komunikacji międzyprocesorowej w rozproszonym systemie operacyjnym AMOEBA*

[D22] R. Wysocki: *Wielowątkowość i zarządzanie procesami w systemie operacyjnym AMOEBA*

Advisor: P. Tatjewski

[D23] P. Tąbiewicz: *Środowisko metod optymalizacji punktów pracy procesów na bazie metody zintegrowanej optymalizacji i adaptacji parametrów*

Advisor: E. Toczyłowski

[D24] K. Sitkowski: *Rozwinięcie instalacji CIM symulującej działanie linii produkcyjnej*

Advisor: T. Traczyk

[D25] M. P. Jabłoński: *Symulator procesów produkcyjnych*

Advisor: W. Traczyk

[D26] B. Sławiński: *Algorytmy uczenia się maszyn z przykładów*

[D27] D. Starosta: *Zastosowanie systemu ekspertowego do wspomagania diagnostyki medycznej w pediatrii*

Advisor: A. Woźniak

[D28] K. Preiskorn: *Projektowanie układów regulacji dla obiektów nieliniowych*

Advisor: C. Zieliński

[D29] A. Miron: *Metody wyznaczania map głębi w systemach stereowizyjnych robotów przemysłowych*

5.2 B.Sc. Degrees

Advisor: K. Nowosad

[D30] J. Kapuściak: *Rola i zadania systemów SCADA. System WinCC firmy Siemens*

[D31] J. Marcinek: *Rola i zadania systemów SCADA. System WinCC firmy Siemens*

6 Publications

6.1 Monographies

6.1.1 Scientific or Technical Books

[B1] Krzysztof Sacha: „Sieci miejscowe - Profibus", Mikom, 1998

6.2 Scientific and Technical Papers in Journals

6.2.1 International Journals

[I1] Piotr Bolek: „METAPOST and patterns", *TUGboat*, **19** (1998) No. 3, pp. 276–283

[I2] Konrad Hejn, Andrzej Pacut, Leszek Kramarski: „The Effective resolution Measurements in Scope of Sine-Fit Test", *IEEE Trans. on Instrumentation and Measurement*, **47** (1998) No. 1 Feb., pp. 45–50

[I3] K.S. Hindi, T. Basta, Krzysztof Pieńkosz: „Efficient Solution of a Multi-commodity, Two-stage Distribution Problem with Constraints on Assignment of Customers to Distribution Centres", *International Transactions in Operational Research*, **5** (1998) No. 6, pp. 519–527

[I4] Włodzimierz Kasprzak, Heinrich Niemann: „Adaptive Road Recognition and Egostate Tracking in the Presence of Obstacles", *International Journal on Computer Vision*, **28** (1998) No. 1, pp. 6–27

[I5] Krzysztof Nowosad: „Predictive Control Sensitivity", *Bulletin of the Polish Academy of Sciences, Technical Sciences*, **46** (1998) No. 3, pp. 343–351

[I6] Andrzej Pacut, Konrad Hejn: „Equivalence of Widrow's and Gray's approaches to uniform quantizers", *Computer Standards and Interfaces*, **19** (1998), pp. 205–212

[I7] Krzysztof Sacha: „Safety Verification of Software Using Structured Petri Nets", *Lecture Notes in Computer Science*, **1516** (1998), pp. 329–342

[I8] Wiesław Traczyk: „Approximations in Data Mining", *Lecture Notes in Artifficial Intelligence*, **1424** (1998), pp. 589–592

6.2.2 Local Journals

[L1] Marek Brudka, Michał Jaworski, Andrzej Pacut: „Identyfikacja geometrii matrycy ultradźwiękowej", *Prace Naukowe Instytutu Cybernetyki Technicznej Politechniki Wrocławskiej*, **99** (1998), pp. 167–175

[L2] Władysław Findeisen: „Hierarchiczne struktury sterowania", *Nauka*, **1** (1998), pp. 65–71

[L3] Krzysztof Kierzenkowski: „Współbieżne przetwarzanie danych sensorycznych w systemach zrobotyzowanych", *Prace Naukowe Instytutu Cybernetyki Technicznej Politechniki Wrocławskiej*, **99** (1998), pp. 47–55

[L4] Urszula Kręglewska: „Architektura sterownika szybkiego robota", *Prace Naukowe Instytutu Cybernetyki Technicznej Politechniki Wrocławskiej*, **99** (1998), pp. 257–266

[L5] Krzysztof Maik, Eugeniusz Toczyłowski: „System zarządzania produkcją w modelowej instalacji CIM", *Zeszyty Naukowe Politechniki Śląskiej, Automatyka*, **124** (1998), pp. 85–89

[L6] Krzysztof Pieńkosz: „Metoda rozwiązywania problemu dystrybucyjnego z wykorzystaniem relaksacji Lagrange'a", *Zeszyty Naukowe Politechniki Śląskiej, Automatyka*, **123** (1998), pp. 277–286

[L7] Krzysztof Sacha: „Oprogramowanie systemowe wieloprocesorowego sterownika szybkiego robota", *Prace Naukowe Instytutu Cybernetyki Technicznej Politechniki Wrocławskiej*, **99** (1998), pp. 279–286

[L8] Cezary Zieliński: „Struktura i programowanie sterownikw systemw wielorobotowych", *Prace Naukowe Instytutu Cybernetyki Technicznej Politechniki Wrocławskiej*, **98** (1998), pp. 225–232

[L9] Cezary Zieliński, Wojciech Szynkiewicz, Andrzej Rydzewski: „Metoda konstruowania sterowników systemów wielorobotowych", *PAR Pomiary-Automatyka-Robotyka*, **2** (1998) No. 12, pp. 8–14

6.3 Scientific and Technical Papers in Conference Proceedings

6.3.1 International Conference Proceedings

[IC1] Jarosław Arabas, Leszek Białobrzeski, Paweł Domański, Konrad Świrski: „Advanced Boiler Control", *Proceedings of the Fifth International Symposium on Methods and Models in Automation and Robotic*, (1998), Międzyzdroje, pp. 521–526

[IC2] Piotr Bolek: „METAPOST and patterns", *Proceedings of the 19th Annual TeX Users Group Meeting*, (1998), Toruń, pp. 106–113

[IC3] Mieczysław A. Brdyś, Jan T. Duda, Piotr Tatjewski: „Improving optimality in multilayer control systems by tighter constraint control and supervision", *Large Scale Systems: Theory & Applications, 8th IFAC/IFORS/IMACS/IFIP Symposium, Preprints*, Vol. **1** (1998), Patras, Greece, pp. 468–473

[IC4] Ewa Figielska: „Integration of a Modified Genetic Algorithm with Mathematical Programming for Solving a Scheduling Problem", *Proceedings of the Fifth International Symposium on Methods and Models in Automation and Robotic*, (1998), Międzyzdroje, pp. 1035–1040

[IC5] Jerzy Gustowski: „Mechanical object driven by the linear DC motor. Modeling, identification and control concepts", *Proceedings of the 6th UK Mechatronics Forum International Conference*, (1998), Skovde, Szwecja, pp. 123–128

[IC6] Andrzej Karbowski: „ Two criteria: expected value - variance problems of the optimal synthesis", *Abstracts*, Vol. **1** (1998), Minsk, pp. 121–124

[IC7] Andrzej Karbowski: „On the connections between stabilization, network routing and receding horizon optimal control problems", *Large Scale Systems: Theory & Applications, 8th IFAC/IFORS/IMACS/IFIP Symposium, Preprints*, Vol. **II** (1998), Patras, Greece, pp. 776–781

[IC8] Krzysztof Maik, Eugeniusz Toczyłowski: „Effective method for solving multi-item lot-size problems with resource limitations", *Proceedings of the Fifth International Symposium on Methods and Models in Automation and Robotic*, (1998), Międzyzdroje, pp. 1063–1068

[IC9] Piotr Marusak, Jerzy Pułaczewski: „Fuzzy Nonlinear Servo. Identification, Designing, Testing", *Proceedings of the Fifth International Symposium on Methods and Models in Automation and Robotic*, (1998), Międzyzdroje, pp. 703–706

[IC10] Ewa Niewiadomska-Szynkiewicz, Michał Warchoł, Maciej Żmuda: „Software Environment for Distributed Simulation of Complex Systems", *Large Scale Systems: Theory & Applications, 8th IFAC/IFORS/IMACS/IFIP Symposium, Preprints*, Vol. **2** (1998), Patras, Greece, pp. 840–845

[IC11] Andrzej Pacut: „A reinforcement network with specialized critics", *Proc. of the International Workshop on Advanced Black-Box Techniques for Nonlinear Modeling*, (1998), Leuven, Belgium, pp. 203–210

[IC12] Andrzej Pacut: „Common Framework of Certain Reinforcement Schedules", *The 1998 IEEE International Joint Conference on Neural Networks Proceedings*, Vol. **III** (1998), Anchorage, Alaska, pp. 2004–2009

[IC13] Andrzej Pacut: „Neural approximations to dynamic programming in unknown environment", *Proceedings of the Fifth International Symposium on Methods and Models in Automation and Robotic*, Vol. **2** (1998), Międzyzdroje, pp. 651–656

[IC14] Andrzej Pacut, Marek Brudka, Michał Jaworski: „Neural processing of ultrasound images in robotic applications", *Proceedings 1998 IEEE Int. Workshop on Emerging Technologies, Intelligent Measurement and Virtual Systems for Instrumentation and Measurement*, (1998), St. Paul, Minnesota, pp. 59–66

[IC15] Andrzej Pacut, Konrad Hejn: „Analog-to-Digital Converters: Towards a Generalization of Widrow's Theorem", *Proc. IEEE Instrumentation and Measurement Conference*, Vol. **2** (1998), St. Paul, Minnesota, pp. 1190–1197

[IC16] Krzysztof Pieńkosz: „Robust hierarchical production planning in the case of uncertain demands", *Proceedings of the 13th International Conference on Systems Science*, Vol. **II** (1998), Wrocław, pp. 141–148

[IC17] Krzysztof Pieńkosz, Eugeniusz Toczyłowski: „An iterative aggregation approach to the capacitated lot size scheduling problem", *Proceedings of the Fifth International Symposium on Methods and Models in Automation and Robotic*, Vol. **3** (1998), Międzyzdroje, pp. 957–962

[IC18] Franciszek Seredyński: „Learning Scheduling Policies for Cellurar Automata-Based Scheduler", *Procedings of IIZUKA'98*, (1998), Fukuoka, Japan, pp. 841–844

[IC19] Mariusz Siomak, Krzysztof Malinowski: „Fuzzy Dynamic Programming in a Fuzzy Environment with a Fuzzy Dynamic System", *Abstracts*, Vol. **2** (1998), Minsk, pp. 243–246

[IC20] Cezary Szwed, Eugeniusz Toczyłowski: „Assignment of teachers to lectures in large-scale timetabling problems", *Proceedings of the 13th International Conference on Systems Science*, (1998), Wrocław, pp. 149–156

[IC21] Piotr Tatjewski: „Two-phase dual-type optimising control algorithm for uncertain plants", *Proceedings of the Fifth International Symposium on Methods and Models in Automation and Robotic*, Vol. **1** (1998), Międzyzdroje, pp. 171–176

[IC22] Eugeniusz Toczyłowski: „Coordination framework for a two layer planning and control structure", *Proceedings of the Fifth International Symposium on Methods and Models in Automation and Robotic*, (1998), Międzyzdroje, pp. 985–990

[IC23] Michał Warchoł, Krzysztof Malinowski: „An algorithm for control of the retention reservoir system under uncertainty”, *Large Scale Systems: Theory & Applications, 8th IFAC/IFORS/IMACS/IFIP Symposium, Preprints*, Vol. **1** (1998), Patras, Greece, pp. 559–564

[IC24] Cezary Zieliński, Andrzej Rydzewski, Wojciech Szynkiewicz: „Multi-Robot System Controllers”, *Proceedings of the Fifth International Symposium on Methods and Models in Automation and Robotic*, Vol. **3** (1998), Międzyzdroje, pp. 795–800

6.3.2 Local Conference Proceedings

[LC1] Jerzy Gustowski, Marusak, Andrzej: „Silnik prądu stałego o ruchu liniowym - model i identyfikacja części elektromagnetycznej”, *Prace X Sympozjum SPD-10 Symulacja Procesów Dynamicznych*, (1998), Zakopane-Kościelisko, pp. 153–162

[LC2] Piotr Marusak: „System wspomagania projektowania i badania algorytmów regulacji ze sterownikami PLC i symulatorami obiektów”, *Prace X Sympozjum SPD-10 Symulacja Procesów Dynamicznych*, (1998), Zakopane-Kościelisko, pp. 259–266

[LC3] Andrzej J. Marusak, Piotr Marusak: „Komputerowe analizatory systemów ze sprzężeniem zwrotnym”, *Prace X Sympozjum SPD-10 Symulacja Procesów Dynamicznych*, (1998), Zakopane-Kościelisko, pp. 253–257

[LC4] Krzysztof Sacha: „Ostre ograniczenia czasowe w sterowniku szybkiego robota”, *Materiały Konferencyjne V Konferencji Systemów Czasu Rzeczywistego „Real-Time Systems'98”*, (1998), Szklarska Poręba, pp. 62–71

[LC5] Piotr Tatjewski, Robert Puź, Marcin Sikora: „Symulator obiektów dynamicznych pracujący w czasie rzeczywistym”, *Prace X Sympozjum SPD-10 Symulacja Procesów Dynamicznych*, (1998), Zakopane-Kościelisko, pp. 351–358

[LC6] Wiesław Traczyk: „Możliwosci zastosowania systemów eksperckich do zarządzania sieciami telekomunikacyjnymi ”, *Krajowe Sympozjum Telekomunikacji'98*, Vol. **C** (1998), Bydgoszcz, pp. 163–168

6.4 Other Publications and Reports

Here we list unrefereed publications and publications of popular character, reports, and unpublished conference presentations.

6.4.1 Unrefereed Journals

[O1] J. Arabas, Paweł Domański, K. Świrski: „Praktyczne aspekty modelowania i optymalizacji procesów przemysłowych.”, *PAK*, **6** (1998), pp. 195–202

[O2] Piotr Bolek: „Formaty publikacji elektronicznych”, *Magazyn Linux & Unix*, **4** (1998), pp. 6–9

[O3] Piotr Bolek: „LaTeX2HTML”, *Biuletyn Polskiej Grupy Użytkowników Systemu TeX*, **10** (1998), pp. 37–48

[O4] Piotr Bolek: „Metapost i (pdf)TeX w Internecie”, *Biuletyn Polskiej Grupy Użytkowników Systemu TeX*, **11** (1998), pp. 65–68

[O5] Piotr Bolek: „Perl w przykładach - Korespondencja seryjna”, *NET FORUM*, **11** (1998), pp. 22–24

[O6] Piotr Bolek: „Perl w przykładach - Sortowanie”, *NET FORUM*, **12** (1998), pp. 20–22

[O7] Piotr Bolek, Adam Dawidziuk: „SGML - nowy etap w rozwoju TeX-a”, *Biuletyn Polskiej Grupy Użytkowników Systemu TeX*, **10** (1998), pp. 32–36

[O8] Jerzy Pułaczewski, Zygmunt Komor: „Nowy regulator rodziny EFTRONIK - EFTRONIK XF”, *PAK*, **3** (1998), pp. 63–67

[O9] Kornel Wydro: „Rozwój polskiej telekomunikacji w aspekcie potrzeb społeczeństwa informacyjnego”, *Przegląd Telekomunikacyjny*, **LXXI** (1998) No. 4, pp. 229–234

[O10] Kornel Wydro: „Rozwój telekomunikacji na obszarach niezurbanizowanych”, *Przegląd Telekomunikacyjny*, **LXXI** (1998) No. 5, pp. 334–338

[O11] Kornel Wydro: „Znaczenie nowych usług telekomunikacyjnych dla obszarów wiejskich”, *Przegląd Telekomunikacyjny*, **LXXI** (1998) No. 5, pp. 341–346

[O12] Kornel Wydro, Ryszard Kossowski: „Problemy ochrony informacji w epoce społeczeństwa informacyjnego”, *Przegląd Telekomunikacyjny*, **LXXI** (1998) No. 10, pp. 687–692

6.4.2 Unrefereed Conference Proceedings

[OC1] A. Kraśniewski, Krzysztof Malinowski, J. Woźnicki: „Shortening a Path to PhD - Impact on Quality of Engineering Education”, *Proc. American Society for Engineering Education Annual Conference*, Vol. **CDROM** (1998), Seattle, pp. 1–6

[OC2] Ewa Niewiadomska-Szynkiewicz: „Synchronous and Asynchronous Distributed Simulation - Methods and Tools”, *Proceedings of the Workshop Advanced Simulation of Systems*, Vol. **2** (1998), Krnov, Czechy, pp. 105–110

[OC3] Ewa Niewiadomska-Szynkiewicz, Jarosław Napiórkowski: „Application of Global Optimization Methods to Operational Control of Multireservoir Systems”, *ICHE'98 Conference Proceedings*, Vol. **CD-ROM** (1998), Cottbus, Niemcy, pp. 1–10

[OC4] Jerzy Paczyński: „Modelling Languages as a Teaching Challenge”, *Abstracts*, (1998), Laxenburg, Austria, pp. 34–34

[OC5] Mariusz Siomak, Krzysztof Malinowski: „Parallel Version of Dynamic Programming”, *PARALEC'98, International Conference on Parallel Computing in Electrical Engineering*, (1998), Białystok, pp. 214–217

[OC6] Eugeniusz Toczyłowski: „On aggregation methods for production scheduling”, *Abstract CORS/INFORMS Conference*, (1998), Montreal, pp. 26–29

[OC7] Tomasz Traczyk: „Bazy danych, narzędzia dostępu do danych i hurtownie danych”, *Czternaste Jesienne Spotkania PTI, Problemy jakości i niezawodności środków informatyki*, (1998), Mrągowo, pp. 75–86

[OC8] Tomasz Traczyk: „Hurtownie danych - wprowadzenie”, *Katalog ekspozycji i prezentacji*, (1998), Poznań, pp. 69–72

[OC9] Tomasz Traczyk: „Hurtownie danych”, *Bazy Danych'98*, (1998), Kazimierz Dolny, pp. 15–24

[OC10] Tomasz Traczyk, Włodzimierz Macewicz: „Język XML w aplikacjach z bazami danych - możliwości zastosowania, pierwsze doświadczenia”, *Ewolucja systemów informatycznych: dane, sprzęt, oprogramowanie i aplikacje*, (1998), Zakopane, pp. 133–146

[OC11] Tomasz Traczyk, Krzysztof Antoszkiewicz, Zdzisław Mączeński: „Zintegrowany system komputerowego wspomagania zarządzania dla elastycznego systemu studiów”, *Business Information Systems'98*, (1998), Poznań, pp. 659–668

[OC12] Maciej Żmuda, Ewa Niewiadomska-Szynkiewicz: „Software Tool for Asynchronous Simulation”, *Proceedings of the Workshop Advanced Simulation of Systems*, Vol. **2** (1998), Krnov, Czechy, pp. 141–146

6.4.3 Reports

[R1] Paweł Białoń: „A language and a software tool for general parallel parametric experiment in model analysis”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-18, 1998

[R2] Andrzej Cichocki, Juha Karhunen, Włodzimierz Kasprzak, Ricardo Vigario: „Neural Networks for Blind Separation with Unknown Number of Sources”, *Helsinki University of Technology, Research Report*, 1998

[R3] Jerzy Gustowski: „Algorytm sterowania wieloobszarowego obiektem nieliniowym (odwrócone wahadło napędzane silnikiem o ruchu liniowym)”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-4, 1998

[R4] Andrzej Karbowski: „Przegląd zagadnień związanych ze stosowalnością oraz zbieżnością metod optymalizacji rozproszonej opartych na dekompozycji bezpośredniej”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-15, 1998

[R5] Piotr Marusak, Jerzy Pułaczewski: „Rozmyte algorytmy regulacji nieliniowego, astatycznego obiektu elektromechanicznego ze sprzężeniem od stanu”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-2, 1998

[R6] Krzysztof Nowosad: „Sensitivity of the terminal control law”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-5, 1998

[R7] Andrzej Pacut, Marek Brudka, Michał Jaworski: „Zastosowanie matrycy ultradźwiękowej do rozpoznawania i chwytania obiektów”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-12, 1998

[R8] Jerzy Pułaczewski: „Algorytm DMC (Dynamic Matrix Control) dla niestabilnych obiektów nieliniowych”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-1, 1998

[R9] Jerzy Pułaczewski: „Algorytm regulacji DMC (Dynamic Matrix Control) Przypadek obiektu z opóźnieniem o jednym wejściu i jednym wyjściu z pomiarem i prognozą zakłócenia”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-6, 1998

[R10] Jerzy Pułaczewski: „Wielowymiarowy algorytm regulacji DMC (Dynamic Matrix Control)”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-11, 1998

[R11] Krzysztof Sacha: „Stanowisko badania sieci przemysłowej Profibus”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-10, 1998

[R12] Krystyna Szacka: „Analiza układu sterowania nadrzędnego obiektu nieliniowego o wielu wejściach i wielu wyjściach”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-16, 1998

[R13] Cezary Szwed: „Instrukcja użytkowania pakietu CPLEX 6.0”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-7, 1998

[R14] Jacek Szymanowski, Tomasz Kruk, Krzysztof Baracz, Oskar Wolski, Radosław Wysocki: „Laboratorium rozproszonych systemów operacyjnych”, *Pre-skrypt*, 1998, pp. 1–90

[R15] Piotr Tatjewski: „Struktury i algorytmy optymalizacji on-line punktów pracy procesó technologicznych”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-13, 1998

[R16] Przemysław Tomkiewicz, Piotr Tatjewski: „Optymalizacja bieżąca punktów pracy - implementacja, interfejs operatora w środowisku Windows”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-14, 1998

[R17] Cezary Zieliński, Wojciech Szynkiewicz: „Podręcznik użytkownika systemu MRROC++”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-9, 1998

[R18] Maciej Ławryńczuk: „Modelowanie i symulacja procesu destylacji dwuskładnikowej dla potrzeb projektowania układów regulacji”, *Raport Instytutu Automatyki i Informatyki Stosowanej Politechniki Warszawskiej*, No. 98-17, 1998

6.4.4 Unpublished Presentations

[Pr1] Piotr Bolek: „Elastyczność i efektywność - wybrane mechanizmy jądra uniksowego na przykładzie systemu Linux”, *Top UNIX98 – Top UNIX98*, Kraków, 23-24 listopada, 1998

[Pr2] Piotr Bolek: „LaTeX2HTML”, *VI Ogólnopolska Konferencja Polskiej Grupy Użytkowników Systemu TeX – BachoTeX’98*, Bachotek, 1998

[Pr3] Piotr Bolek: „Po co SGML?”, *Jesienne Warsztaty Linuksowe – PLUG’98*, Warszawa, 1998

[Pr4] Piotr Bolek, Adam Dawidziuk: „SGML - nowy etap w rozwoju TeX-a”, *VI Ogólnopolska Konferencja Polskiej Grupy Użytkowników Systemu TeX – BachoTeX’98*, Bachotek, 1998

[Pr5] Władysław Findeisen: „Hierarchiczne struktury sterowania”, *Szkoła Informatyki Stosowanej „Analiza Komputerowa i Podejmowanie Decyzji w Złożonych Systemach” – SIS*, Warszawa, 1998

[Pr6] Janusz Granat: „Graphical Specification of the User Preferences in Multiple-Criteria Model Analysis”, *14th International Conference Multiple Criteria Decision Making – MCDM98*, Charlottesville, 1998

[Pr7] Janusz Granat: „Multicriteria Analysis in the Design of Telecommunications", *IFIP WG 7.6 - IIASA Workshop on Advances in Modeling: Paradigms, Methods and Applications – AMAP 98*, Laxenburg, Austria, 1998

[Pr8] Janusz Granat, Marek Makowski: „ISAAP - Interactive Specification and Analysis of Aspiration-based Preferences", *12th JISR-IIASA Workshop on Methodologies and Tools for Complex System Modeling and Integrated Policy Assessment – CSM98*, Laxenburg, 1998

[Pr9] Andrzej Karbowski: „Optymalizacja rozproszona oparta na dekompozycji bezpośredniej", *Szkoła Informatyki Stosowanej „Analiza Komputerowa i Podejmowanie Decyzji w Złożonych Systemach" – SIS*, Warszawa, 1998

[Pr10] Krzysztof Malinowski: „Wstęp do optymalizacji hierarchicznej", *Szkoła Informatyki Stosowanej „Analiza Komputerowa i Podejmowanie Decyzji w Złożonych Systemach" – SIS*, Warszawa, 1998

[Pr11] Krzysztof Pieńkosz: „A greedy randomised algorithm for graph colouring", *16th European Conference on Operational Research – EURO XVI*, Bruksela, 1998

[Pr12] Mariusz Siomak: „Równoległe programowanie dynamiczne", *Szkoła Informatyki Stosowanej „Analiza Komputerowa i Podejmowanie Decyzji w Złożonych Systemach" – SIS*, Warszawa, 1998

[Pr13] Cezary Szwed, Eugeniusz Toczyłowski: „Wspomaganie decyzji przydziału specjalności dla studentów w warunkach elastycznego studiowania", *BOS'98*, Kutno, 1998

[Pr14] Jacek Szymanowski: „Unix a systemy rozproszone", *Top UNIX98 – Top UNIX98*, Kraków, 23-24 listopada, 1998

[Pr15] Jakub Witkowski: „Komputerowe wyznaczanie zbioru Parety", *Szkoła Informatyki Stosowanej „Analiza Komputerowa i Podejmowanie Decyzji w Złożonych Systemach" – SIS*, Warszawa, 1998

[Pr16] Adam Woźniak: „Systemy decyzyjne z niezgodnością interesów", *Szkoła Informatyki Stosowanej „Analiza Komputerowa i Podejmowanie Decyzji w Złożonych Systemach" – SIS*, Warszawa, 1998

7 Conference Participation and Organization

7.1 International Conferences

[Conf1] *Fifth International Symposium on Methods and Models in Automation and Robotic – MMAR'98*, Międzyzdroje, 1998
Paweł Domański: [IC1]
Ewa Figielska: [IC4]
Krzysztof Maik: presentation of [IC8]
Krzysztof Malinowski: Program Committee Member
Piotr Marusak: [IC9]
Andrzej Pacut: [IC13]
Krzysztof Pieńkosz: presentation of [IC17]
Jerzy Pułaczewski: [IC9]
Piotr Tatjewski: [IC21]

Eugeniusz Toczyłowski: presentation of [IC8], presentation of [IC22]
Cezary Zieliński: presentation of [IC24]

[Conf2] *IEEE Instrumentation and Measurement Conference – IMTC/98*, St. Paul, Minnesota, 1998
Andrzej Pacut: presentation of [IC15]

[Conf3] *International Workshop on Advanced Black-Box Techniques for Nonlinear Modeling – ABB Techniques*, Leuven, Belgium, 1998
Andrzej Pacut: presentation of [IC11]

[Conf4] *1998 IEEE International Joint Conference on Neural Networks – IJCNN'98*, Anchorage, Alaska, 1998
Andrzej Pacut: presentation of [IC12]

[Conf5] *1998 IEEE Int. Workshop on Emerging Technologies, Intelligent Measurement and Virtual Systems for Instrumentation and Measurement – ETIMVIS'98*, St. Paul, Minnesota, 1998
Andrzej Pacut: presentation of [IC14]

[Conf6] *13th International Conference on Systems Science – Systems Science*, Wrocław, 1998
Krzysztof Pieńkosz: presentation of [IC16]
Cezary Szwed: presentation of [IC20]
Eugeniusz Toczyłowski: participation

[Conf7] *Rough Sets and Current Trends in Computing – RSCTC'98*, Warszawa, 1998
Wiesław Traczyk: participation

[Conf8] *Dynamical Systems: Stability, Control, Optimization – DSSCO '98*, Minsk, 1998
Andrzej Karbowski: presentation of [IC6]

[Conf9] *14th International Conference Multiple Criteria Decision Making – MCDM98*, Charlottesville, 1998
Janusz Granat: presentation [Pr6]

[Conf10] *Dynamical Systems: Stability, Control, Optimization – DSSCO '98*, Minsk, 1998
Mariusz Siomak: presentation of [IC19]

[Conf11] *The 6th UK Mechatronics Forum International Conference – Mechatronics '98*, Skovde, Szwecja, 1998
Jerzy Gustowski: presentation of [IC5]

[Conf12] *17th International Conference on Computer Safety, Reliability and Security – SAFECOMP'98*, Heidelberg, 1998
Krzysztof Sacha: presentation of [I7]

[Conf13] *19th Annual TeX Users Group Meeting – TUG'98*, Toruń, 1998
Piotr Bolek: presentation of [IC2]

[Conf14] *8th IFAC/IFORS/IMACS/IFIP Symposium „Large Scale Systems: Theory & Applications" – LSS'98*, Patras, Greece, 1998
Andrzej Karbowski: presentation of [IC7]
Krzysztof Malinowski: Program Committee Member
Ewa Niewiadomska-Szynkiewicz: presentation of [IC10]
Piotr Tatjewski: Scientific Committee Member

Michał Warchoł: presentation of [IC23]
Maciej Żmuda: participation

[Conf15] *Methodologies for the Conception, Design and Application of Soft Computing – IIZUKA'98*, Fukuoka, Japan, 1998
Franciszek Seredyński: [IC18]

7.2 Local Conferences

[Conf16] *VI Krajowa Konferencja Robotyki – VI KKR 1998*, Świeradów, 1998
Marek Brudka: presentation of [L1]
Anatol Gosiewski: Scientific Committee Head
Krzysztof Kierzenkowski: presentation of [L3]
Urszula Kręglewska: presentation of [L4]
Krzysztof Sacha: presentation of [L7]
Cezary Zieliński: presentation of [L8], Program Committee Member

[Conf17] *Real Time Systems'98 – RTS'98*, Szklarska Poręba, 1998
Krzysztof Sacha: presentation of [LC4], Program Committee Member

[Conf18] *XI Krajowa Konferencja Automatyzacji Dyskretnych Procesów Przemysłowych – XI KKADPP*, Zakopane, 1998
Krzysztof Pieńkosz: presentation of [L6]

[Conf19] *BOS'98*, Kutno, 1998
Cezary Szwed: presentation [Pr13]
Eugeniusz Toczyłowski: presentation [Pr13]

[Conf20] *X Sympozjum Symulacja Procesów Dynamicznych – SPD-10*, Zakopane-Kościelisko, 1998
Jerzy Gustowski: presentation of [LC1]
Piotr Marusak: [LC3], [LC2]
Piotr Tatjewski: presentation of [LC5], Program Committee Member

[Conf21] *Krajowe Sympozjum Telekomunikacji – KST'98*, Bydgoszcz, 1998
Wiesław Traczyk: [LC6]

[Conf22] *III Krajowa Konferencja Naukowo-Techniczna Diagnostyka Procesów Przemysłowych – DPP'98*, Jurata k. Gdańska, 1998
Piotr Tatjewski: Program Committee Member

7.3 Schools, Seminars and Other Meetings

[Conf23] *IV Konferencja Developerów i użytkowników Oracle – PLOUG'98*, Zakopane, 1998
Włodzimierz Macewicz: participation
Tomasz Traczyk: presentation of [OC10]

[Conf24] *IFIP WG 7.6 - IIASA Workshop on Advances in Modeling: Paradigms, Methods and Applications – AMAP 98*, Laxenburg, Austria, 1998
Janusz Granat: presentation [Pr7]
Jerzy Paczyński: presentation of [OC4]

[Conf25] *Karty Elektroniczne - Krok w XXI wiek – KE*, Kazimierz, 1998
Andrzej Rydzewski: participation

[Conf26] *Advanced Simulation of Systems – ASIS 1998*, Krnov, Czechy, 1998
Ewa Niewiadomska-Szynkiewicz: presentation of [OC2]
Maciej Żmuda: presentation of [OC12]

[Conf27] *16th European Conference on Operational Research – EURO XVI*, Bruksela, 1998
Krzysztof Pieńkosz: presentation [Pr11]

[Conf28] *12th JISR-IIASA Workshop on Methodologies and Tools for Complex System Modeling and Integrated Policy Assessment – CSM98*, Laxenburg, 1998
Janusz Granat: presentation [Pr8]

[Conf29] *Targi Zastosowań Teleinformatyki INFOFESTIWAL'98 – InfoFestiwal'98*, Poznań, 1998
Tomasz Traczyk: presentation of [OC8], Chairman of Session

[Conf30] *Top UNIX98 – Top UNIX98*, Kraków, 23-24 listopada, 1998
Piotr Bolek: presentation [Pr1]
Jacek Szymanowski: presentation [Pr14]

[Conf31] *Szkoła Informatyki Stosowanej „Analiza Komputerowa i Podejmowanie Decyzji w Złożonych Systemach" – SIS*, Warszawa, 1998
Władysław Findeisen: presentation [Pr5]
Andrzej Karbowski: presentation [Pr9]
Krzysztof Malinowski: presentation [Pr10]
Ewa Niewiadomska-Szynkiewicz: Organising Committee Head
Mariusz Siomak: presentation [Pr12]
Jakub Witkowski: presentation [Pr15]
Adam Woźniak: presentation [Pr16]

[Conf32] *CORS/INFORMS*, Montreal, 1998
Eugeniusz Toczyłowski: presentation of [OC6]

[Conf33] *Jesienne Warsztaty Linuksowe – PLUG'98*, Warszawa, 1998
Piotr Bolek: presentation [Pr3]

[Conf34] *VI Ogólnopolska Konferencja Polskiej Grupy Użytkowników Systemu TeX – BachoTeX'98*, Bachotek, 1998
Piotr Bolek: presentation [Pr2], presentation [Pr4]

[Conf35] *International Conference on Parallel Computing in Electrical Engineering – PARALEC'98*, Białystok, 1998
Mariusz Siomak: presentation of [OC5]

[Conf36] *Czternaste Jesienne Spotkania PTI – PTI Mrągowo'98*, Mrągowo, 1998
Tomasz Traczyk: presentation of [OC7]

[Conf37] *Bazy Danych'98 – CPI Kazimierz*, Kazimierz Dolny, 1998
Tomasz Traczyk: presentation of [OC9]

[Conf38] *Business Information Systems'98 – BIS'98*, Poznań, 1998
Tomasz Traczyk: [OC11]

[Conf39] *American Society for Engineering Education Annual Conference – ASEE*, Seattle, 1998
Krzysztof Malinowski: [OC1]