

INSTITUTE OF CONTROL
AND COMPUTATION ENGINEERING

2007 ANNUAL REPORT



WARSAW UNIVERSITY OF TECHNOLOGY
FACULTY OF ELECTRONICS AND INFORMATION TECHNOLOGY
INSTITUTE OF CONTROL AND COMPUTATION ENGINEERING
NOWOWIEJSKA 15/19, 00-665 WARSAW, POLAND
<http://www.ia.pw.edu.pl>, sekretariat@ia.pw.edu.pl



From the Director

The Institute of Control and Computation Engineering (ICCE – in Polish: Instytut Automatyki i Informatyki Stosowanej) was created in 1955 as the Chair of Automatic Control and Telemechanics by Professor Władysław Findeisen. It was reorganized in 1970 to become 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 the staff and students towards computational and algorithmic aspects of control, decision support, man-machine interfaces, network communications, etc. This resulted in 1994 in the creation of new educational profiles offered by the institute and a change of its name to the present one. Professor Władysław Findeisen had been the Director of the institute until he was elected the Rector of Warsaw University of Technology in 1981. His achievements are recognized worldwide. He is Doctor Honoris Causa of the City University London, Technical University of Gdańsk, Technical University of Ilmenau and Warsaw University of Technology.

The institute offers courses in a broad area of information technology, concentrating on control and decision support systems, at three levels of education. At first two levels (equivalent to B.Eng. and M.Eng.) the degree programs combine courses from the areas of computer science and control. We are also proud to offer interesting opportunities to our postgraduates so that they can continue their study and research towards a Ph.D. either in Computer Science or Control.

In 2007 the institute was involved in organizing the 10-th National Conference on Evolutionary Algorithms and Global Optimization, June 11-13, 2007, Będlewo, Poland, which gathered Polish scientists working in the area of artificial intelligence, in modeling and optimization, as well as in global optimization.

Prof. Ewa Niewiadomska, a member of our academic staff, was awarded a prize of Ministry of Science and Higher Education for the book ‘Symulacja komputerowa w analizie i projektowaniu złożonych systemów sterowania’.

Prof. Krzysztof Malinowski was elected the President of the Committee of Automatic Control and Robotics of the Polish Academy of Sciences for the term 2007–2011. Prof. Piotr Tatjewski was elected the member of this committee and the chair of its Section of Automatic Control Systems. Moreover, Prof. Cezary Zieliński became the Secretary of this Committee.

As usual in September the Institute took part in the annual event called the Science Festival. Prof. W. Kasprzak delivered a lecture entitled ‘The application speech and image analysis in robotics’. Moreover three presentation were organised. Mr T. Winiarski and Mr M. Staniak presented the Rubik’s cube puzzle solving robot system, Mr A. B. Kowalski showed the speech recognition system and Mr L. Czajka presented the single-image based 3-D reconstruction of the Rubik’s cube.

On 6th December 2007 a mobile robot race competition was organised by the Student Robotics Club ‘Bionic’ supervised by Dr W. Szyrkiewicz and Mr T. Winiarski from Robot Programming and Pattern Recognition Group. This event attracted 32 teams with their machines and significantly many more spectators.

Research is a vital part of our activities, directly affecting both the institute’s recognition in Poland and abroad, and the quality of teaching. Description of research programs conducted by the staff of the Institute can be found in this report. I express my sincere appreciation to the faculty and staff of the Institute for their efforts and contributions to our achievements in teaching and research.

I express my gratitude to all our partners, and in particular to our partners from abroad actively participating in international research programs. We would appreciate feedback concerning our activities. We shall be glad to answer any and all questions and we will be pleased to send reprints of our papers and reports upon request.

Piotr Tatjewski

Contents

1	General Information	2
1.1	Directors	2
1.2	Organization of the Institute	2
1.3	Statistical Data	31
2	Faculty and Staff	33
2.1	Professors Emeriti	33
2.2	Senior Faculty	35
2.3	Supporting Faculty and Staff	45
2.4	Ph.D. Students	46
2.5	Administrative and Technical Staff	49
3	Teaching Activities – Academic Year 2005/2006	51
4	Projects	53
5	Degrees Awarded	58
5.1	Ph.D. Degrees	58
5.2	M.Sc. Degrees	58
5.3	B.Sc. Degrees	62
6	Publications	68
6.1	Monographs	68
6.2	Chapters in Scientific or Technical Books	68
6.3	Scientific and Technical Papers in Journals	69
6.4	Scientific and Technical Papers in Conference Proceedings	71
6.5	Abstracts	75
6.6	Reports and Other Papers	75

Institute of Control and Computation Engineering
Faculty of Electronics and Information Technology
Warsaw University of Technology
Nowowiejska 15/19, 00-665 Warsaw, Poland
<http://www.ia.pw.edu.pl>, sekretariat@ia.pw.edu.pl

MAIN OFFICE, room 521
tel.: +48 22 825 09 95, +48 22 234 73 97, fax: +48 22 825 37 19

STUDENTS OFFICE, room 22/23
tel.: +48 22 234 7750, tel.: +48 22 825 52 80



1 General Information

The following information about organization of the Institute reflects the situation on December 31, 2007.

1.1 Directors

Professor Piotr Tatjewski, Director
Professor Cezary Zieliński, Deputy Director for Research
Dr. Tomasz Traczyk, Deputy Director for Academic Affairs

1.2 Organization of the Institute

SYSTEMS CONTROL DIVISION


<i>Division Head:</i>	Professor Krzysztof Malinowski
<i>Professors:</i>	Włodzimierz Kasprzak, Krzysztof Malinowski, Andrzej Pacut, Cezary Zieliński
<i>Professors, retired:</i>	Władysław Findeisen, Radosław Ładziński, Jacek Szymanowski
<i>Assistant Professors:</i>	Piotr Arabas, Adam Czajka, Mariusz Kamola, Andrzej Karbowski, Tomasz J. Kruk, Bartłomiej Kubica, Ewa Niewiadomska-Szynkiewicz, Wojciech Szynkiewicz, Paweł Wawrzyński, Adam Woźniak
<i>Assistants:</i>	Adam Kozakiewicz, Tomasz Winiarski, Maciej Staniak
<i>Senior Lecturer:</i>	Andrzej Rydzewski, Michał Warchoł
<i>Ph.D. Students:</i>	Marcin Chochowski, Małgorzata Kudelska, Andrzej Igielski, Michał Karpowicz, Tomasz Kornuta, Michał Kudelski, Piotr Kwaśniewski, Marek Majchrowski, Michał Marks, Roman Bartosz Nowicki, Joanna Putz-Leszczyńska, Łukasz Stasiak, Przemysław Strzelczyk, Piotr Trojanek, Rafał Wardziński, Artur Wilkowski, Tomasz Winiarski

Research of the division is conducted in 3 research groups:

Complex Systems Group (E. Niewiadomska-Szynkiewicz, K. Malinowski, P. Arabas, M. Kamola, A. Karbowski, T. J. Kruk, B. Kubica, A. Woźniak, M. Warchoń, A. Kozakiewicz, M. Karpowicz, P. Kwaśniewski, M. Marks)

The main area of interest is the theory and methodology of model-based predictive repetitive control and hierarchical control structures for non-linear systems under uncertainty, methods for solving continuous and discrete time optimization problems, and software for computer aided analysis and design of complex systems. Particular attention is given to distributed and parallel, synchronous and asynchronous, computations as well as to analysis and design of control algorithms and pricing techniques for computer networks. Also, important work is concerned with development of techniques for information systems security.

Complex Systems Group

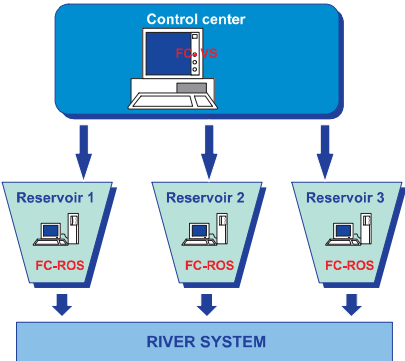


Software for complex systems simulation

Flood Control

FC-ROS & FC-VS (Flood Control)

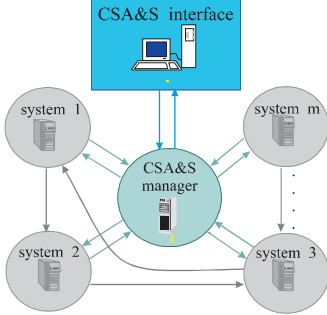
decision support systems for flood control in multireservoir systems.



Distributed Simulation

CSA&S (Complex Systems Analysis & Simulation)


heterogeneous software environment providing a framework for simulation experiments carried out on parallel computers.



ASim/Java (Asynchronous Simulation/Java)

library that may be used to build parallel or distributed discrete event simulators

Complex Systems Group



Traffic control in TCP/IP networks

Family of price-based control algorithms for IP networks

Congestion control:

- New algorithm proposed
- Verified through simulations

Joint traffic engineering / bandwidth allocation methodology - designed to improve effectiveness (under investigation).

Simulation Tools


TcpSim – a fast TCP/IP simulator:

- calculation of transmission times for bulk data transfers
- flow-based - much faster than packet-level simulators
- original method of traffic modeling
- implemented in Java.

BrokerSim – a C++ pricing simulation package for OPNET:

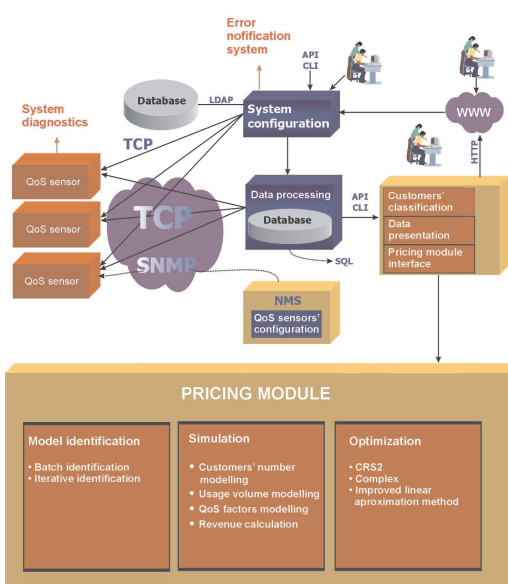
- traffic generator for user profiles
- short-term traffic demand approximator
- broker module: pricing decisions and traffic shaping
- router pricing module augmenting OPNET's router model

Complex Systems Group



Quality of Service in IP Networks

- Differentiation of IP services
- Quality of service
- Pricing support
- Integration with NSP operation systems



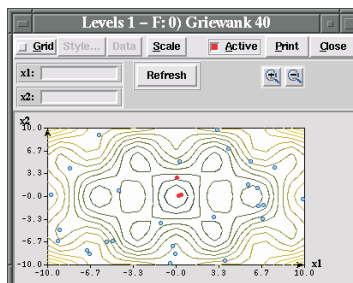
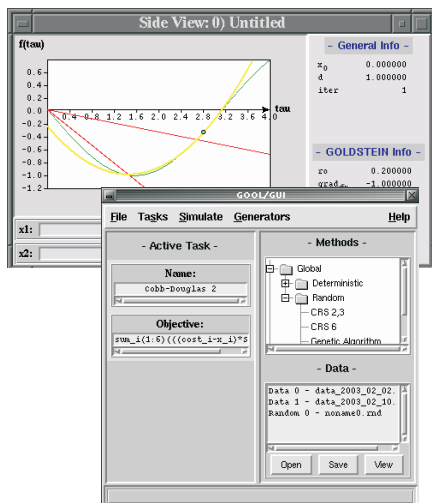
The diagram illustrates a system architecture for QoS in IP networks. It features a central 'TCP/SNMP' cloud connected to 'QoS sensor' blocks. These sensors feed into 'System diagnostics' and 'System configuration' components. The 'System configuration' component interacts with a 'Database' via 'LDAP' and an 'Error notification system' via 'API CLI'. It also connects to 'Data processing' and another 'Database' via 'API CLI'. The 'Data processing' component interacts with the second 'Database' via 'SQL'. The 'System configuration' component is linked to 'WWW' and 'HTTP' services. The 'Data processing' component feeds into a 'Pricing module interface' which includes 'Customers' classification', 'Data presentation', and 'Pricing module interface'. Below this, an 'NMS' block handles 'QoS sensors' configuration'. At the bottom, a large 'PRICING MODULE' box contains three sub-sections: 'Model identification' (Batch and Iterative identification), 'Simulation' (Customers' number modelling, Usage volume modelling, QoS factors modelling, Revenue calculation), and 'Optimization' (CRS2, Improved linear approximation method).

Complex Systems Group



Global optimization

GOOL - Global Optimization Object-Oriented Library



GOOL

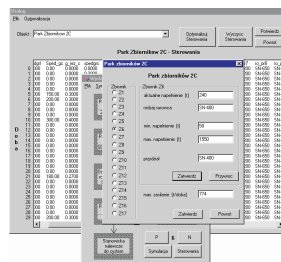
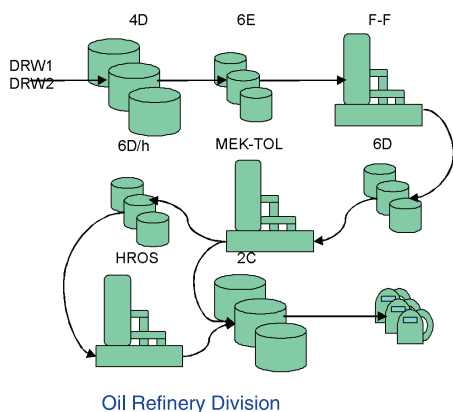
library of random search generators and optimization algorithms for convex and nonconvex, unconstrained and constrained problems

Complex Systems Group



Operations scheduling using Constraint Programming

Solution of a scheduling problem in an Oil Refinery Division




Simulation and optimization system

Goals:

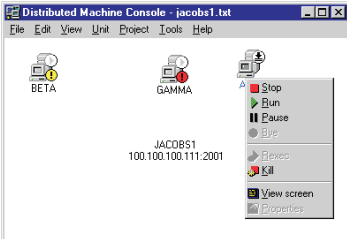
- Simulation of an Oil Refinery Division
- Finding all feasible solutions
- Meeting all technical requirements
- Constraint scheduling methods
- Very fast computations


Complex Systems Group



Parallel and distributed computations

- research on price and direct method of decomposed optimization
- research on parallel implementation of global optimization algorithms
- development of new software tools for parallel and distributed computations
- a monograph published in 2001






New software tools:

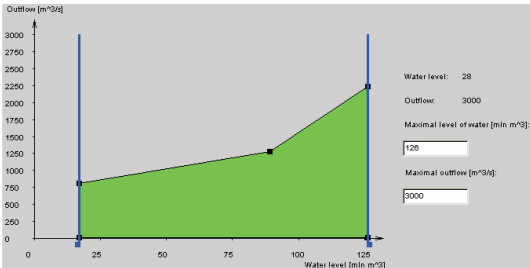
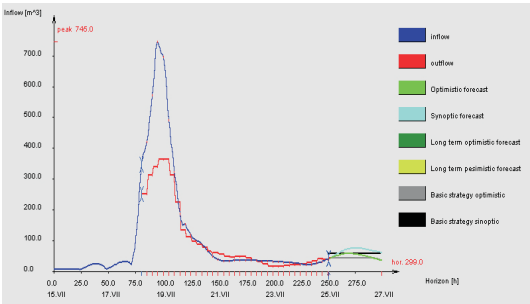
- WDM** (windows distributed machine) – a software environment for performing distributed computations in a cluster of machines working under windows
- GEPAS** (generic parallel suite) – an implementation of distributed shared memory in network
- NONOS** (nonlinear optimization solver) – an ASP type optimization server (submission by e-mail or browsers)

Complex Systems Group




Optimal control and closed-loop design

- development of OO libraries for calculation of optimal control in general nonlinear deterministic problems with constraints
- development of OO libraries for calculation of optimal closed-loop policies in general stochastic problems
- development of Decision Support Systems for flood control in single and multireservoir systems
- theoretical studies on optimal control in various conditions eg. with stochastic scenarios, fuzzy systems, worst-case, different risk measures, etc.
- theoretical and simulation studies on real-time control in computer networks at different levels

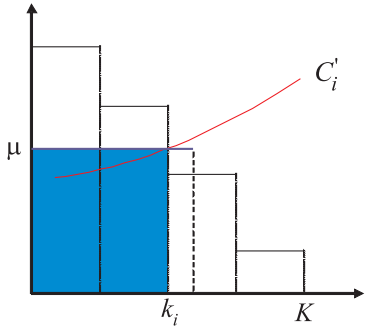



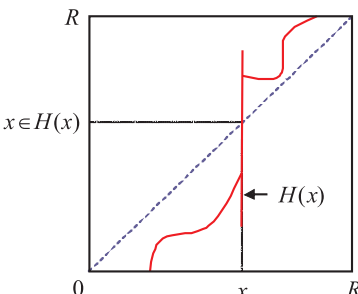
Complex Systems Group



Game theory and mechanism design


- auction and market design
- computation of equilibrium bidding strategies
- incentive regulation in telecommunication





- resource allocation under imperfect information
- principal-agent problems in optimal contract design
- best response dynamics and stability of Nash equilibria

Complex Systems Group



Interval computations for nonlinear problems

Instead of single numbers (points), we can perform calculations on intervals (possibly multidimensional).

Rules of interval arithmetic (and other interval functions) are designed so that:

$$a \in \mathbf{a} = [\underline{a}, \bar{a}], \quad b \in \mathbf{b} = [\underline{b}, \bar{b}],$$

$$\varepsilon \in \{+, -, \cdot, /, \} \Rightarrow a \varepsilon b \in \mathbf{a} \varepsilon \mathbf{b}$$

Such an approach allows to describe the uncertainty of parameters and also to deal with numerical inaccuracy.

For example we have the following rules for addition and multiplication:

$$[\underline{a}, \bar{a}] + [\underline{b}, \bar{b}] = [\underline{a} + \underline{b}, \bar{a} + \bar{b}]$$

$$[\underline{a}, \bar{a}] \cdot [\underline{b}, \bar{b}] = [\min\{\underline{a}\underline{b}, \underline{a}\bar{b}, \bar{a}\underline{b}, \bar{a}\bar{b}\}, \max\{\underline{a}\underline{b}, \underline{a}\bar{b}, \bar{a}\underline{b}, \bar{a}\bar{b}\}]$$

Interval (inclusion) function:

$$f(x) = x^2 + 2x + 1$$

$$\mathbf{f}(\mathbf{x}) = \mathbf{x}^2 + 2 \cdot \mathbf{x} + 1$$

$$x \in \mathbf{x} = [\underline{x}, \bar{x}] \Rightarrow f(x) \in \mathbf{f}(\mathbf{x})$$

$$\mathbf{f}[-5, 1] = [-5, 1]^2 + 2 \cdot [-5, 1] + 1 = [-9, 28] \supseteq [0, 16]$$

Interval tools:

- the branch-and-bound method
- monotonicity test
- interval Newton operators
- constraint propagation
- ...

Problems that can be solved:

- systems of nonlinear equations
- constraint satisfaction problems
- global optimization problems
- multicriterial optimization problems (convex and nonconvex)

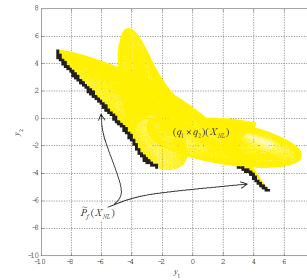
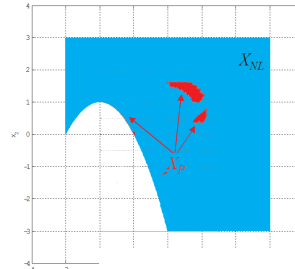
Complex Systems Group



Interval computations seek the Pareto-front of nonlinear multicriterial problems

```


compute (q(), x0, ey, ex)
// L is the list of quadruples
// (y, L_in, L_bound, L_unchecked,
// where L's are lists of qes x
y0 = q(x0);
enqueue(L, (y0, {}, {}, {x0}));
while (a quadruple in L, for which
    wid(y) > ey)
    pop this quadruple
    (y, L1, L2, L3) from L;
    if (L1?{}) then
        delete sets dominated by y;
    end if
    if (wid(y) > ey) then
        bisect y;
        invert resulting sets;
        enqueue results;
    end if
end while
end compute
    
```



Biometrics and Machine Learning Group (Andrzej Pacut, A. Czajka, P. Wawrzyński, M. Chochowski, M. Kudelska, M. Kudelski, R. B. Nowicki, J. Putz-Leszczynska, Ł. Stasiak, P. Strzelczyk, R. Wardziński)

The research is centered on biologically inspired control and information technology, including biometrics, machine learning, uncertainty modeling, and biological modeling. Biometrics consists in using personal characteristics for identity authentication. Our research in biometrics includes pattern recognition for iris, hand-written signature, hand shape and lines, etc. Also, safety of biometric data storage and exchange, biometrics intelligent cards, and data encryption using biometrics are investigated. Machine learning research is focused on reinforcement learning, and in particular, learning algorithms, adaptive control, and multi-agent systems. Also, learning in neural networks and modeling granularity is investigated.

Biometrics and Machine Learning Group




Biometrics

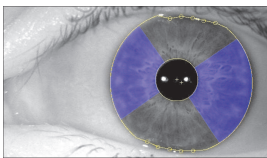
Iris verification

- Prototype iris recognition system
 - real-time automatic iris capture
 - automatic localization of iris and occlusions
 - fast Zak-Gabor transform for calculation of the unique iris features
 - stimulated infrared reflections analysis for detection of subterfuges (printed irises)
- Eye aliveness detection
 - pupil dynamics modeling (patent pending)
 - detection of stimulated reflections from the cornea
 - frequency spectrum analysis
- Iris image permutation for replay attack prevention

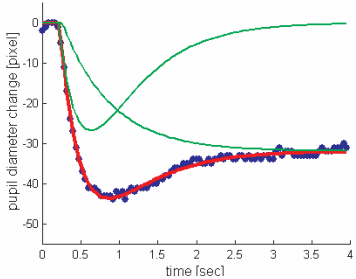
Prototype iris recognition system (IRS) with aliveness detection



Iris coding
Human eye imaged in infrared light by the IRS. Automatic localization of iris sectors free from occlusions (marked in blue)




Aliveness detection
Comparison of measured (blue dots) and modeled (red line) pupil reaction to light changes enables to construct a subterfuge detection mechanism



time [sec]	measured [pixel]	modeled [pixel]	green curve [pixel]
0.0	0	0	0
0.5	-10	-10	-10
1.0	-45	-45	-25
1.5	-40	-40	-15
2.0	-35	-35	-10
2.5	-32	-32	-8
3.0	-30	-30	-7
3.5	-29	-29	-6.5
4.0	-28	-28	-6

9

Biometrics and Machine Learning Group



Biometrics


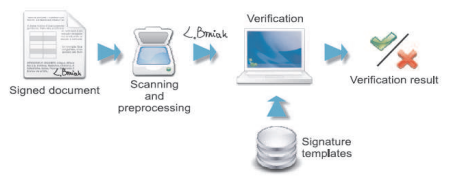
Handwritten signature -based identity verification

Verification of on-line signatures


- recognition based on handwriting dynamics, rather than paper images
- use of neural networks and dynamic programming in a two stage classifier with a global classifier at the second stage
- good results for MCYT & SVC databases

Verification of scanned signatures

- Integration of several independent methods of verification
- use of statistics, neural networks and Hidden Markov Models for signature features extraction

Biometrics and Machine Learning Group

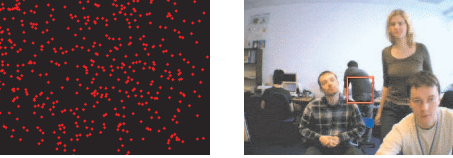


Biometrics

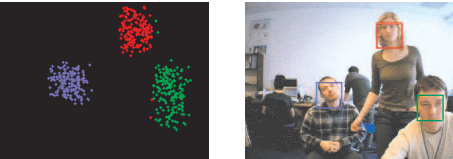
Particle filter-based face tracking and identification

- reference object stored as hue - saturation histogram in the HSV color space
- particle filtering for focus of attention
- „dust”-filtering, based on single pixel classification with fast cluster labelling algorithm for exact tracking
- Bhattacharyya coefficient -based distance measure used to weight particles and „dust”
- automatic detection of the number of objects by Modified X-Means algorithm
- work in progress on gradual information collection for the purpose of identification with increasing confidence level


Sample tracking sequence (24 fps)



Frame #0: Particles spread all over the image (left: particle space, right: the image space)




Frame #4: Particles converged to objects, number of objects detected automatically



Frame #4: Dust filtering for exact tracking


Biometrics and Machine Learning Group




Biometrics

EEG-based identity verification

- Comparison of EEG signals distant in time
 - Short-term variability of EEG
 - Long-term variability of EEG
- Variability of EEG models in different recording conditions
- Linear modeling of EEG signal
- Nonlinear modeling of EEG
 - GARCH - Generalized Autoregressive Conditional Heteroskedasticity model

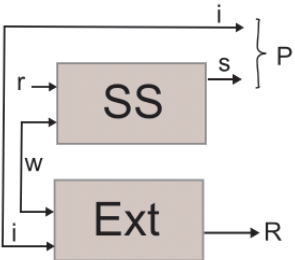


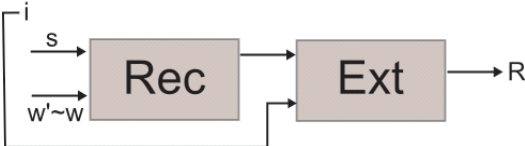
Biometrics and Machine Learning Group



Biometrics


Biometric cryptography





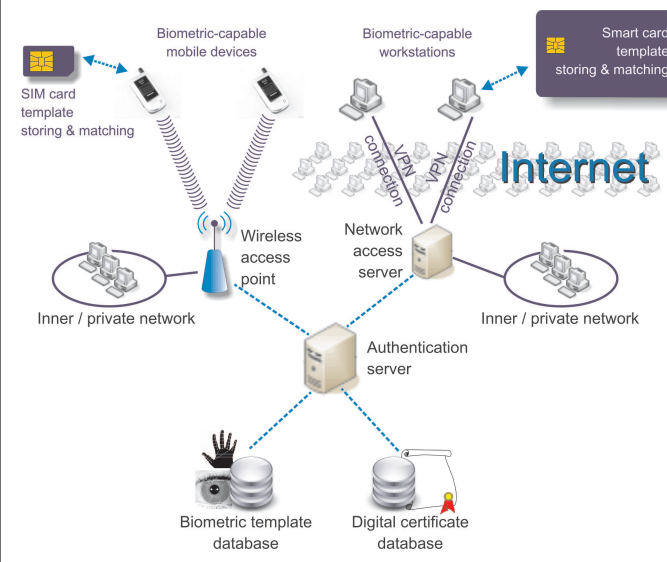
- Assessing information capacity of biometric data
 - no model approach based on statistical properties of comparison s
 - model approach based on models for each modality
- Construction of **secure sketches** and **fuzzy extractors**
 - characterization of errors for different algorithms and modalities
 - proposition of error correcting codes best fitting bio-cryptography schemas

Biometrics and Machine Learning Group



Biometrics

Biometric authentication for secure remote access



Novel authentication protocols and techniques employing biometrics

VPN & wireless networks applications


Development of biometric capable mobile devices and workstations

Smartcards and SIM cards application for distributed template storage and processing (match-on-token)

Central template database design and management

Multiple biometrics (iris, fingerprint and others)

Biometrics and Machine Learning Group

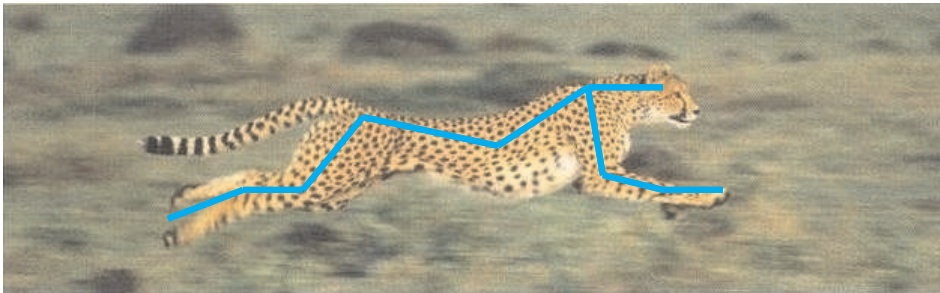


Machine Learning


Model-free on-line adaptive control based on reinforcement learning

Typical Reinforcement Learning methods are far too slow to be used in adaptive control. Our solution is based on a combination of **Actor-Critic methods** and **experience replay**. Simulations show more than **hundredfold increase** of control adaptation learning speed.


Reinforcement Learning algorithms usually behave poorly when time discretization increases. As a remedy we propose **piecewise non-Markov policies**. We tested this approach using a simulated planar model of cheetah.



Biometrics and Machine Learning Group



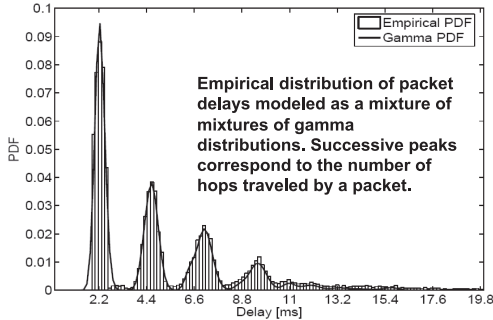
Machine Learning



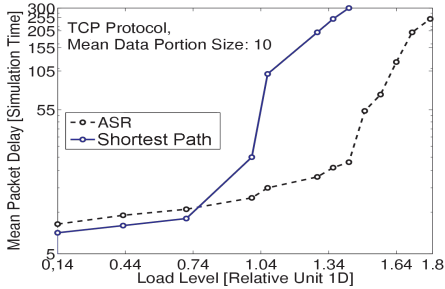
Improving Ant Routing by Statistical Modeling

We model packet delay distribution with a mixture of probability distributions (Fig. left below). We use the estimated model to improve the performance of ant routing (AR).

- AR is typically considered under UDP in the transport layer. We extended AR to work under TCP
- Range of load levels for AR is higher than for non-adaptive policies (Fig. below)




Empirical distribution of packet delays modeled as a mixture of gamma distributions. Successive peaks correspond to the number of hops traveled by a packet.



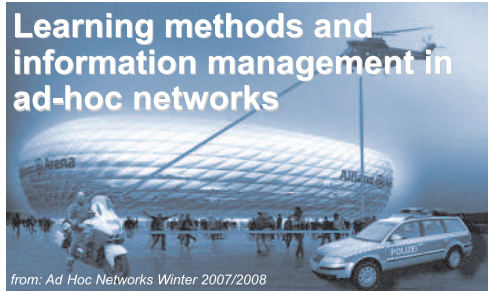
TCP Protocol, Mean Data Portion Size: 10

Legend: ASR (dashed line), Shortest Path (solid line)

Biometrics and Machine Learning Group



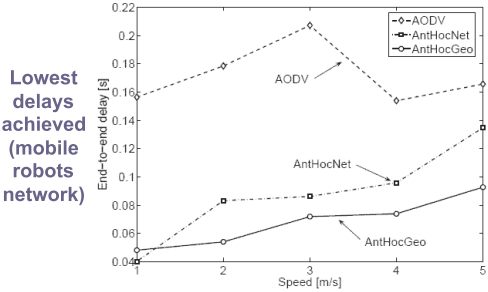
Machine Learning



Learning methods and information management in ad-hoc networks

from: Ad Hoc Networks Winter 2007/2008

- Highly dynamic environment
- Strong need for adaptive mechanisms to solve routing problems, topology control, QoS provisioning, etc.
- We propose *geographical cells* (Fig. right) as an information management system, together with learning algorithms



Lowest delays achieved (mobile robots network)

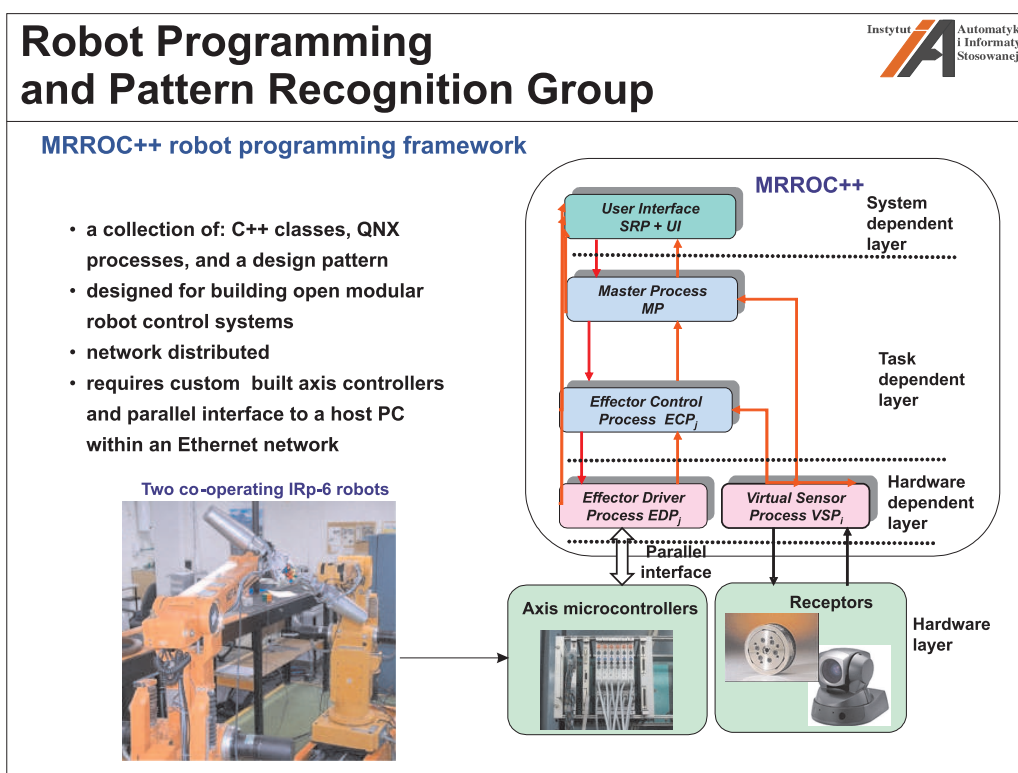
Geographical cells comprise the information within a geographical location

9	10	11	12 <small>Node3</small>
5	6 <small>Node1</small>	7 <small>Node2</small>	8
1 <small>Source</small>	2	3	4 <small>Destination</small>


- Experiments in ns2 simulator
- Two application scenarios:
 - Telecommunication scenario
 - Mobile robots scenario
- Geographical cells improve the routing performance (Fig. left below)

Robot Programming and Pattern Recognition Group (C. Zieliński, W. Kasprzak, W. Szykiewicz, A. Rydzewski, T. Winiarski, T. Kornuta, M. Staniak, M. Majchrowski, P. Trojanek, A. Wilkowski)

Research of the group is concerned with robot motion planning and control systems, autonomous mobile robot localization and navigation, robot programming methods, computer vision systems and speech recognition systems. In the robot control systems area research is focused on new motion and force/position control algorithms for multi-robot systems. Special emphasis is given to the sensor-based motion planning and control of the single and multiple articulated or mobile robots. In the computer vision and signal processing (speech analysis) area the research is concentrated on autonomous navigation, transportation and security relevant environments. All of this research is centered around service robots, i.e. two-handed devices using visual servoing, force control, and speech recognition to fulfill tasks that humans usually execute.




Robot Programming and Pattern Recognition Group



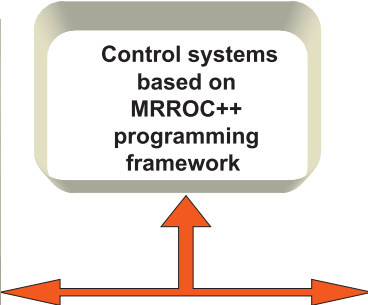
RNT and POLYCRANK prototype robots

- **RNT robot:** high stiffness, large workspace, serial-parallel kinematic structure
 - well suited to milling and polishing tasks
- **POLYCRANK robot:** capable of very fast motions, has no joint limits, direct drive
 - well suited to palletization tasks


RNT robot:




Control systems based on MRROC++ programming framework



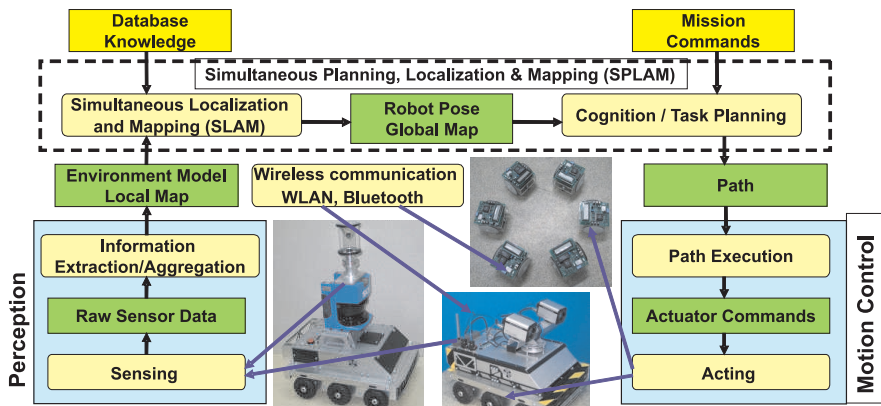
POLYCRANK robot



Robot Programming and Pattern Recognition Group




Control architecture for autonomous mobile robot teams



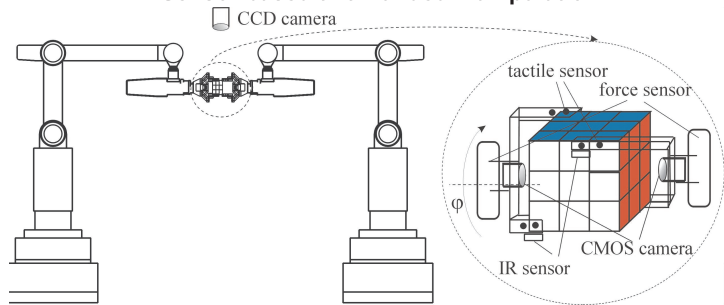
Research objectives:

- To develop the perceptual, representation, reasoning, learning and communication capabilities of autonomous mobile robot systems in human-oriented real-life environments
- To develop and implement a complete, effective, and reusable software for autonomous robot systems that incorporates both programming (manual coding) and learning-derived (automated coding) software composition to increase the ability of autonomous robots to function in unpredictable, dynamic environments
- To study the human-robot interaction (multi-modal interfaces)

Robot Programming and Pattern Recognition Group



Sensor based two-handed manipulation




Rubik's cube puzzle as a benchmark task for service robots

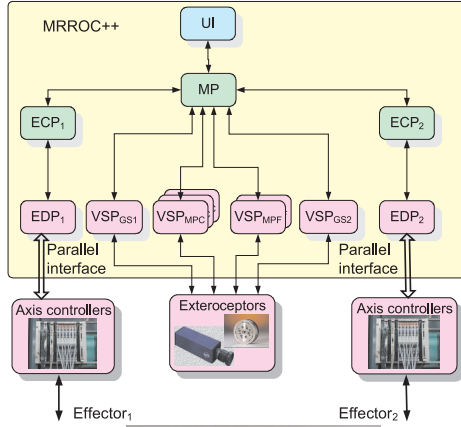
Solution of the benchmark task requires:

- Two-handed manipulation skill to efficiently turn the faces of the cube
- Visual sensing capability to locate the cube and identification of its initial state
- Visual servomechanism to approach the cube and to get hold of it
- Using tactile and force sensors to avoid jamming of the cube while rotating the faces
- Capacity for using tactile and force stimulus in manipulation
- Fusion of deliberative and behavioural control to work out the plan of motions solving the puzzle and to adapt quickly to sudden changes in the environment (e.g., jamming)
- Ability to recognize spoken commands and to synthesize replies and queries

Robot Programming and Pattern Recognition Group



Two-handed Service Robot Controller Capable of Solving a Rubik's Cube Puzzle



Components:

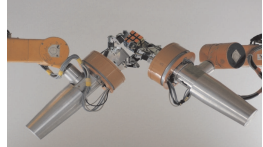
MP – Master Process (produces the solution of the puzzle and generates the nominal motion trajectories for the two arms)

ECP – Effector Control Process (transmits the macro-steps generated by the MP to the EDP)

VSP – Virtual Sensor Process (aggregates data from sensors, i.e. cameras, enabling the localisation of the cube and identification of its state)

EDP – Effector Driver Process (divides the macro-step into steps and executes each step using the Task Frame Formalism for position-force control)

UI – User Interface (operator console and status and error reporting)

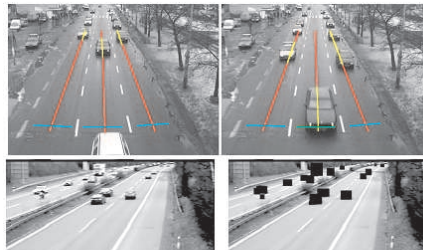


Robot Programming and Pattern Recognition Group

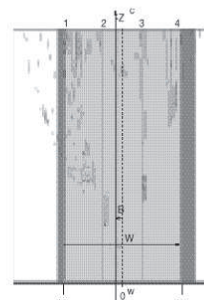
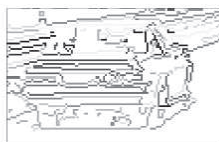


Road traffic analysis. Autonomous navigation.

•Supported by the project IST-11250 **OMNI** (“Open Model For Network-wide Heterogeneous Intersection-based Transport Management”, 2000-2003) an „intelligent” visual sensor system was developed that performs queue length measurement and car counting – for every road lane in the image.



•Computer-vision based car driver assistance – road tracking and obstacle detection.

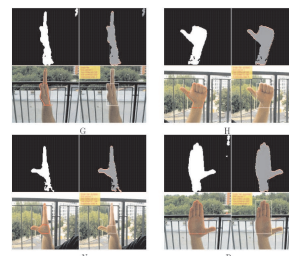
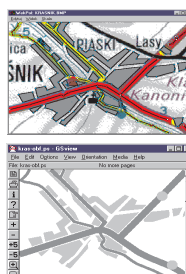
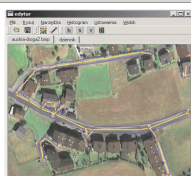
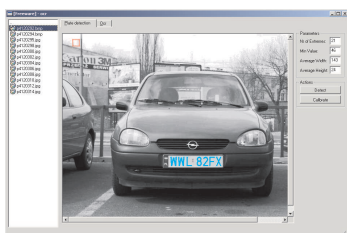


Robot Programming and Pattern Recognition Group



2-D object recognition in digital images

- Licence plate recognition (cars, containers)
- Hand gesture recognition
- The analysis of aerial and cartographic images

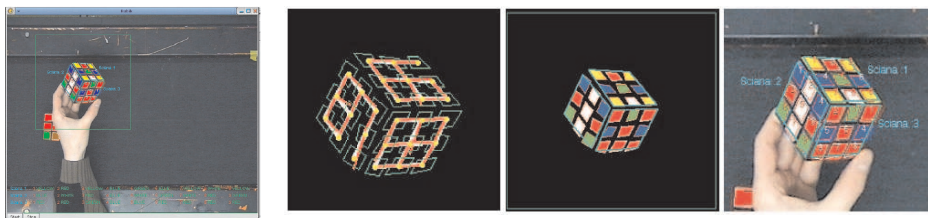


Robot Programming and Pattern Recognition Group

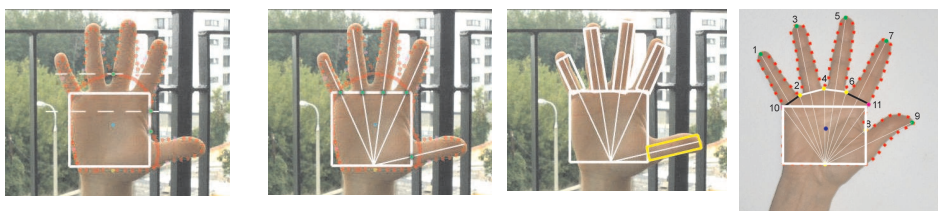


3-D object reconstruction in digital images

- **Rubik's cube** reconstruction



- **Free hand** reconstruction and measurement

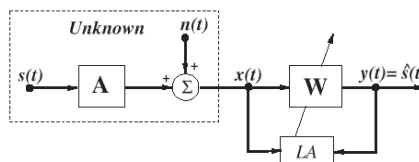


Robot Programming and Pattern Recognition Group

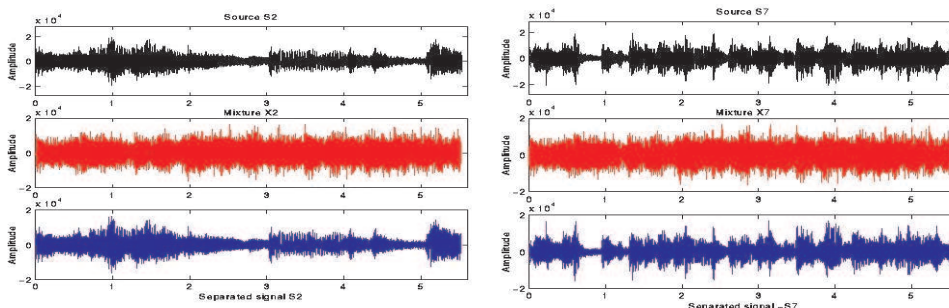


Blind separation of mixed signals

- Only mixtures of source signals can be acquired,
- The goal is to separate the original sources.



Example of two signal channels. In every column we have: one unknown sound source, one mixture (sensed signal) and the appropriate output signal (which is the separated source).

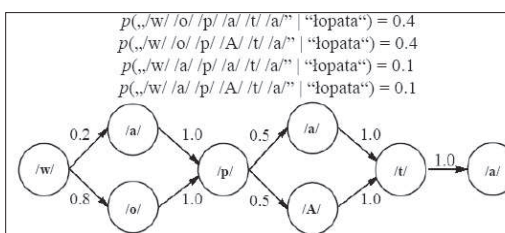
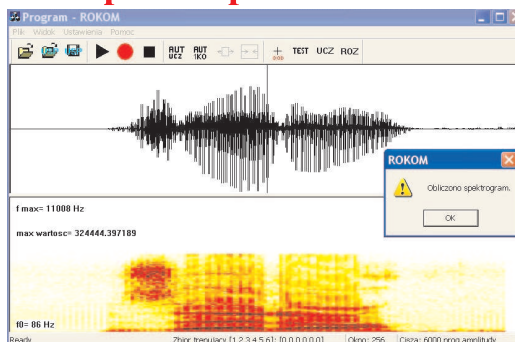
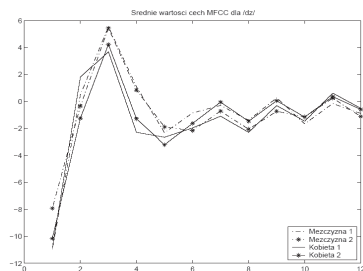
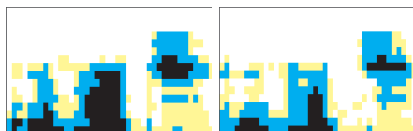


Robot Programming and Pattern Recognition Group



The recognition of polish speech

- Spectral analysis,
- Feature detection in signal frames,
- Sub-phoneme modelling,
- Frame classification,
- Model-based sentence recognition.



CONTROL AND SOFTWARE ENGINEERING DIVISION


<i>Division Head:</i>	Professor Piotr Tatjewski
<i>Professors:</i>	Piotr Tatjewski, Krzysztof Sacha
<i>Assistant Professors:</i>	Paweł Domański, Maciej Ławryńczuk, Piotr Marusak, Marcin Szlenk, Andrzej Zalewski
<i>Senior Lecturers:</i>	Jerzy Gustowski, Zygmunt Komor, Urszula Kręglewska
<i>Senior Engineer:</i>	Włodzimierz Macewicz
<i>Ph.D. Students:</i>	Ali Mhammed Benniran, Adam Działak, Anna Felkner, Maciej Grola, Piotr Kaczyński, Andrzej Ratkowski, Marek Strzelczyk, Piotr Sztandera, Krzysztof Szyber, Marek Zalewski

Research of the division is conducted in 2 research groups:

Control Engineering Group (P. Tatjewski, P. Domański, Z. Komor, M. Ławryńczuk, P. Marusak, J. Gustowski, U. Kręglewska, A. Działak, P. Kaczyński, M. Strzelczyk, K. Szyber)

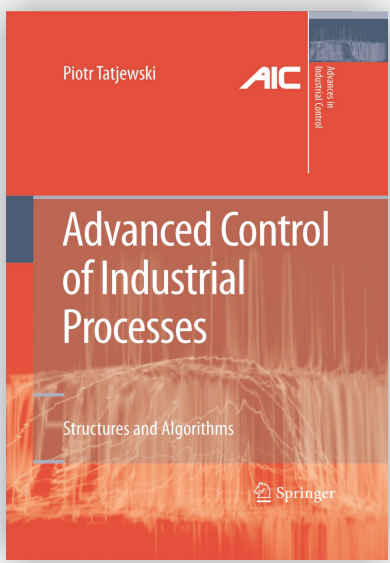
Research of the group encompasses control engineering techniques, in particular industrial process control. The focus is on predictive and fuzzy control algorithms, multilayer optimizing and supervisory control, and non-linear system control and analysis. Model-based predictive control algorithms for linear and nonlinear process modeling are developed and investigated. Soft computing methods for design and tuning of control systems are used, based on fuzzy systems, neural nets, and genetic algorithms. Theoretical considerations are combined with simulation analysis and investigations. Computer Control Systems Laboratory features laboratory-scale processes and is equipped with programmable controllers, industrial computers and workstations with software tools, including Matlab with Toolboxes and professional SCADA systems.

Control Engineering Group




Advanced control of industrial processes

- The multilayer control structure for industrial processes
- Non-linear process modeling using fuzzy techniques and neural networks
- Fuzzy control algorithms of Takagi-Sugeno type
- Algorithms and structures of model predictive control with linear and nonlinear process models (control laws, optimization-based algorithms)
- Software for development and testing of advanced process control algorithms




Springer, London, 2007

Control Engineering Group




Optimization of industrial processes and large-scale systems

- Procedures for steady-state optimization of industrial processes
- Structures and algorithms for on-line measurement-based set-point optimization under uncertainty
- Hierarchical (multilevel) optimization methods for large-scale systems
- Multilevel algorithms for on-line set-point optimization of interconnected processes under uncertainty



Imperial College Press/ World Scientific, 2005

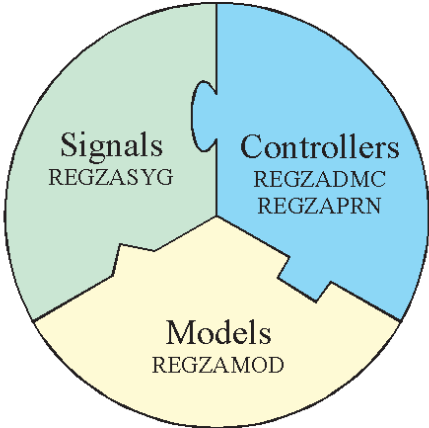
Control Engineering Group




REGZA - Algorithms and software environment for modeling and advanced control of industrial processes

Software Package:

- REGZASYG** – programs and interface for signal processing
- REGZAMOD** – programs and interface for process modeling
- REGZADMC** – interface and model predictive control algorithms: linear DMC and nonlinear with fuzzy process models
- REGZAPRN** – interface and model predictive control algorithms: linear GPC and nonlinear with neural network process models



Control Engineering Group

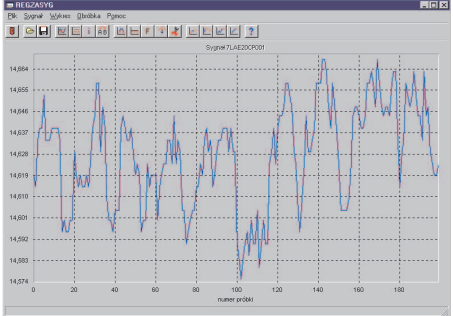


REGZA - Algorithms and software environment for modeling and advanced control of industrial processes

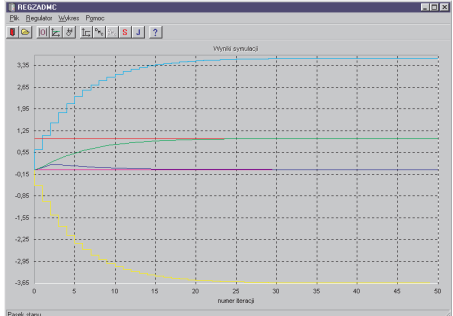
Nonlinear predictive control structures based on fuzzy and neural models

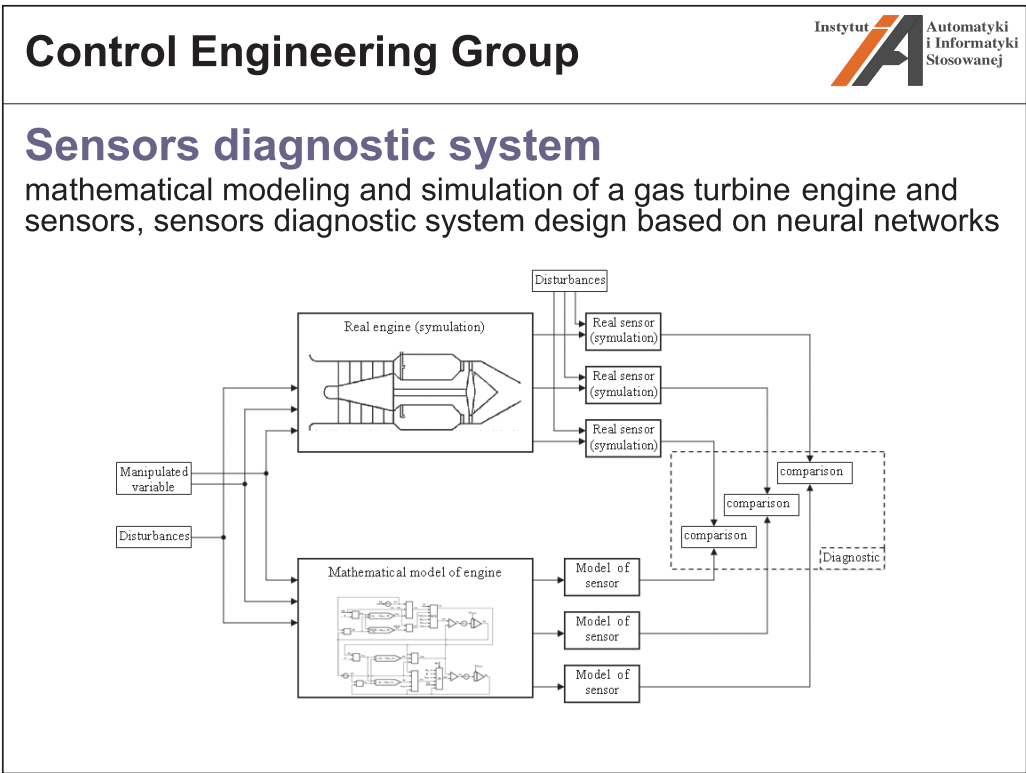
- Algorithms with successive linearization
- Algorithms with nonlinear prediction and linearization
- Algorithms with iteratively updated nonlinear prediction and linearization
- Algorithm with nonlinear optimization

Main window of REGZASYG program



Main window of REGZADMC program






Software Engineering Group (K. Sacha, A. Zalewski, W. Macewicz, M. Szlenk, A. Felkner, M. Grula, R. Kacperczyk, A. Ratkowski, P. Sztandera, M. Zalewski)

The main area of interest is the development and quality evaluation of software. Topics include software processes, analysis, design and quality evaluation methods, and software audit. Apart of the research activity, we have been working on a number of commercial projects related to the development and evaluation of huge software systems for public organizations and for the industry. The scope of those projects included business process modeling, requirements analysis, strategic planning, conducting the testing process, and software audit.

Software Engineering Group



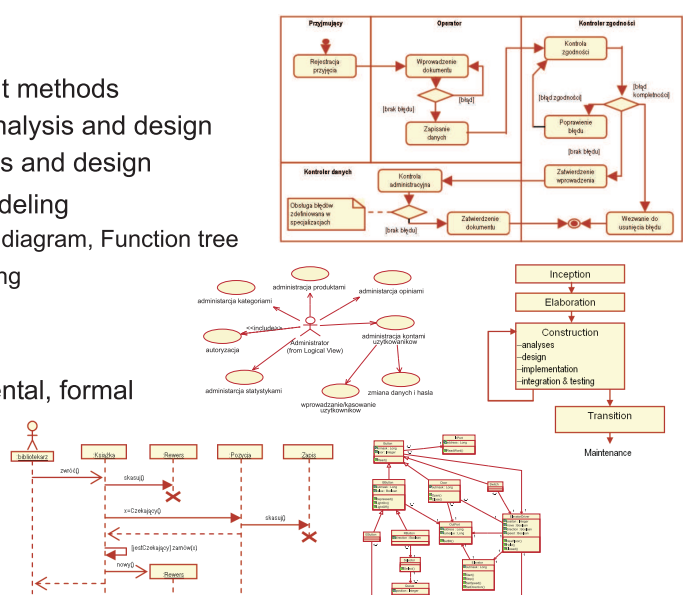
Software development

Research topics:


- Software development methods
 - Object-oriented analysis and design
 - Structured analysis and design
- Business process modeling
 - Workflow, Data flow diagram, Function tree
- Requirements engineering
- Acceptance testing
- Software processes
 - Waterfall, incremental, formal

Systems and tools :

- Rational Rose
- Rational RequisitePro
- Structured Architect



Software Engineering Group



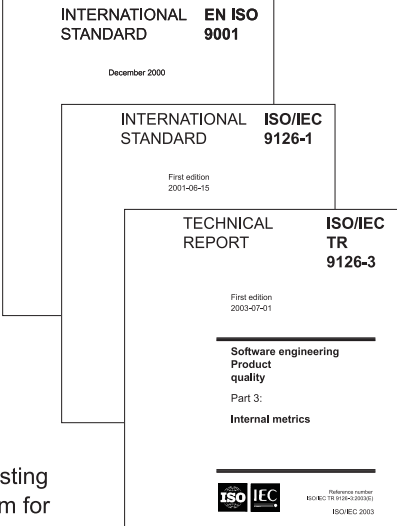
Evaluation of the software quality

Research topics:


- Quality of the software process
- Quality of the software products
- Evaluation method:
 - Defining the set of quality criteria
 - Defining the set of questions
 - Evaluation and ranking
 - Threats and recommendations

Sample projects:

- Evaluation of the expected quality of software developed for IACS (support system for EU Common Agriculture Policy in Poland)
- Supervision and evaluation of the acceptance testing of the integrated management and control system for the post delivery service in Poland



Software Engineering Group



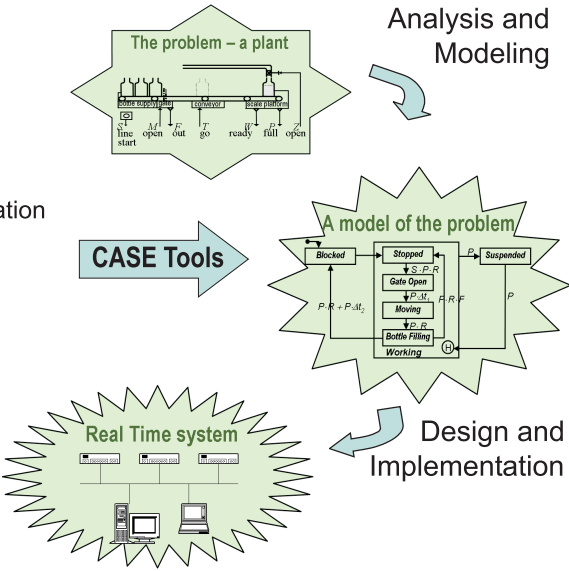
Real time systems

Research topics:

- System analysis and design
- System and software architecture
- Real time operating system
 - Task scheduling
 - Communication and synchronization
- Industrial networks
 - Devicebuses
 - Fieldbuses
- PLC controllers
 - Automatic program generation

Systems and tools:

- QNX, OS/9
- Profibus
- Siemens Step 7




OPERATIONS RESEARCH AND MANAGEMENT SYSTEMS DIVISION

- Division Head:* Professor Eugeniusz Toczyłowski
- Professor:* Eugeniusz Toczyłowski
- Assistant Professors:* Krzysztof Fleszar, Mariusz Kaleta, Krzysztof Pieńkosz, Grzegorz Płoszajski, Tomasz Traczyk, Izabela Żółtowska
- Ph.D. Students:* Przemysław Kacprzak, Kamil Kołtyś, Robert Kuźmiuk, Andrzej Midera, Piotr Pałka, Mariusz Rogulski, Kamil Smolira

Research of the division is concerned with operation research and structural discrete optimization methods for control and management of discrete processes, including applications in the deregulated electric power industry, computer integrated manufacturing and educational systems. The research is focused on market and auctions design, scheduling techniques, efficient structural-based optimization algorithms, time-table generation, strategic and tactical planning, detailed scheduling, and real-time operational control. Also, the object oriented and relational database management systems and CASE methods are investigated to design of the distributed multi-functional heterogeneous information systems.

Operations Research and Management Systems Division



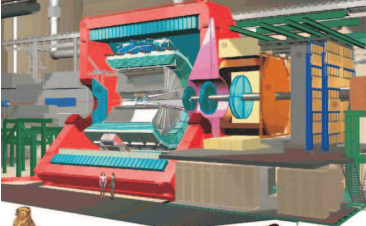
ALICE Detector Construction Database Group

Detector Construction Database for A Large Ion Collider Experiment (ALICE)*

➤ The goal of the project:
To create a database and an application environment for use in the initial construction of sub-detectors for ALICE and to facilitate the operation of the completed ALICE detector

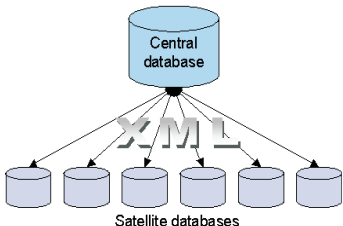
➤ Solution:

- Distributed heterogeneous database
 - satellite databases at participating laboratories
 - central repository at CERN
- Flexible generic data structures
- XML-based data interchange




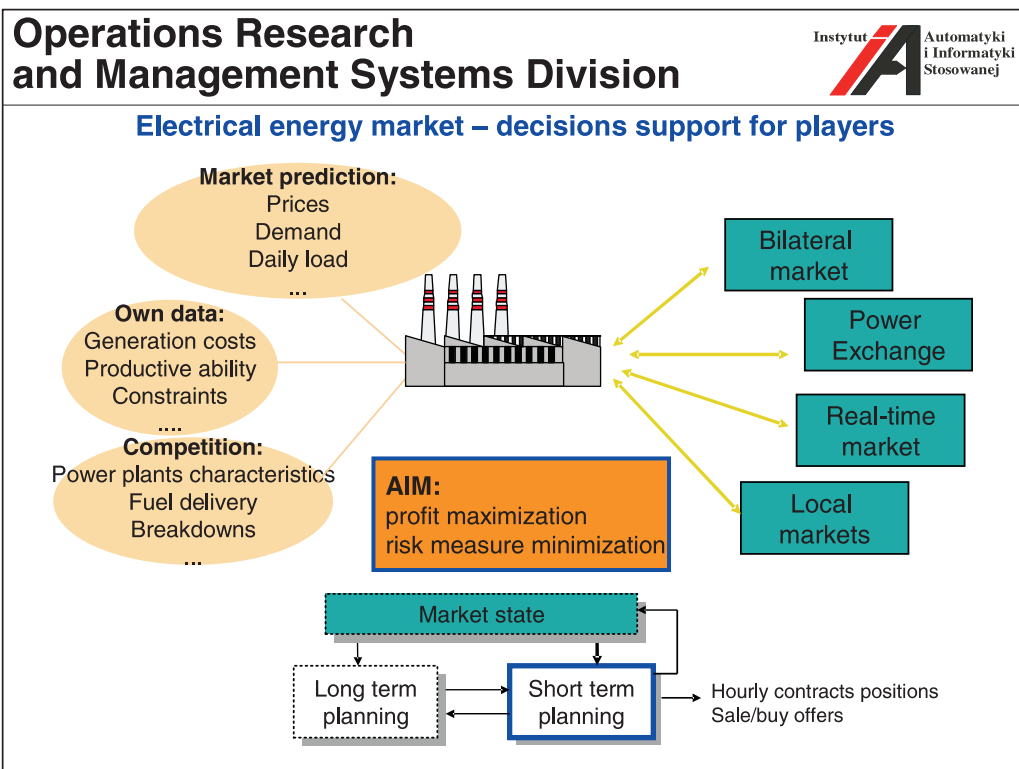
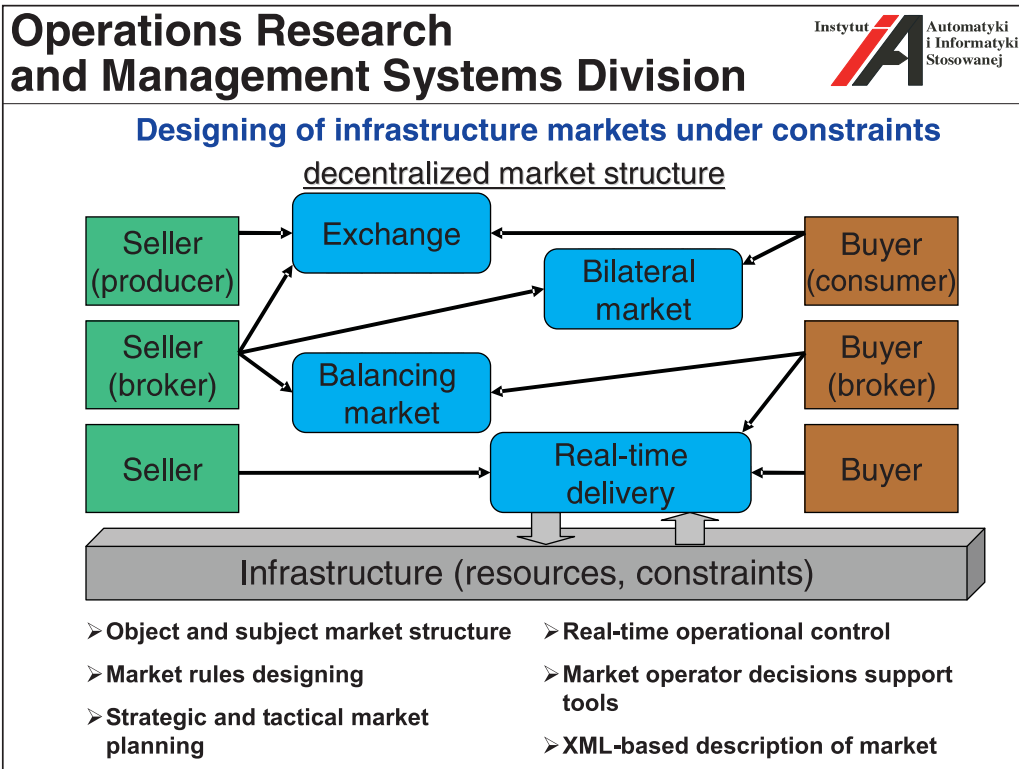
Alice

ALICE is one of the four detectors at the Large Hadron Collider (LHC) of the European Laboratory for Particle Physics (CERN), Geneva.




* In co-operation with Faculty of Physics





Operations Research and Management Systems Division



Library catalogue digitization

Skew correction

Binarization

Noise elimination

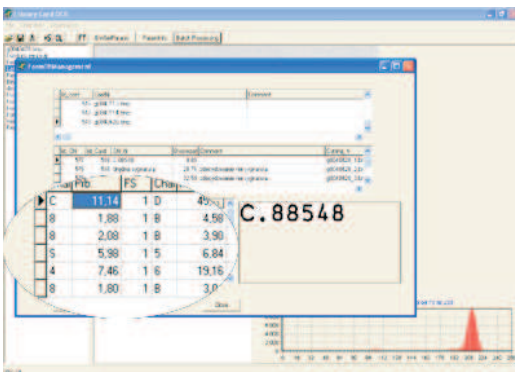
Segmentation

C.88548

gy and their inter-
ference held in

Framing


C.88548



Recognition

C.88548

Operations Research and Management Systems Division



M³ Multicommodity Market Model

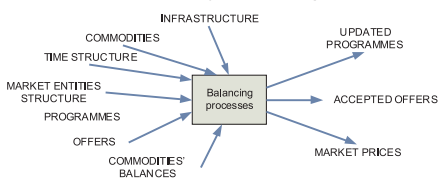
M³ is a flexible and universal market data and communication model
<http://www.openm3.org>

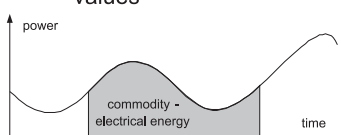
M³ is mainly (but not only) designed for

- **Centralized** (auctions, exchanges) and **distributed, multicommodity** markets
- **Infrastructure** markets
- **„Real-time”** markets on which commodities
 - are non-storable, localized in time and space,
 - delivered too late become worthless, their storage is limited
 - are integrals of some instantaneous values

M³ consists of several layers: formal mathematical model, conceptual data model, expressed in form of UML class diagrams, exemplary relational database structure, XML schemas for static data, communication models and XML schemas for messages and Web Services definitions.

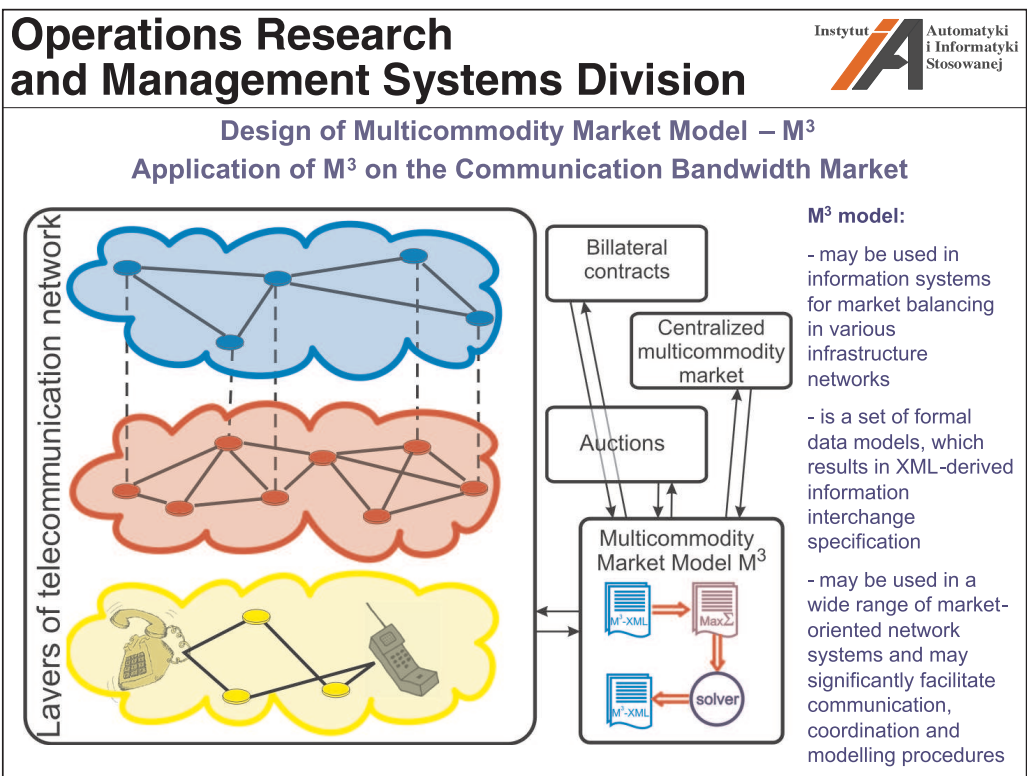
Conceptual model of M³ describes the inputs and outputs of elementary balancing process:





M³ helps markets' development by providing

- flexible framework both for realworld market systems and for research projects
- possibilities for integration of software components
- possibilities for organizing benchmark data repository




OPTIMIZATION AND DECISION SUPPORT DIVISION

- Division Head:* Professor Włodzimierz Ogryczak
- Professors:* Włodzimierz Ogryczak, Wiesław Traczyk
- Associate Professor:* Jerzy Paczyński
- Assistant Professors:* Janusz Granat, Adam Krzemienowski, Andrzej Stachurski, Tomasz Śliwiński
- Senior Lecturers:* Tadeusz Rogowski, Jerzy Sobczyk
- Lecturer:* Grzegorz Wójcik
- Ph.D. Students:* Krzysztof Bareja, Bartosz Kozłowski, Michał Majdan, Piotr Rzepakowski

Research of the division is focused on the theory of distributed and parallel computational methods, and software for optimization. The theory covers a whole area of linear and non-linear, dynamic, stochastic and multiple criteria problems, and deals with such topics as the sensitivity aspects and the 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. Also, research is carried on the methods of reasoning in knowledge based systems.


Optimization and Decision Support Division



Risk Measures and Optimization under Risk

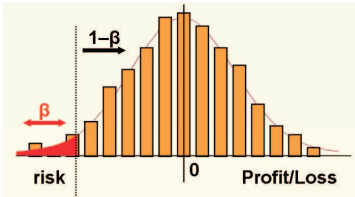
- focus on risk measures consistent with axiomatic models of preferences for choice under risk
- risk preference modeling from strongest risk aversion to complete risk neutrality
- optimization with linear programming: very large dimensions, fast and stable numerical implementations

Returns

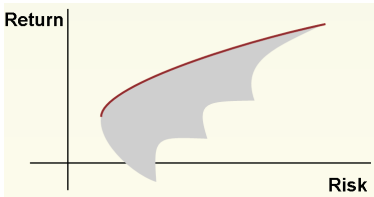


↓

Distribution approach




Mean-risk analysis



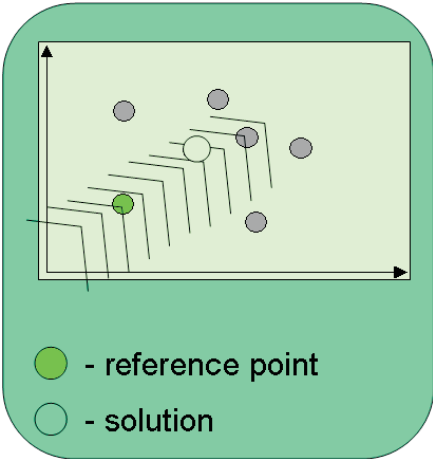
←

Optimization and Decision Support Division




Reference Point Method

- interactive method for multicriteria model analysis
- guiding information by specification of the reference points
- a Pareto-optimal solution is selected for a given reference point





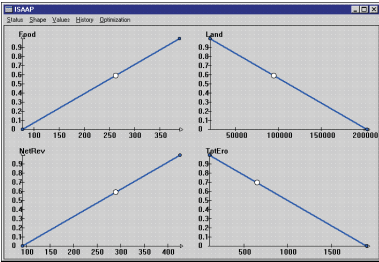
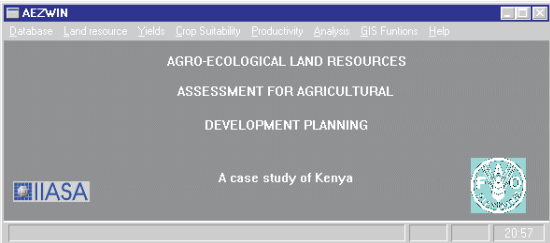
● - reference point
○ - solution

Optimization and Decision Support Division



Application of the reference point method to land resource assessment

1.3 Statistical Data

FACULTY and STAFF	2005		2006		2007	
	persons	FTE	persons	FTE	persons	FTE
Academic Staff	44(+2)	37.48(+2)	43(+2)	37.5(+2)	44(+2)	37.25(+2)
by titles/degrees						
Professors	4	4	4	4	4	3.75
D.Sc.-s	5	5	6	6	6	6
Ph.D.-s	24(+2)	21(+2)	24(+2)	21(+2)	25(+2)	21.5(+2)
M.Sc.-s	11	7.48	9	6.5	9	6
by positions						
Professors	8	8	9	9	9	8.75
Associate Professors	0	0	0	0	1	1
Assistant Professors	21(+2)	19(+2)	22(+2)	20(+2)	23(+2)	20.5(+2)
Senior Lecturers	6	5	7	5.5	7	5
Lecturers	1	0.5	1	0.5	1	0.5
Assistants	7	3.98	4	2.5	3	1.5
Ph.D. Students	36		37		33	
Technical Staff	3	2.5	3	2.5	3	2.5
Administrative Staff	6	5.5	6	5.5	6	5.5

FTE – Full Time Employment units,

+ – corrections due to persons on long-term leave of absence

ACTIVITIES	2005	2006	2007
Teaching activities			
standard teaching potential, hours	8 212	8 327.25	8 182.49
# hours taught	15 914.5	15 341.51	14 331.60
Degrees awarded			
D.Sc.	0	1	0
Ph.D.	5	5	2
M.Sc.	47	51	50
B.Sc.	40	53	54
Research projects			
granted by WUT	11	3	8
granted by State institutions	5	7	9
granted by international institutions	1	1	1
other	4	0	0
Reviewed publications			
monographs (authored or edited)	2	2	8
chapters in books	18	31	16
papers in journals	15	32	46
papers in conference proceedings	55	44	66
Reports, abstracts and other papers	14	28	13
Conferences			
participation (# of conferences)	33	40	45
participation (# of part. from ICCE)	52	73	81

RESOURCES	2004	2005	2006	2007
Space (sq.m.)				
laboratories	585	585	585	585
library + seminar room	74	74	74	74
faculty offices	724	724	724	724
Computers				
workstations*	14	14	9	15
personal computers*	245	245	165	269
Library resources				
books	4683	4732	4814	4862
booklets	1684	1779	1885	1960
journals subscribed	7	6	6	5

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

2 Faculty and Staff

Presentation of our faculty starts with Professors Emeriti and continues with Senior Faculty, Supporting Faculty, Ph.D. Students, and Administrative Staff. Senior Faculty includes Professors, Associate Professors, Assistant Professors, and Senior Lecturers. By Supporting Faculty we understand Lecturers, Assistants, and Research Associates, as well as Technical Staff. The personal information below regards the period of January 1 – December 31, 2006.

2.1 Professors Emeriti

Władysław Findeisen Professor (retired July 1999)

Systems Control Division, Complex Systems Group
room 524, tel. 660 7397 and 825 0995
W.Findeisen@ia.pw.edu.pl

M.Sc. 1949, Ph.D. 1954. Full Professor since 1962.

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), Technische Universität Ilmenau (1998). Chairman of the Social Council to the Primate of Poland (1986–90), Vice-President of the Polish Academy of Sciences (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).

Radosław Ładziński Professor (retired January 1998)

Systems Control Division, Complex Systems Group
room 570, tel. 660 7648
R.Ladzinski@ia.pw.edu.pl

Born 1927, M.Sc. 1952, Ph.D. 1957 from WUT; the title of Professor of Technical Sciences awarded in 1968.

With WUT since 1949. Vice-Dean of the Faculty of Electronics, (1964–1969), head of the Ph.D. Program in Control Engineering and Computer Science (1977–1981), chairman of the Electronics and Information Technology Committee for Ph.D. Degree in Control and Computer Engineering (1991–1996). As Professor Emeritus author of the programme and the first lecturer of the two basic Undergraduate Courses: *Dynamic System* and *Control*, both taught in English (1998–2007). Parallel working with Institute of Electrical Engineering of Polish Academy of Sciences (PAN) (1955–1962), and with Institute of Automatic Control of PAN (1963–1968). Post-Doctoral Scholar, Royal Institute of Technology, Stockholm, Sweden (1957), British Council Scholar, University of Cambridge, England (1959–60), Visiting Lecturer, Department of Mathematics, University of Ghana, Accra, Ghana (1962–63), Professor of Engineering Science, University of Mosul, Iraq (1970–74), Professor of Engineering Mathematics, Rivers State University of Science and Technology, Port Harcourt, Nigeria (1981–87), Member of Magdalene College, University of Cambridge, England.

Interests: Dynamic systems, control theory, and applied mathematics.

Jerzy Pułaczewski Senior Engineer (retired since October 2003)

Systems Control Division, Robot Programming and Pattern Recognition Group
 room 570, tel. 660 7648
 J.Pulaczewski@ia.pw.edu.pl

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).

Interests: Digital control algorithms, process modeling and simulation, process control.

Jacek Szymanowski Professor (retired January 2000)

Systems Control Division, Complex Systems Group
 room 530, tel. 660 7922
 J.Szymanowski@ia.pw.edu.pl

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. Retired since January 1999.

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

Andrzej P. Wierzbicki Professor (retired March 2004)

Optimization and Decision Support Division
 room 24, tel. 6607750, 8255280
 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 (1971–1975), Deputy Dean (1971–1972) and then Dean of FEIT (1975–1978) member of the Senate (1975–1978), member or chairman of many university commissions.

Since 1978 working with the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria and served (1979–1984) as the chairman of the Systems and Decision Sciences Program. Visiting prof. at the University of Minnesota, Minneapolis, MN, Brown University, Providence, RI (1970–1971), Kyoto University, Japan (1989–1990), Fernuniversitaet Hagen (1985) and Japan Advanced Institute of Science and Technology (2004-).

Director of the National Institute of Telecommunications in Poland (1996–2004). Chairman of the Commission of Applied Research of the State Committee for Scientific Research (KBN) (1991–1994). Chairman of the Consulting Panel for Promotion and Policy of Science of State Committee for Scientific Research (KBN) (1994–2000), Member of the Consulting Panel for Computer Infrastructure of Science KBN (1994–2000), Chairman of the Consulting Panel for International Scientific Cooperation of State Committee for Scientific Research (KBN) (2000–2004). Chairman of the Scientific Council of the Industrial Institute for Automation and Measurements (PIAP) (1991–2004), chairman of the Scientific Council of Scientific and Academic Computer Network NASK (1994–2004), and member of the Scientific Council of Institute of System Research (IBS PAN) (since 1992). Member of the Committee of Automation and Robotics of Polish Academy of Sciences (PAN) (since 1970). Member of the Committee for Future Studies “Poland 2000+” PAN (since 1986, deputy chairman since 2000). Member and deputy chairman of the Panel for Cooperation with IIASA of PAN.

Member of the Polish Association for the Club of Rome. Member of Polish Mathematical Society (PTM) (since 1975) and of Society of Polish Electrical Engineers (SEP) (since 1970). Member of the Information Society Technology Advisory Group (ISTAG) of the European Commission (2000-2002). Recipient of George Cantor Award of the Int. Soc. of Multi-Criteria Decision Making for his results in multi-criteria optimization theory and decision support methodology (1992). Recipient of Tomasz Hofmokl Award of NASK for the promotion of informational society, 2005. Recipient of Best Paper Award at the Hawaii International Conference of Systems Science, 2005 for the paper: "Knowledge Creation and Integration: Creative Space and Creative Environments".

Interests: Optimization theory and algorithms, decision theory, decision support systems, negotiation methods and experiences, applications in telecommunication, information society issues, knowledge creation.

2.2 Senior Faculty

Piotr Arabas Assistant Professor (part-time)

Systems Control Division, Complex Systems Group
room 573, tel. 22 234 7126
P.Arabas@elka.pw.edu.pl

M.Sc. 1996, Ph.D. 2004 from WUT

With WUT since 2002.

Interests: Hierarchical systems, predictive control, management of telecommunication services.

Adam Czajka Assistant Professor (part-time)

Systems Control Division, Biometrics and Machine Learning Group
room 573, tel. 22 234 7126
A.Czajka@ia.pw.edu.pl, www.ia.pw.edu.pl/~aczajka

M.Sc. 2000, Ph.D. 2005 from WUT

Received his M.Sc. in Computer Control Systems in 2000 and Ph.D. in Control and Robotics in 2005 from Warsaw University of Technology. Since 2003 he is with Warsaw University of Technology, and since 2002 with Research and Academic Computer Network NASK working for Biometric Laboratories. Member of the NASK Research Council (2006-). Member of Polish Committee for Standardization (Technical Committee 182 - Information Security in IT Systems, 2007-). He is also a member of the IEEE (Institute of Electrical and Electronics Engineers, Inc., 2002-) and serves as the Secretary of the IEEE Poland Section (2005-).

Interests: Biometrics, pattern recognition, systems security.

Paweł Domański Assistant Professor (part-time)

Control and Software Engineering Division, Control Engineering Group
room 571, tel. 22 234 7861
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.

Krzysztof Fleszar Assistant Professor (on leave since October 2005)

Operations Research and Management Systems Division
room 561, tel. 22 234 7123

K.Fleszar@ia.pw.edu.pl, www.ia.pw.edu.pl/~kfleszar

M.Sc. 2000, Ph.D. 2004 from WUT.

With WUT since 2003.

Interests: Combinatorial optimisation, scheduling and allocation, combinatorial auctions decision support, multi-dimensional optimisation.

Janusz Granat Assistant Professor

Optimization and Decision Support Division
room 25A, tel. 22 234 7640

J.Granat@ia.pw.edu.pl, www.ia.pw.edu.pl/~janusz

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

With WUT since 1987, chairmen of IFIP Working Group TC 7.6, Optimization-Based Computer Modeling and Design

Interests: Decision support systems, multicriteria decision analysis, data warehouses, decision support in telecommunication industry.

Jerzy Gustowski Senior Lecturer

Control and Software Engineering Division, Control Engineering Group
room 525, tel. 22 234 7699

J.Gustowski@ia.pw.edu.pl

M.Sc. 1979 from WUT.

With WUT since 1979.

Interests: Low level software for computer control, interfacing, single-chip microcomputers, PLC controllers.

Mariusz Kaleta Assistant Professor

Operations Research and Management Systems Division
room 561, tel. 22 234 7123

M.Kaleta@ia.pw.edu.pl

M.Sc. 2000, Ph.D. 2005, from WUT

With WUT since 2003.

Interests: Discrete optimization, operations research and management, decision support in energy market.

Mariusz Kamola Assistant Professor (part-time)

Systems Control Division, Complex Systems Group
room 573, tel. 22 234 7126

M.Kamola@ia.pw.edu.pl, www.ia.pw.edu.pl/~mkamola

M.Sc. 1997, Ph.D. 2004 from WUT.

With WUT since 2002.

Interests: Modeling and simulation, optimization, parallel computation, IP networks.

Andrzej Karbowski Assistant Professor

Systems Control Division, Complex Systems Group
room 572, tel. 22 234 7632
A.Karbowski@ia.pw.edu.pl, www.ia.pw.edu.pl/~karbowsk

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

With WUT since 1983. Research visitor: Politecnico di Milano and Universita di Genova, 1992, Edinburgh Parallel Computing Centre, 2000. Member of IEEE.

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 computer networks.

Włodzimierz Kasprzak Professor

Systems Control Division, Robot Programming and Pattern Recognition Group
room 554, tel. 22 234 7866
W.Kasprzak@ia.pw.edu.pl, www.ia.pw.edu.pl/~wkasprza

M.Sc. 1981, Ph.D. 1987 from WUT, Dr-Ing. 1997 from Univ. of Erlangen-Nuremberg, D.Sc. 2001 from WUT.

With WUT since 1997. Member of Polish Section of IAPR.

Interests: Computer vision, speech recognition, pattern classification, signal analysis, artificial intelligence.

Zygmunt Komor Senior Lecturer (part-time)

Control and Software Engineering Division, Control Engineering Group
room 571, tel. 22 234 7861
Z.Komor@ia.pw.edu.pl

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

With WUT since 1964.

Interests: Automatic control, control instrumentation design and implementation.

Urszula Kręglewska Senior Lecturer

Control and Software Engineering Division, Control Engineering Group
room 553, tel. 22 234 7121
U.Kreglewska@ia.pw.edu.pl, www.ia.pw.edu.pl/~ukreglew

M.Sc. 1973 from WUT.

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

Interests: Computer interfaces design.

Tomasz J. Kruk Assistant Professor

Systems Control Division, Complex Systems Group
room 530, tel. 22 234 7922
T.Kruk@ia.pw.edu.pl, www.ia.pw.edu.pl/~tkruk

M.Sc. 1994 from Technical University of Gdańsk. Ph.D. 1999 from WUT.

With WUT since 1999.

Interests: Operating systems, computer and network security, distributed systems.

Adam Krzemienowski Assistant Professor (since Oct. 2007, on leave since Dec. 2007)

Optimization and Decision Support Division
A.Krzemienowski@ia.pw.edu.pl

Ph.D. 2007 from WUT.

With WUT since 2007.

Bartłomiej Kubica Assistant Professor (since September 2006)

Systems Control Division, Complex Systems Group
room 573a, tel. 22 234 7860
bkubica@elka.pw.edu.pl

M.Sc. 2001, Ph.D. 2006 from WUT.

With WUT since 2005.

Interests: Interval mathematics, optimization, numerical computations, queueing systems, probability, network management.

Maciej Ławryńczuk Assistant Professor

Control and Software Engineering Division, Control Engineering Group
room 567, tel. 22 234 7673
M.Lawrynczuk@ia.pw.edu.pl

M.Sc. 1998, Ph.D. 2003 from WUT.

With WUT since 2003. Winner of “Gold chalk” (“Złota kreda”) award.

Interests: Process control and optimization, predictive control, neural networks, modelling.

Krzysztof Malinowski Professor (Head of Division)

Systems Control Division, Complex Systems Group
room 517, tel. 22 234 7397 and 8250995
K.Malinowski@ia.pw.edu.pl, www.ia.pw.edu.pl/~malinows

M.Sc. 1971, Ph.D. 1974, D.Sc. 1978, the title of Professor of Technical Sciences awarded in 1989, appointed to ordinary professorship in 1994.

With WUT since 1971. Director of ICCE (1984–1996), Dean of the FEIT (1996–1999), Director of the Center for Control and Information-Decision Technology (1993–2003). Member of the Senate of the Warsaw University of Technology (1993–2002), Chairman of the Senate Committee on Academic Staff (1993–1996 and 1999–2002), Chairman of Senate Committee on Research (1996–1999), Director of the University Priority Research Program in Control, Information Technology, and Automation (PATIA) (1994–1999). Correspondent Member of the Polish Academy of Sciences (PAN) (since 1998), Member of the Warsaw Scientific Society (TNW), Member of Technical Sciences Group of the Ministry of National Education Expert Committee, Chairman of the Committee of Automation and Robotics of Polish Academy of Sciences (PAN), Vice Director (Research) of the Research and Academic Computer Network Institute (NASK), Chairman of the Scientific Council of the Industrial Institute for Automation and Measurements (PIAP), Member of the IFAC Technical Committees on Optimal Control and on Large Scale Systems.

Interests: Hierarchical control, model-based predictive control of nonlinear systems, applications of optimization, management and control of computer networks.

Piotr Marusak Assistant Professor

**Control and Software Engineering Division, Control Engineering Group
room 567, tel. 22 234 7673**

P.Marusak@ia.pw.edu.pl, www.ia.pw.edu.pl/~pmarusak

M.Sc. 1997, Ph.D. 2003 from WUT.

With WUT since 2002.

Interests: Predictive control of nonlinear systems, digital control algorithms, process modeling and simulation.

Ewa Niewiadomska-Szykiewicz Assistant Professor (Leader of the Group)

**Systems Control Division, Complex Systems Group
room 572, tel. 22 234 7632**

E.Niewiadomska@ia.pw.edu.pl, www.ia.pw.edu.pl/~ens

M.Sc. 1986, Ph.D. 1995, D.Sc. 2005 from WUT.

Research Assistant at the Institute of Geophysics of Polish Academy of Sciences in (1987–1988), with WUT since 1988, NASK since 2001, IEEE Member.

Interests: Large scale systems, computer simulation, computer aided control systems design, environmental systems management, distributed computations, global optimization, telecommunication systems, ad hoc networks.

Włodzimierz Ogryczak Professor (Head of Division)

**Optimization and Decision Support Division
room 24, tel. 22 234 7750, 8255280**

W.Ogryczak@ia.pw.edu.pl, www.ia.pw.edu.pl/~wogrycza

M.Sc. 1973, Ph.D. 1983 in Mathematics from Warsaw University, D.Sc. 1997 in Computer Science from PAN.

With Warsaw University, Institute of Informatics 1973–2000, with WUT since 2000. H.P. Kizer Eminent Scholar Chair in Computer Science at Marshall University, USA (1989–1992), visiting professor at Service de Mathématique de la Gestion of Université Libre de Bruxelles, Brussels, Belgium (1994–1995). Member of INFORMS, International Society of MCDM, GARP, Expert of The State Accreditation Committee.

Interests: Computer solutions and interdisciplinary applications in the area of operations research, optimization and decision making with the main stress on: multiple criteria analysis and decision support, decision making under risk, linear, network and discrete programming, location and distribution problems.

Andrzej Pacut Professor (Leader of the Group)

**Systems Control Division, Biometrics and Machine Learning Group
room 522, tel. 22 234 7733**

A.Pacut@ia.pw.edu.pl, www.ia.pw.edu.pl/~pacut

M.Sc. 1969, Ph.D. 1975, D.Sc. 2000 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 1993–2005. Senior Member of IEEE, member of INNS (Int. Neural Networks Society). Vice Chairman (2001–2005) and Chairman (2006–) of the IEEE Poland Section. Member, Tech. Committee 182 of Polish Normalization Committee (PKN) (2003–), Head of the NASK Biometric Laboratories (2003–), member of NASK Science Council.

Interests: Learning systems, system identification, biometrics, neural modeling, neural networks.

Jerzy Paczyński Assistant Professor (Docent)

Optimization and Decision Support Division
room 26, tel. 22 234 7862

J.Paczynski@elka.pw.edu.pl, www.ia.pw.edu.pl/~paczynsk

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

With WUT since 1963. Deputy Director for Academic Affairs (1996–2005).

Interests: Modeling, modeling languages, transformations of formal languages — tools and applications, application of computer algebra and logic programming to systems theory and optimization.

Krzysztof Pieńkosz Assistant Professor

Operations Research and Management Systems Division
room 560a, tel. 22 234 7864

K.Pienkosz@ia.pw.edu.pl

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.

Grzegorz Płoszajski Assistant Professor

Operations Research and Management Systems Division
room 560a, tel. 22 234 7864

G.Ploszajski@ia.pw.edu.pl

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

With WUT since 1969. Deputy Director for Information of the Main Library of WUT since 1996. Committee Member of ‘Kasa Mianowskiego’ since 2004.

Interests: Control and simulation of discrete production systems, production management, quality management, library automation, text algorithms, information retrieval.

Tadeusz Rogowski Senior Lecturer (part-time)

Optimization and Decision Support Division
room 530, tel. 22 234 7922

T.Rogowski@ia.pw.edu.pl

M.Sc. 1972 from WUT.

With WUT since 1972, Director of University Computer Center (1989–2002).

Interests: Computer network, programming languages, operating systems.

Andrzej Rydzewski Senior Lecturer

Systems Control Division, Robot Programming and Pattern Recognition Group
room 566, tel. 22 234 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.

Krzysztof Sacha Professor (Leader of the Group)

**Control and Software Engineering Division, Software Engineering Group
room 562, tel. 22 234 7756**

K.Sacha@ia.pw.edu.pl, www.ia.pw.edu.pl/~sacha

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

With WUT since 1976. Designer in Minicomputer Research and Development Center ERA (1973), Software Engineering Consultant for Industrial Automation Enterprise PNEFAL (1987–90), University of Groningen (1991–1992), Technical University of Lingby (1993), Project Manager in Aler-ton Integracja Serwis (1999–2002), Advisor to the President of Social Insurance Institution (2004–2007). Member of IEEE Computer Society and Section of Software Engineering of Polish Academy of Sciences (PAN). Member of the Senate of High School of Economy and Information Technology, Warsaw, Poland.

Interests: Software engineering, software quality evaluation, software specification and design methods, real-time systems.

Jerzy Sobczyk Senior Lecturer (part-time)

**Optimization and Decision Support Division
room 519, tel. 22 234 7863**

J.Sobczyk@ia.pw.edu.pl, www.ia.pw.edu.pl/~jurek

M.Sc. 1985 from WUT.

With WUT since 1984. FEIT Network Administrator.

Interests: Computer networks, programming languages, parallel and distributed programming, multi-criteria optimization.

Andrzej Stachurski Assistant Professor

**Optimization and Decision Support Division
room 25a, tel. 22 234 7640**

A.Stachurski@ia.pw.edu.pl, www.ia.pw.edu.pl/~stachurs

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, Åbo 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. Author and co-author of many scientific papers and reports on optimization algorithms, identification, applications of optimizations in macro-economy modeling and optimal design problems in structural engineering. Co-author of a textbook "Podstawy optymalizacji" ("Foundations of Optimization") published in 1999. Reviewer of Control&Cybernetics, Optimization, Archives of Control Science, SIAM J. on Optimization, IEEE Concurrency.

Interests: Interests: nonlinear programming, large-scale optimization, applications to the optimal design problems in structural engineering, parallel and distributed calculations in Mathematical Programming.

Marcin Szlenk Assistant Professor

**Control and Software Engineering Division, Software Engineering Group
room 555, tel. 22 234 7997**

M.Szlenk@ia.pw.edu.pl

M.Sc. 2000, Ph.D. 2006 from WUT

With WUT since 2005

Interests: Software modelling and verification, formal methods in software engineering.

Wojciech Szynkiewicz Assistant Professor

Systems Control Division, Robot Programming and Pattern Recognition Group
 room 554, tel. 22 234 7866
 W.Szynkiewicz@ia.pw.edu.pl

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

With WUT since 1985. Deputy Director of the Research Center for Control and Information-Decision Technology (1999–2003).

Interests: Robotics, multiple robots coordination, robot sensor-based manipulation and motion planning, autonomous navigation, real-time systems.

Tomasz Śliwiński Assistant Professor (since Oct. 2007)

Optimization and Decision Support Division
 room 26, tel. 22 234 7862
 T.Sliwinski@ia.pw.edu.pl

M.Sc. 1999, Ph.D. 2007 from WUT

With WUT since 2004

Interests: Discrete optimisation, operations research, decision support.

Piotr Tatjewski Professor (Director of the Institute, Head of Division)

Control and Software Engineering Division, Control Engineering Group
 room 521, tel. 22 234 7397 and 825 0995
 P.Tatjewski@ia.pw.edu.pl, www.ia.pw.edu.pl/~tatjewsk

M.Sc. 1972, Ph.D. 1976, D.Sc. 1988, the title of Professor of Technical Sciences awarded in 2003, appointed to ordinary professorship in 2006

With Warsaw University of Technology since 1972. Head of Process Control Group since 1991, Deputy Director of ICCE for Academic Affairs (1987–1991), 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 (1992/1993). Member of Committee of Control and Robotics of Polish Academy of Sciences since 2004, since 2007 Chair of the Automatic Control Systems Section of this Committee, Member of the Control and Robotics Section of the Scientific Research Council (KBN) 1997–2004. Member of Programme Committee of the Journal PAK, Int. Journal of Applied Mathematics and Computer Science, Journal of Automation, Mobile Robots and Intelligent Systems, Expert of Ministry of Education and Science for Educational Standards

Interests: Multi-layer control systems, process control and optimization, predictive control, decomposition methods in optimization and control, soft computing methods.

Eugeniusz Toczyłowski Professor (Head of Division)

Operations Research and Management Systems Division
 room 516, tel. 22 234 7950
 E.Toczyłowski@ia.pw.edu.pl

M.Sc. 1973, Ph.D. 1976, D.Sc. 1989 from WUT, the title of Professor of Technical Sciences awarded in 2004.

With WUT since 1973. Head of Operations Research and Management Systems Division, Vice-Dean of the Faculty of Electronics at WUT (1990–1993), chairman of the Rector's Committee for University Computerization (1993–1999), Advisor to the Dean on Strategic Planning (1993–1996). Head of the Undergraduate Program in Information Systems for Decision Support. Member of the Section on Decision Support (since 1992) and the Section on Knowledge Engineering and Operations Research (2003–) of the Committee of Automation and Robotics of Polish Academy of Sciences, Member of the Scientific Council of the Systems Research Institute (IBS PAN) (since

2002), Member of Consulting Council EnergoProject S.A. (2003–), Member of Steering Committee of the Energy Market (2003–).

Interests: Structural approaches to discrete optimization, operations research and management, management information systems, auction theory, competitive market design under constraints.

Tomasz Traczyk Assistant Professor (Deputy Director of the Institute since August 2005)

Operations Research and Management Systems Division
room 22/23, tel. 22 234 7750, 22 825 5280
 T.Traczyk@ia.pw.edu.pl, www.ia.pw.edu.pl/~ttraczyk

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, Web-based and distributed systems, XML language and its applications, variant configuration, software configuration management.

Wiesław Traczyk Professor (part-time)

Optimization and Decision Support Division
room 523, tel. 22 234 7791
 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 Senate of Warsaw University of Technology (1981–1984), Chairman of the Senate Committee of Finances (1981–84). Professor of the University in Port Harcourt, Nigeria (1984–1987), Professor of the Institute of Telecommunications (1997–2006). Chairman of FEIT Committee for Ph.D. Degrees in Automatic Control and Computer Sciences (1990–2005). Head of ICCE Optimization and Decision Support Division (1997–2002).

Interests: Knowledge engineering, expert systems, artificial intelligence.

Michał Warchoń Senior Lecturer, part-time

Systems Control Division, Complex Systems Group
room 560, tel. 22 234 7665
 M.Warchol@ia.pw.edu.pl, www.ia.pw.edu.pl/~warchol

M.Sc. 1991, Ph.D. 2002 from WUT.

With WUT since 1991.

Interests: Predictive control, synthesis of control systems, symbolic calculations, operating systems.

Paweł Wawrzyński Assistant Professor

Systems Control Division, Biometrics and Machine Learning Group
room 572a, tel. 22 234 7120
 P.Wawrzynski@elka.pw.edu.pl, http://staff.elka.pw.edu.pl/~pwawrzyn

M.Sc. 2001 from WUT and 2004 from Warsaw University, Ph.D. 2005 from WUT.

With WUT since 2005.

Interests: Reinforcement learning, neural networks; modeling of memory, consciousness, and perception; adaptive control, learning robots.

Adam Woźniak Assistant Professor

Systems Control Division, Complex Systems Group
room 560, tel. 22 234 7665
 A.Wozniak@ia.pw.edu.pl, www.ia.pw.edu.pl/~wozniak

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

With WUT since 1970. Advisor to the Dean of Faculty for Departmental Libraries (1987–1993 and 1999–2002), Member of WUT Library Council (since 1999), Member of WUT Committee for Student Admissions (2001–2002), Dean’s Coordinator for Second-level Distance Learning (2005–).

Interests: Control of complex systems, servomechanisms, robot control, multi-criteria optimization, game theory, multiagent systems, decision support systems.

Andrzej Zalewski Assistant Professor (part-time)

Control and Software Engineering Division, Software Engineering Group
room 555, tel. 22 234 7997
 A.Zalewski@ia.pw.edu.pl

M.Sc. 1997, Ph.D. 2003 from WUT.

With WUT since 2002. Member of Information Systems Audit and Control Association (ISACA)

Interests: Software engineering, real-time systems, timing requirements, concurrent systems, performance analysis for computer systems, IT project economics.

Cezary Zieliński Professor (Deputy Director of the Institute, Leader of the Group)

Systems Control Division, Robot Programming and Pattern Recognition Group
room 565, tel. 22 234 5102, 8255280
 C.Zielinski@ia.pw.edu.pl, www.ia.pw.edu.pl/~zielinsk

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

With WUT since 1985. Research visitor at Loughborough University of Technology, UK (1990, 1992), Senior Fellow at Nanyang Technological University, Singapore (1999–2001), Secretary of Priority Research Program in Control, Information Technology, and Automation (PATIA) (1994–1999). Member of the Editorial Board of International Journal of Intelligent Mechatronics: Design and Production, Program Committee Member of PAK (Pomiary, Automatyka, Kontrola). Member of the Forecast Committee of the Polish Academy of Sciences: Poland 2000 Plus (2003–). Senior Member of IEEE (2002–). Vice Dean for Research and International Cooperation FEIT (2002–2005), Head of ICCE Robot Programming and Pattern Recognition Group since 1996. Member of the board of EURON (European Robotics Network of Excellence). Deputy Director of ICCE for Research (2005–). Secretary of the Control and Robotics Committee of the Polish Academy of Sciences (2007–).

Interests: Robot programming methods, open-structure robot controllers, behavioral control, digital and microprocessor systems.

Izabela Żółtowska Assistant Professor (since October 2007)

Operations Research and Management Systems Division
room 526, tel. 22 234 7125
 I.Zoltowska@elka.pw.edu.pl, home.elka.pw.edu.pl/~imilenko

M.Sc. 2000, Ph.D. 2006 from WUT.

With WUT since 2005.

Interests: Operations, planning and economics of electric energy systems, optimization theory and its applications.

2.3 Supporting Faculty and Staff

Adam Kozakiewicz Assistant (part-time)

Systems Control Division, Complex Systems Group
room 573a, tel. 22 234 7860
akozakie@ia.pw.edu.pl

M.Sc. 2001 from WUT.

With WUT since 2006.

Interests: Computer networks, distributed computation, network and systems security.

Włodzimierz Macewicz Senior Software Engineer

Control and Software Engineering Division, Software Engineering Group
room 525, tel. 22 234 7699
W.Macewicz@ia.pw.edu.pl, www.ia.pw.edu.pl/~wujek

M.Sc. 1983 from WUT.

With WUT since 1983.

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

Maciej Staniak Assistant (since December 2007)

Systems Control Division, Robot Programming and Pattern Recognition Group
room 012, tel. 22 234 7117
mstaniak@elka.pw.edu.pl, <http://robotyka.ia.pw.edu.pl/twiki/bin/view/Team/MaciejStaniak>

M.Sc. 2002 from WUT

With WUT since 2007

Interests: Visual servoing, robot control, real-time systems, programming frameworks, force and visual manipulator control integration.

Tomasz Winiarski Assistant (part-time)

Systems Control Division, Robot Programming and Pattern Recognition Group
room 012, tel. 22 234 7117
T.Winiarski.ia.pw.edu.pl

M.Sc. 2— from WUT

With WUT since 2004

Interests: Robot control systems, artificial intelligence.

Grzegorz Wójcik Lecturer (part-time)

Optimization and Decision Support Division
room 519, tel. 22 234 7863
G.Wojcik@ia.pw.edu.pl, www.ia.pw.edu.pl/~grzesio

M.Sc. 1994 from WUT.

With WUT since 1994, part-time since Feb. 1998.

Interests: Computer networks management, information systems.

2.4 Ph.D. Students

Krzysztof Bareja Ph.D. Student

Optimization and Decision Support Division
room 556, tel. 22 234 7124
K.Bareja@elka.pw.edu.pl

Supervisor: Włodzimierz Ogryczak

Marcin Chochowski Ph.D. Student

Systems Control Division, Biometrics and Machine Learning Group
room 518a, tel. 22 234 7805
mchochow@elka.pw.edu.pl, www.ia.pw.edu.pl/~mchochow

Supervisor: Andrzej Pacut

Adam Działak Ph.D. Student

Control and Software Engineering Division, Control Engineering Group
room 567, tel. 22 234 7673
A.Dzialak@ia.pw.edu.pl

Supervisor: Piotr Tatjewski

Anna Felkner Ph.D. Student

Control and Software Engineering Division, Software Engineering Group
room 556, tel. 22 234 7124
A.Felkner@elka.pw.edu.pl

Supervisor: Krzysztof Sacha

Małgorzata Kudelska Ph.D. Student

Systems Control Division, Biometrics and Machine Learning Group
room 572a, tel. 22 234 7120
M.Gadomska@elka.pw.edu.pl

Supervisor: Andrzej Pacut

Maciej Gula Ph.D. Student

Control and Software Engineering Division, Software Engineering Group
room 556, tel. 22 234 7124
M.Gula@elka.pw.edu.pl

Supervisor: Krzysztof Sacha

Przemysław Kacprzak Ph.D. Student

Operations Research and Management Systems Division
room 526, tel. 22 234 7125
P.Kacprzak@ia.pw.edu.pl

Supervisor: Eugeniusz Toczyłowski

Piotr Kaczyński Ph.D. Student

Control and Software Engineering Division, Control Engineering Group
room 567, tel. 22 234 7673
P.Kaczynski@elka.pw.edu.pl

Supervisor: Piotr Tatjewski

Michał Karpowicz Ph.D. Student

Systems Control Division, Complex Systems Group
room 573a, tel. 22 234 7860
M.Karpowicz@ia.pw.edu.pl

Supervisor: Krzysztof Malinowski

Kamil Kołtyś Ph.D. Student

Operations Research and Management Systems Division
room 526, tel. 22 234 7125
K.Koltys@ia.pw.edu.pl

Supervisor: Eugeniusz Toczyłowski

Tomasz Kornuta Ph.D. Student

Systems Control Division, Robot Programming and Pattern Recognition Group
room 012, tel. 22 234 7117
T.Kornuta@elka.pw.edu.pl

Supervisor: Cezary Zieliński

Bartosz Kozłowski Ph.D. Student

Optimization and Decision Support Division
room 556, tel. 22 234 7124

Supervisor: Włodzimierz Ogryczak

Michał Kudelski Ph.D. Student

Systems Control Division, Biometrics and Machine Learning Group
room 572a, tel. 22 234 7120
M.Kudelski@elka.pw.edu.pl

Supervisor: Andrzej Pacut

Robert Kuźmiuk Ph.D. Student

Operations Research and Management Systems Division
room 526, tel. 22 234 7125
R.Kuzmiuk@ia.pw.edu.pl

Supervisor: Eugeniusz Toczyłowski

Piotr Kwaśniewski Ph.D. Student

Systems Control Division, Complex Systems Group
room 573a, tel. 22 234 7860
P.Kwasniewski@elka.pw.edu.pl

Supervisor: Krzysztof Malinowski

Marek Majchrowski Ph.D. Student

Systems Control Division, Robot Programming and Pattern Recognition Group
room 012, tel. 22 234 7117
M.Majchrowski@elka.pw.edu.pl

Supervisor: Cezary Zieliński

Michał Majdan Ph.D. Student

Optimization and Decision Support Division
room 556, tel. 22 234 7124
M.Majdan@ia.pw.edu.pl

Supervisor: Włodzimierz Ogryczak

Michał Marks Ph.D. Student

**Systems Control Division, Complex Systems Group
room 573, tel. 22 234 7126
M.Marks@ia.pw.edu.pl**

Supervisor: Ewa Niewiadomska-Szynkiewicz

Andrzej Midera Ph.D. Student

**Operations Research and Management Systems Division
room 526, tel. 22 234 7125
A.Midera@ia.pw.edu.pl**

Supervisor: Eugeniusz Toczyłowski

Roman Bartosz Nowicki Ph.D. Student

**Systems Control Division, Biometrics and Machine Learning Group
room 572a, tel. 22 234 7120**

Supervisor: Andrzej Pacut

Piotr Pałka Ph.D. Student

**Operations Research and Management Systems Division
room 526, tel. 22 234 7125
P.Palka@ia.pw.edu.pl**

Supervisor: Eugeniusz Toczyłowski

Joanna Putz-Leszczyńska Ph.D. Student

**Systems Control Division, Biometrics and Machine Learning Group
room 518a, tel. 22 234 7805
jputz@elka.pw.edu.pl**

Supervisor: Andrzej Pacut

Andrzej Ratkowski Ph.D. Student

**Control and Software Engineering Division, Software Engineering Group
A.Ratkowski@elka.pw.edu.pl**

Supervisor: Krzysztof Sacha

Piotr Rzepakowski Ph.D. Student

**Optimization and Decision Support Division
room 556, tel. 22 234 7124
P.Rzepakowski@elka.pw.edu.pl**

Supervisor: Włodzimierz Ogryczak

Kamil Smolira Ph.D. Student

**Operations Research and Management Systems Division
room 526, tel. 22 234 7125
K.Smolira@elka.pw.edu.pl**

Supervisor: Eugeniusz Toczyłowski

Łukasz Stasiak Ph.D. Student

**Systems Control Division, Biometrics and Machine Learning Group
room 518a, tel. 22 234 7805
lstasiak@elka.pw.edu.pl**

Supervisor: Andrzej Pacut

Przemysław Strzelczyk Ph.D. Student

Systems Control Division, Biometrics and Machine Learning Group
room 518a, tel. 22 234 7805
pstrzelc@elka.pw.edu.pl

Supervisor: Andrzej Pacut

Piotr Sztandera Ph.D. Student

Control and Software Engineering Division, Software Engineering Group
room 556, tel. 22 234 7124
P.Sztandera@ia.pw.edu.pl

Supervisor: Krzysztof Sacha

Krzysztof Szyber Ph.D. Student

Control and Software Engineering Division, Control Engineering Group
room 567, tel. 22 234 7673
K.Szyber@ia.pw.edu.pl

Supervisor: Piotr Tatjewski

Piotr Trojanek Ph.D. Student

Systems Control Division, Robot Programming and Pattern Recognition Group
room 012, tel. 22 234 7117
P.Trojanek@elka.pw.edu.pl

Supervisor: Cezary Zieliński

Rafał Wardziński Ph.D. Student

Systems Control Division, Biometrics and Machine Learning Group
room 518a, tel. 22 234 7805
rafal@elka.pw.edu.pl

Supervisor: Andrzej Pacut

Artur Wilkowski Ph.D. Student

Systems Control Division, Robot Programming and Pattern Recognition Group
room 556, tel. 22 234 7124
A.Wilkowski@elka.pw.edu.pl

Supervisor: Włodzimierz Kasprzak

Marek Zalewski Ph.D. Student

Control and Software Engineering Division, Software Engineering Group
room 556, tel. 22 234 7124
M.Zalewski@ia.pw.edu.pl

Supervisor: Krzysztof Sacha

2.5 Administrative and Technical Staff

Elżbieta Głowacka Secretary, Student affairs.

room 23, tel. 22 234 7750, 22 825 5280
E.Glowacka@ia.pw.edu.pl

Maria Graszka Office support.

room 23, tel. 22 234 7750, 22 825 5280
M.Graszka@ia.pw.edu.pl

Elżbieta Matyjasiak Secretary, Main office.

room 521, tel. 22 234 7397, 22 825 0995
E.Matyjasiak@ia.pw.edu.pl

M.Sc. 2002 from Warsaw School of Management and Marketing.

Jolanta Niedbała Office support (part-time).

room 527, tel. 22 234 7865
J.Niedbalo@ia.pw.edu.pl

Jadwiga Osowska Manager, Finances.

room 563, tel. 22 234 7122
J.Osowska@ia.pw.edu.pl

M.Sc. 1975 from WUT.

Agnieszka Paprocka Finances Support (part-time).

room 563, tel. 22 234 7122
A.Paprocka@ia.pw.edu.pl

Ryszard Tchórz Technical support.

room 559, tel. 22 234 7698

Beata Woźniak Manager, Administration.

room 521a, tel. 22 234 7397
B.Wozniak@ia.pw.edu.pl

M.Sc. 1993 from Warsaw University.

3 Teaching Activities – Academic Year 2005/2006

Course Title	Course code	Hours per week	Class	Lecturer
Adaptive and Learning Systems	SAU	2 – 1 –	PP-SID, OT	A. Pacut (fall)
Administration of UNIX and TCP/IP	ASU	2 – 2 –	OSK, OT	J. Sobczyk
Algorithms and Data Structures	AISD1	2 – 1 –	sem. 3	A. Zalewski (spring)
Biometric Identity Verification	BIT	2 – 1 –	PP-SID, OT	A. Pacut (fall)
Commercial Data Bases 2	KBD2	2 – – 2	BDSI, OT	T. Traczyk (fall)
Computer Networks	ECONE	2 1 1 –	ANGL, OT	J. Sobczyk (spring)
Computer Networks (I)	SKM	2 – 1 1	SKOR, OT	J. Sobczyk (spring/fall)
Computer Networks Control	SSK	2 – 1 –	PZ-SID, OT	K. Malinowski (fall)
Control	ECONT	2 1 1 –	ANGL, OT	P. Domański(spring/fall)
Data Bases 2	BD2	2 – – 1	BDSI, OT	T. Traczyk
Decision Support	WDEC	2 – 2 –	MKPWD, OT, PP-SID	J. Granat
Decision Support Under Risk Conditions	WDWR	2 – – 1	PZ-I, OT	W. Ogryczak (spring)
Digital Circuits	EDC1	2 – 2 –	ANGL	C. Zieliński (spring)
Discrete and Network Optimisation	ODS	2 – – 1	PZ-I, PZ-A, PZ-O, OT	E. Toczyłowski (fall)
Distributed Operating Systems	RSO	2 – 1 –	PZ, OT, PZ-I, PZ-SID, PZ-ISI	T. Kruk (spring)
Dynamic Systems	EDYSY	2 – 2 –	ANGL, OT	R. Ładziński (fall) M. Ławryńczuk, P. Marusak (spring)
Event programming (I)	PROZ	2 – – 1	ATP, OT	W. Kasprzak (fall)
Fundamentals of Control Systems	PSTE	2 – 1 –	sem. 4	P. Tatjewski (spring) K. Malinowski (fall)
Fundamentals of Digital Technology	PTCY	2 – 2 –	sem. 2	C. Zieliński (fall)
Fundamentals of Operation Research	POBO	2 – 1 –	sem. 4	K. Pieńkosz (spring) G. Płoszajski (fall)
Fundamentals of Optimization	POPTY	2 – 2 –	MKPWD, OT	A. Stachurski
Fundamentals of Parallel Computation	PORR	2 – – 2	SKOR, PZ-A, PZ-I	A. Karbowski
Fundamentals of Programming	PRI	2 1 2 –	sem. 1	J. Paczyński (spring)
Image and Speech Recognition	EIASR	2 1 – 1	ANGL., OT	W. Kasprzak (fall)
Image and Speech Recognition	ROSM	2 – – 1	PZ-P, ISO, OT, MUS	W. Kasprzak (fall)
Information Project Management	ZPI	2 – – 1	BDSI, OT	K. Pieńkosz
Introduction to Robotics	WR	2 – 2 –	MUS, SCRJC,OT	W. Szynekiewicz
Knowledge Engineering	IW	2 – – 1	ISO, OT	W. Traczyk
Methods of Artificial Inteligence	MSI	2 – – 1	ISO, PZ-P, PZ-O	C. Zieliński, A.Pacut W. Kasprzak (spring)
Numerical Methods (J)	MNUM	2 – – 1	PSTER, OT	P. Tatjewski
Numerical Methods	ENUME	2 – 2 –	ANGL, OT	P. Tatjewski (fall)
Object Oriented Programming	PROBE	2 – 2 –	sem. 2	W. Kasprzak (fall)
Operating System	EOPSY	2 1 1 –	ANGL, OT	T. Kruk (fall)
Software Engineering	IOP	2 – 1 –	OSK, OT	K. Sacha
Software Specification and Design	SPOP	2 – 1 –	OSK, PZ-SID, PZ-I, OT	K. Sacha
Management IT Systems	SIZ	2 – – 2	MKPWD, OT	J. Granat
Microcomputer Systems	SMK	2 – 1 –	SYK, OT	A. Rydzewski (fall)

Course Title	Course code	Hours per week	Class	Lecturer
Neural Networks	SNR	2 - - 1	ISO, PZ, PZ-I, PZ-SID, OT	A. Pacut (spring)
Operating Systems	SOI	2 - 2 -	OSK, OT	T. Kruk (fall)
Optimization and Decision Support	OWD	2 - - 1	PZ-A, PZ-I, OT	W. Ogryczak (fall)
Parallel Numerical Methods	EPNM	2 - - 2	ANGL., OT	A. Stachurski (fall)
Principles of Computer Science	EPCOS	2 - - -	ANGL, OT	W. Kasprzak (fall)
Process Control	STP	2 1 - 1	PSTER, OT, SCRJC	M. Ławryńczuk (fall)
Process Management and Scheduling	ZAH	2 - 2 -	MKPWD, OT, MUS, PP-SID	E. Toczyłowski (spring/fall)
Programmable Controllers	SP	2 - 1 -	MUS, OT	J. Gustowski (spring/fall)
Programming 1	EPRO1	2 1 1 -	ANGL, OT	J. Paczyński (fall)
Programming 2	EPRO2	2 - 2 -	ANGL, OT	A. Stachurski (spring/fall)
Real-time Systems	SCZR	2 - 2 -	PSTER, OT	K. Sacha
Synthesis of Decision Rules	SRD	2 - 2 -	MKPWD, MUS, OT, PP-SID	K. Malinowski (spring)
Theory of Optimization	TOP	2 - - 1	MKPWD, PZ-P, OT	W. Ogryczak (spring)

Table explanations

Hours per week

The digits in a four-digit code denote number of hours per week of, consecutively: lectures, tutorials, laboratory hours and project hours (for instance, [2 -1 1] corresponds to two hours of lectures, no tutorials, one hour of laboratory and one hour of project per week).

Symbol	level	description
OT	all levels	free electives
ANGL	all levels	taught in English
MUS	B.Sc.	specialization in Control Systems and Methods
MKPWD	B.Sc.	specialization in Computer Methods of Decision Support
BDSI	B.Sc.	specialization in Databases and Information Systems
OSK	B.Sc.	specialization in Computer System Programming
ISO	B.Sc.	specialization in Intelligent Computation Systems
PSTER	B.Sc.	specialization in Control
SKOR	B.Sc.	specialization in Computer Networks and Distributed Computations
ATP	B.Sc.	specialization in Programming Algorithms
SYK	B.Sc.	specialization in Computer Systems
SCRJC	B.Sc., M.Sc.	specialization in Control Systems
PZ-P	M. Sc., Ph.D.	advanced classes, fundamental
PZ-A	M. Sc., Ph.D.	advanced classes, control
PZ-I	M. Sc., Ph.D.	advanced classes, informatics
PZ-SID	M.Sc., Ph.D.	advanced classes, Decision and Information Systems
PP-SID	M.Sc., Ph.D.	fundamental classes, Decision and Information Systems

4 Projects

- [PR1] Network of Excellence within EU FP6 IST FET 507728 **European Robotics Research Network of Excellence**, granting period: 01.05.2004 – 31.05.2008. Principal investigator from WUT: Cezary Zieliński. EURON II is the continuation of EURON I within FP6.

The objective of EURON (European Robotics Network) is the implementation and maintenance of a network of excellence within the 6th Framework Programme that enables the coordination of research and education, fosters the collaboration between academic and industrial institutions, encourages publications and conferences in the area of robotics. The aim is to provide the foundation that allows Europe to remain at the forefront of robotics both in terms of research and industrial products.

- [PR2] MNiI Grant No. 1287/B/T02/2007/33 **Active sensing, interpretation of sensory information and manipulation in service robots**, granting period: 31.10.2007 – 30.10.2010. Principal investigator: Cezary Zieliński.

This work focuses on the control requirements for service robots, especially on the sensing and manipulative capabilities. Active sensing involves purposeful motion of the robot to obtain relevant information from the environment. Once the measurements are obtained they need to be transformed into symbolic form in the interpretation process. The other aspect of this research is two handed manipulation and multi-fingered grasping. A multi-fingered gripper is developed for that purpose. Force sensing and visual servoing are used to perform service tasks. Moreover, the Human-Machine Interface is under investigation. Both speech understanding and recognition of gestures are studied. The experiments are conducted on a two-handed robot system equipped with cameras and force sensors. The control software is based on the MRROC++ robot programming framework.

- [PR3] MNiI Grant No. N514 003 32/0361 **Analyzing real-time markets balancing and pricing mechanism**, granting period: 01.06.2007 – 12.05.2008. Principal investigator: Eugeniusz Toczyłowski. Investigator: Kamil Smolira.

Main goal of the project is to develop and analyze mechanisms, which may be applied for real-time-markets in distributed systems like telecommunication, power and transportation systems, etc. Such kind of markets should enrich system controls procedures by economic rules and criteria, which allow to increase their efficiency and to deregulate most of "natural" monopolies. Due to specific operation conditions and specific commodities classic market mechanism can not be directly applied to the real-time markets. There are three main research areas. Designing real-time markets processes structure respecting their relations to other market segments, as well as decision support tools, which may be used during processes scheduling. Development of multi-commodity balancing models, which respect technical constraints, allow to balance simultaneously many related commodities, and ensure system safety. Appropriate market pricing, which take into consideration limited trade possibilities and their cost, treat fair all market entities and ensure incentives compatibility.

- [PR4] MNiI Grant No. 1278/B/T02/2007/33 **A method of position-force control for utilisation in service robots**, granting period: 31.10.2007 – 30.10.2008. Principal investigator: Cezary Zieliński. Investigator: Tomasz Winiarski.

This project concentrates on position-force control of manipulators. Diverse position-force control algorithms are implemented and their performance is being compared. Those investigations should lead to the formulation of basic motion primitives that will enable the expression of any task involving end-effector motion in free space, in contact with an object, and in the intermediate phase between free motion and contact. The elaborated control methods are tested on a real robot. The control software is based on the MRROC++ robot programming framework.

- [PR5] MNiI Grant No. 1283/B/T02/2007/33 **Analysis of methods of hand-eye senso-motoric coordination in service robots**, granting period: 31.10.2007 – 30.10.2008. Principal investigator: Cezary Zieliński. Investigator: Maciej Staniak.

This project concentrates on visual servo controllers. This kind of coordination is of fundamental importance when acquiring and releasing objects or when executing tasks needing contact between tools and objects. Different structures of visual servos are compared and hybrid control methods

are being elaborated. Produced control methods are tested on a real robot. The control software is based on the MRROC++ robot programming framework.

- [PR6] MNiI Grant No. PBZ-MEiN-1/2/2006 **Energetic safety of the country**, granting period: 28.06.2007 – 15.12.2007. Principal investigator: Eugeniusz Toczyłowski. Investigators: Mariusz Kaleta, Tomasz Traczyk, Kamil Smolira, Przemysław Kacprzak, Piotr Pałka, Mariusz Rogulski, Izabela Żółtowska.

The goals of the project are defined in two streams: 1) developing multicommodity trade mechanisms for balancing electrical energy market and cross-border capacity auctions from the point of view of system safety conditions, 2) developing open data standards for scientific researches in the area of electrical energy market mechanisms. Variants of balancing the electrical energy systems based on multicommodity mechanism were developed. Preliminary open environment for experiments and benchmark data repository of market balancing mechanisms were proposed.

- [PR7] MNiI Grant 3 T11A 005 28 **Multipurpose predictive control algorithms**, granting period: 17.05.2005 – 16.11.2007. Principal investigator: Piotr Tatjewski. Investigators: Paweł Domański, Maciej Ławryńczuk, Piotr Marusak.

The goal of the research is to develop structures and algorithms of multipurpose predictive control, in particular concerning optimizing predictive control and control in reconfigurable structures. The first topic concerns a case when dynamics of disturbances (uncontrolled process inputs) is comparable with dynamics of the controlled process, thus making classical multilayer approach not efficient. Closer cooperation or even integration of regulatory control and current set-point optimization is the subject of the research. The second topic is to develop design procedures leading to multipurpose reconfigurable predictive control, when both structure and parameters of the controller can be on-line adopted to the changes in control targets and/or external influences. The hierarchical approach is considered, with an intelligent supervisory unit. Related practically important case is when reconfiguration is triggered by occurrence of faults, leading to the design of fault-tolerant control systems. Versatility in formulation of predictive control algorithms makes on-line changes in their structure and parameters possible, adopting to the current process situation.

- [PR8] MNiI Grant no 3T11C 005 27 **Models and algorithms for efficient and fair resource allocation in complex systems**, granting period: 20.10.2004 – 19.10.2007. Coordinator: ICCE. Principal investigators: Włodzimierz Ogryczak, Michał Pióro (IT), Eugeniusz Toczyłowski. Investigators: Krzysztof Pieńkosz, Krzysztof Fleszar, Mariusz Kaleta, Adam Krzemienowski, Tomasz Śliwiński.

The goal of the research is to develop theory and techniques concerned with quantitative analysis and decision support at the strategic, tactical and operational level of fair resource (or cost) allocation in various systems. Techniques for inequality measurement and equitable optimization algorithms as well as their use in decision support process represent the main algorithmic focus while the fairness of costs or profits allocation procedures within complex systems is major modeling issue of the research within ICCE. Fairness problems related to the telecommunication network design are analyzed by researchers from IT.

- [PR9] MNiI Grant no PBZ-MIN/011/013/2004 **Models of threats in the urban agglomeration within Crisis Management System, dedicated for Warsaw**, granting period: 29.06.2006 – 29.06.2009. 11 research institutions. Coordinator Military University of Technology, Faculty of Cybernetics. Principal investigators from ICCE: Ewa Niewiadomska-Szynkiewicz, Krzysztof Malinowski. Investigators: Michał Karpowicz, Andrzej Sikora.

The general objective of the grant is to develop and implement the Crisis Management System (CMS) dedicated for urban agglomeration of Warsaw. The Expected results are: a set of threat models (e.g. predictive) and algorithms covering threats defined in the catalogue of urban threat, a demonstrable distributed software components of CMS for threat analysis supporting. A real urban threat is described by: a type of threat, a source of threat, critical infrastructures, possible losses, methods of counteractions, etc. The following type of threads are considered: military, chemical, biological, radiological, fire, flood, network infrastructures (service), terrorist, environmental catastrophes. The focus is on the synergy effect of complex threats. Due to the complexity of the system the distributed software environment is proposed as a simulation framework. The general idea of CMS software system is as follows: it will consist of autonomy of simulators in a wide and heterogeneous „open architecture” network, the event-driven, continues and astronomical

time management will be considered. coherent simulation – same time and events for all software applications and users, reusability of simulators and other components. The simulator will be used to predict states or factors values for next periods and simulate the course and effects of terrorist action. The goal of ICCE team is to realize 18th task of the project: Prediction and simulation of floods of the Vistula river and crisis management in Warsaw during flood. The expected final result of this task is the component of CMS for flood modeling, simulation, prediction and decision support concerned with flood management in the agglomeration of Warsaw.

- [PR10] MNiI Grant 0290/t02/2006/30 **Analysis of integrated multi-product trade models in the distributed systems with area differentiated prices of goods and services based on the energy market**, granting period: 31.05.2006–30.05.2007. Principal investigator: Eugeniusz Toczyłowski. Investigator: Mariusz Rogulski.

The purpose of the project is to consider a security constrained balancing problem for joint balancing of the electric power and regulation reserves under presence of the security constraints, where the detailed requirements for transmission reserves in the distributed power network are directly taken into account. There are developed approximate optimization methods that provide efficient and fast solutions for this security constrained balancing problem.

- [PR11] Rector's Grant 503S0001007 **Heterogeneous network of cooperating mobile robots**, granting period: 31.10.2007 – 30.10.2008. Principal investigator: Cezary Zieliński.

Network of heterogeneous robots is a group in which individual robots have different abilities to sense and influence the environment. Networks of such robots are capable of: cooperative transport of awkward loads; search for e.g., mines, intruders; patrol e.g., storage areas, airports; clean public places; forming robust variable configuration sensor/communication networks. The primary advantage of such systems over single universal robots is their greater immunity to failure. Research focus of this project is: creation of novel mobile robots; environment sensing and recognition algorithms (vision, touch); control of individual robots (behavioral and deliberative); communication within the network (explicit and implicit); tradeoffs of coordination vs. autonomy; endowing robots with the ability to learn.

- [PR12] Rector's Grant 503W0043007 **The development of four legged walking robot**, granting period: 16.04.2007 – 1.12.2007: Principal investigator: Wojciech Szynekiewicz. Investigators: Michał Wałęcki, Bartosz Markocki, Piotr Trojanek, Marek Majchrowski.

The goal of this project was to design and to develop a new control system for the four legged walking machine. The mechanical part of the robot was developed in the previous project. The mechanical part comprised of a central body and four legs was constructed out of aluminium for the strength to weight ratio of the material. Each leg has three degrees of freedom actuated by three digital servo motors. The embedded controller hardware is based on single-board microcontrollers and FPGA modules. New control hardware for servo motors was developed and tested.

- [PR13] Dean's Grant 503G0044007 **Systems learning to react efficiently in dynamic environments**, granting period: 02.06.2007 – 31.12.2007. Principal investigator: Paweł Wawrzyński. Investigators from Institute of Electronic Systems: Jarosław Arabas, Paweł Cichosz, Kamil Muszyński, Michał Wojtyra.

The aim of the project was to create a platform for comparison of techniques from the fields of artificial intelligence and automatic control applicable to sequential decision making in complex and quickly changing environments. The platform was based on the computer game of Half-Life. The game constituted a realistic virtual world in which human players fought with each other and with characters controlled by artificial intelligence. Within the project, the software was developed that enabled easy design and implementation of the artificial intelligence of the Half-Life non-player characters. Furthermore, the artificial intelligence based on predictive control was designed and implemented. Its performance turned out to be very good - it was almost invincible by a human player and much more efficient than artificial intelligence based on behavioral techniques that had been presented for this purpose in the literature earlier.

- [PR14] Dean's Grant 503G0045007 **Image gesture- and spoken words- recognition supported by the HMM**, granting period: 02.06.2007 – 31.12.2007. Principal investigator: Włodzimierz Kasprzak. Investigators: Artur Wilkowski, Przemysław Dymarski (Institute of Telecommunications), Sławomir Kula, (Institute of Telecommunications), Sebastian Wydra (Institute of Telecommunications).

The research project was jointly performed by two research groups from the Institute of Control and Computation Engineering and the Institute of Telecommunications. The main motivation of this project was to develop an intermediate-level of the recognition system that is common to image sequence and speech analysis. The main achievements of this work can be summarized by the following:

1. A specific speech feature set was proposed and experimentally verified. It extends the Mel-cepstral set by 3 coefficients, representing periodicity, tonality and stationarity.
2. A hand tracking module in image sequences was developed. It provides classes of hand positions based on hand contour features in real-time.
3. Two new learning algorithms for the HMMs (Hidden Markow Model) were proposed and experimentally verified. The first approach creates discriminative HMMs due to the extension of the learning set by critical samples (i.e. samples that are located on the borders between two classes). The second approach applies an evolutionary algorithm for structure (i.e. number of states) and parameter learning of the HMM.
4. The influence of the F0-formant distribution onto the type of sentence (i.e. information, question, surprise) was studied.

Particular results of this work are given in the following reports:

1. W.Kasprzak (Ed.), 'Rozpoznawanie sekwencji cech w sygnale mowy z wykorzystaniem modelu HMM'. *ICCE Report*, No. 08-01, Warszawa, January 2008 (70 pages)
2. A. Wilkowski, 'Implementacja algorytmów syntezy i analizy mowy w środowisku programowym systemu robotycznego'. *ICCE Report*, No. 08-01, Warszawa, January 2008 (35 pages)

[PR15] Dean's Grant 503G0048007 **Experimental investigation of dependability of advanced control algorithms**, granting period: 01.06.2007 – 31.12.2007. Coordination: Institute of Computer Science (P. Gawkowski, J. Sosnowski). Institute of Control and Computation Engineering: M. Ławryńczuk, P. Marusak, P. Tatjewski.

The objective of the grant was to study dependability of advanced control algorithms in presence of software implemented faults. A software implemented fault injector was used which was developed in the Institute of Computer Science. Two Model Predictive Control (MPC) algorithms were investigated: the DMC (Dynamic Matrix Control) algorithm and GPC (Generalized Predictive Control) algorithms in their explicit formulations (i.e. analytical). Improved software implementations of MPC algorithms were formulated. Fault sensitivity of the proposed implementations was verified in a distillation column control system and a remotely operated vehicle used in nuclear plants. The experimental results proved the efficiency of proposed software improvements.

[PR16] Integration Grant 503G0046007 **Models and optimization algorithms for survivable design of telecommunication networks**, granting period: 01.06.2007 – 31.12.2007. Coordination: Institute of Telecommunications. Principal investigator: Włodzimierz Ogryczak. Investigator: Tomasz Śliwiński.

The main objective of the project was to develop the optimization methodology to deal with network design problems where, in the case of a failure, the affected primary flows are restored using assigned protection paths. The problems are formulated with LP methodology using the link-path notation of multi-commodity flow. Several path (column) generation algorithms enabling efficient resolution of the considered design problems for networks of realistic size have been developed and analyzed.

[PR17] Integration Grant: 503/G/1032/4000/000 Sub grant 503G0047007 **Advanced Methods and Tools of Software Engineering**, granting period: 27.04.2007 – 31.12.2007. Coordination: Institute of Computer Science. Investigator: Krzysztof Sacha.

The research is aimed at the development of methods and tools for modeling requirements and automatic generation of programs. The main results are prototypes of software tools, accompanied by a set of 8 published theoretical papers.

- [PR18] Statutory Grant 504G036300: **Development of methodology of control, decision support and production management**, granting period 1.10.2005 – 31.12.2006 and 15.07.2006 – 31.12.2007 and 1.09.2007 – 15.04.2008. Principal investigators: Ewa Niewiadomska-Szynkiewicz, Andrzej Pacut, Krzysztof Malinowski, Włodzimierz Ogryczak, Krzysztof Sacha, Piotr Tatjewski, Eugeniusz Toczyłowski, Cezary Zieliński.

5 Degrees Awarded

5.1 Ph.D. Degrees

Advisor: **Włodzimierz Ogryczak**

ADAM KRZEMIENOWSKI

Średnia warunkowa jako narzędzie wspomaganie decyzji w warunkach ryzyka

Degree awarded on May 29, 2007 (with honors)

Advisor: **Eugeniusz Toczyłowski**

MARIUSZ ROGULSKI

Analiza wybranych modeli zintegrowanego obrotu wielotowarowego w systemach rozproszonych na przykładzie rynku energii

Degree awarded on October 23, 2007 (with honors)

TOMASZ ŚLIWIŃSKI

Technika generacji kolumn w strukturalnych algorytmach harmonogramowania i wspomaganie decyzji

Degree awarded on June 26, 2007 (with honors)

5.2 M.Sc. Degrees

Advisor: **J. Wytrębawicz**

P. SIDOROWICZ

Problemy bezpieczeństwa usług katalogowych LDAP

Degree awarded on March 2007

P. POKŁADEK

System wykrywania włamań jako moduł serwera WWW. Implementacja dla projektu Apache 2

Degree awarded on June 2007

Advisor: **Piotr Tatjewski**

M. KURCZ

Algorytm Predictive Functional Control

Degree awarded on April 2007

A. DZIAŁAK

Algorytm jawny rozmyty z ograniczeniami regulacji predykcyjnej obiektów nieliniowych

Degree awarded on July 2007

Advisor: **Eugeniusz Toczyłowski**

M. RÓŻACKI

Zastosowanie Rynków Czasu Rzeczywistego przy podnoszeniu efektywności rozdziału dóbr w obrocie wielotowarowym

Degree awarded on March 2007

R. KUŹMIAK

System wspomaganie decyzji krótkoterminowych wytwórcy energii z uwzględnieniem emisji CO₂, SO₂ i NO_x

Degree awarded on June 2007

Advisor: **Tomasz Kruk**

K. SKULSKI

Badanie niezawodnej komunikacji grupowej w środowisku klastrowym Open SSI

Degree awarded on October 2007

Advisor: **Ewa Niewiadomska-Szynkiewicz**

J. MATUSZEWSKI

Realizacja i badania symulacyjne protokołów FAST TCP i HTPNET w środowisku NS2

Degree awarded on March 2007

M. MARKS

Wybrane zastosowania stochastycznej optymalizacji globalnej

Degree awarded on July 2007

M. FILIPOWICZ

Badania algorytmów sterowania topologią sieci sensorów w środowisku JiST/SWANS

Degree awarded on July 2007

Advisor: **Tomasz Traczyk**

K. STANISŁAWEK

Zastosowanie struktur relacyjno-obiektowych w procesie optymalizacji struktury konstrukcyjnej bazy danych detektora ALICE

Degree awarded on February 2007

K. KOŁTYŚ

Optymalizacja zapytań wyszukiwujących komponenty w relacyjno-obiektowej bazie danych DCDB

Degree awarded on June 2007

Advisor: **Włodzimierz Ogryczak**

W. KAMIŃSKI

Rozwinięcie metody analizy obwiedniowej

Degree awarded on October 2007

P. MARKOWSKI

Wykorzystanie programowania liniowego z ograniczeniami rzeczywistymi do konstrukcji portfela efektywnego

Degree awarded on October 2007

Advisor: **Jerzy Paczyński**

D. JAŃCZUK

Wspomaganie prognozowania popytu na ropę naftową

Degree awarded on 01.2007

Advisor: **Janusz Granat**

G. MIKULSKI

Odkrywanie zależności czasowych w danych w celu ich segmentacji

Degree awarded on March 2007

A. PASIECZNY

Modelowanie analityczne uwzględniające informacje kontekstowe na przykładzie obliczania wartości klienta

Degree awarded on October 2007

M. GÓRAL

Algorytm optymalizowany wykrywania asocjacji w systemach informacyjnych dla atrybutów numerycznych

Degree awarded on October 2007

J. ROŻEN

Analiza i porównanie możliwości przetwarzania informacji o masowym ruchu abonenckim w oparciu o technologię relacyjną i strumieniową

Degree awarded on October 2007

Advisor: **Andrzej Stachurski**

P. SZENK

Mini-platforma edukacyjna na przykładzie kursu 'Podstaw optymalizacji'

Degree awarded on March 2007

T. HURKAŁA

Analiza i implementacja metody sekwencyjnego programowania kwadratowego

Degree awarded on June 2007

Advisor: **Grzegorz Płoszajski**

M. HRYCIUK

Model procesu wdrożenia elektronicznej legitymacji studenckiej na przykładzie Politechniki Warszawskiej

Degree awarded on March 2007

Advisor: **Maciej Ławryńczuk**

Ł. MAKSYMOWICZ

Rozmyte sieci neuronowe w modelowaniu i nieliniowej regulacji predykcyjnej

Degree awarded on April 2007

M. ROSIEWICZ

Algorytmy regulacji predykcyjnej z liniowymi i nieliniowymi modelami w przestrzeni stanów

Degree awarded on June 2007

P. GOCŁOWSKI

Zautomatyzowana metoda doboru parametrów regulatora FDMC

Degree awarded on October 2007

J. ZADURA

Wykorzystanie sieci neuronowych do modelowania i diagnostyki czujników silnika lotniczego

Degree awarded on October 2007

Advisor: **Jerzy Sobczyk**

M. RATYŃSKI

Wykrywanie nieprawidłowości w charakterystykach sieci komputerowych

Degree awarded on March 2007

P. SUŁEK

Wirtualne Sieci Prywatne

Degree awarded on VPN w aspekcie zastosowania PKI (March 2007*)

Advisor: **Paweł Wawrzyński**

M. WOJTYRA

Sterownik predykcyjny dla bota w grze komputerowej

Degree awarded on October 2007

M. WIECZOREK

Algorytmy uczenia przez wzmacnianie w wyznaczaniu sterowania złożonych symulowanych obiektów numerycznych

Degree awarded on October 2007

J. PIĘDEL

Zastosowanie intensywnych algorytmów uczenia przez wzmacnianie

Degree awarded on October 2007

Advisor: **Michał Warchoł**

P. BASIŃSKI

Zastosowanie algorytmów podprzestrzeni stanów do identyfikacji obiektów opisanych przy użyciu zbiorów rozmytych

Degree awarded on March 2007

Advisor: **Andrzej Kraśniewski**

M. MIODUSKA

Analysis of functional requirements for a web

Degree awarded on based information system supporting teaching and management in the Division of Telecommunication Fundamentals (April 2007*)

Advisor: **Cezary Szwed**

M. TRYKA

Układanie harmonogramów pracy

Degree awarded on March 2007

Advisor: **Cezary Zieliński**

J. SAŁACKA

Szybkie algorytmy przeszukiwania drzew rozwiązań w celu znalezienia sekwencji ruchów ścianami kostki Rubika

Degree awarded on July 2007

A. SIBILSKA

Porównanie metody wykorzystującej proste i odwrotne zadanie kinematyki oraz jacobian do sterowania manipulatorem

Degree awarded on September 2007

Advisor: **Andrzej Rydzewski**

M. PODZIEWSKI

Przyrząd do transportu próbek

Degree awarded on March 2007

M. HAMADA

Układ sterowania autonomicznym robotem mobilnym

Degree awarded on October 2007

Advisor: **A. Kowalski**

M. KUBLA

Open Service Access (OSA) components in Services Delivery Platforms

Degree awarded on October 2007

Advisor: **Julian Myrcha**

M. PRZYSUCHA

Modelowanie aspektowe z wykorzystaniem języka UML

Degree awarded on June 2007

Advisor: **Andrzej Ciemski**

M. CHALIMONIUK

Zastosowanie algorytmów mrówkowych do rozwiązywania problemów planowania tras ze zwrotami i okienkami czasowymi

Degree awarded on June 2007

R. PYRKA

Wybór optymalnych portfeli papierów wartościowych poprzez analizę ryzyka inwestycji

Degree awarded on October 2007

Advisor: **Jarosław Chudziak**

R. BABICKI

Wykrywanie nadużyć w sieciach telefonii komórkowej

Degree awarded on October 2007

Advisor: **Krzysztof Fleszar**

T. BECHERKA

Wybrane algorytmy bilansowania ilościowego i wartościowego aukcji kombinatorycznych i ich wpływ na zachowania racjonalnych uczestników

Degree awarded on June 2007

Advisor: **Mariusz Kamola**

P. PAULSKI

Optymalizacja pożytku społecznego dla użytkowników z funkcją użyteczności uwzględniającą jakość usług teletransmisyjnych

Degree awarded on June 2007

Advisor: **Marcin Szlenk**

M. ZALEWSKI

Formalizacja i analiza właściwości statycznego modelu procesów z wykorzystaniem sieci Petriego

Degree awarded on June 2007

5.3 B.Sc. Degrees

Advisor: **Jerzy Gustowski**

A. BERNAT

Stanowisko laboratoryjne sterowania programowalnego z wykorzystaniem elementów elektropneumatycznych

Degree awarded on March 2007

Advisor: **Włodzimierz Ogryczak**

P. WOJDA

Modelowanie w budowaniu aplikacji

Degree awarded on September 2007

Ł. BARAN

Mechanizmy języka Java oraz technologia J2EE w projektowaniu i implementacji algorytmu sympleksowego

Degree awarded on September 2007

Advisor: **Janusz Granat**

B. MARCHEWKA

Rozwój systemu modelowania strukturalnego SMT

Degree awarded on October 2007

A. GOSK

Modele techno-ekonomiczne w rozwoju sieci szerokopasmowych

Degree awarded on October 2007

A. BALCERZAK

Information System for supporting selection of Strategic Initiatives

Degree awarded on October 2007

Advisor: **Włodzimierz Kasprzak**

M. MULA

Automatyczne rozpoznawanie napisów na kontenerach w obrazach cyfrowych

Degree awarded on January 2007

M. KOZIŃSKI

Hand Image Based Person Identification

Degree awarded on February 2007

J. WALKIEWICZ

Rozpoznawanie pojazdów w sekwencji obrazów cyfrowych

Degree awarded on February 2007

A. WYSZOMIERSKI

Detekcja osób w obrazach otoczenia autonomicznego pojazdu

Degree awarded on February 2007

M. KISŁY

A CSLU application for spoken command recognition

Degree awarded on February 2007

M. LEWCZUK

Procedury autokalibracji kamery i rekonstrukcji 3-wymiarowego obiektu na podstawie obrazów

Degree awarded on October 2007

P. JAWORSKI

Wielowarstwowa aplikacja WWW do przechowywania danych multimedialnych

Degree awarded on October 2007

J. SEKUŁA

Program do obróbki i analizy obrazów map kartograficznych

Degree awarded on October 2007

Advisor: **Cezary Zieliński**

M. URBANOWICZ

Algorytmy rozpoznawania obrazu w różnych przestrzeniach kolorów

Degree awarded on February 2007

K. ROCKI

Zastosowanie sieci neuronowych typu ART do lokalizacji i rozpoznawania obiektów przy użyciu sygnału wizyjnego

Degree awarded on May 2007

Advisor: **Wojciech Szynkiewicz**

K. PORCZYK

Rozpoznawanie poleceń głosowych przez robota mobilnego

Degree awarded on October 2007

M. KAWKA

System operacyjny dla sterownika robota mobilnego

Degree awarded on September 2007

Advisor: **Tomasz Śliwiński**

M. MIKOŁAJCZUK

Biblioteka wspomagająca stosowanie techniki generacji kolumn w pakiecie ILOG CPLEX

Degree awarded on February 2006

M. NOWOROLNIK

Harmonogramowanie produkcji techniką generacji kolumn

Degree awarded on October 2007

Advisor: **Paweł Domański**

M. LITNIEWSKI

Wielokryterialne metody wspierania decyzji inwestycyjnych

Degree awarded on February 2007

Advisor: **Ewa Niewiadomska-Szynkiewicz**

M. ROGACEWICZ

Algorytmy FLID-DL i E-FLID-DL do sterowania w sieciach IP

Degree awarded on February 2007

M. SIERHEJ

Simulator of 8February 11 wireless network in the ASim/Java environment

Degree awarded on October 2007

M. ANTONIK

Adaptive Routing Algorithms for Mobile Ad Hoc Networks

Degree awarded on October 2007

A. ROCHALSKA

Table-driven routing Algorithms for Ad-Hoc Mobile Wireless Networks

Degree awarded on October 2007

Advisor: **Andrzej Karbowski**

M. WRÓBLEWSKI

Zintegrowany routing i sterowanie w sieciach obejmujące dwie warstwy sieci TCP/IP

Degree awarded on March 2007

Advisor: **Adam Woźniak**

M. PYSIAK

Metody optymalizacji globalnej wykorzystującej pokrycia

Degree awarded on March 2007

A. KARPIŃSKI

Mechanizmy działania systemów wieloagentowych

Degree awarded on October 2007

Advisor: **Grzegorz Płoszajski**

R. WIETESKA

Ujednolicanie danych na przykładzie informacji pozyskiwanych ze sklepów internetowych

Degree awarded on February 2007

M. WTYKŁO

Ekstrakcja danych z sieci Internet na przykładzie pozyskiwania informacji ze sklepów internetowych

Degree awarded on February 2007

Advisor: **Mariusz Kaleta**

M. SKRZYŃSKI

Open distributed gaming platform

Degree awarded on October 2007

Advisor: **Krzysztof Pieńkosz**

T. BARAŃSKI

Problem wyznaczania najtańszego doskonałego skojarzenia

Degree awarded on October 2007

D. DULĘBA

Rozwiązywanie problemów pakowania z ograniczoną podzielnością elementów

Degree awarded on October 2007

T. KALETA

Algorytmy heurystyczne rozkroju pasa materiału

Degree awarded on October 2007

Advisor: **Andrzej Ciemski**

M. KARBOWY

Technologia J2EE jako platforma do budowy aplikacji webowych

Degree awarded on February 2007

Advisor: **Julian Myrcha**

M. GREGORCZYK

Realizacja wielowarstwowej aplikacji internetowej na przykładzie gry w brydża

Degree awarded on February 2007

Advisor: **Jerzy Berliński**

R. CIRMIRAKIS

Measurement of force and acceleration describing rowing activity

Degree awarded on September 2007

Advisor: **Maciej Ławryńczuk**

SZ. PANAS

Pakiet oprogramowania do efektywnej identyfikacji statycznych i dynamicznych modeli neuronowych

Degree awarded on February 2007

J. BIELECKI

System do zarządzania przychodnią lekarską

Degree awarded on February 2007

Advisor: **Piotr Tatjewski**

S. BECZEVA

Środowisko programowe projektowania metod symulacji układów dynamicznych

Degree awarded on October 2007

Advisor: **Piotr Marusak**

M. PAWLAK

Środowisko do komputerowego wspomaganie projektowania, symulacji i badania właściwości układów regulacji predykcyjnej wielowymiarowych obiektów

Degree awarded on February 2007

Advisor: **Andrzej Zalewski**

M. HUCHLA

Weryfikacja implementacji polityk bezpieczeństwa przez systemy zapór ogniowych

Degree awarded on April 2007

A. ZDANOWSKI, P.ZYSKOWSKI

Design and Implementation of Web Services Research Laboratory Environment

Degree awarded on October 2007

Advisor: **Andrzej Stachurski**

A. KIEWICZ

Wyspecjalizowane narzędzie do symulacji stochastycznych centrum kontaktu z klientem

Degree awarded on June 2007

Advisor: **Tomasz Traczyk**

M. LECHMAN

Interaktywna grafika wektorowa w procesie instalacji okablowania detektora ALICE

Degree awarded on June 2007

Advisor: **Grzegorz Protaziuk**

P. GOLCZ

Zastosowanie algorytmu SVM do klasyfikacji klientów telekomunikacyjnych pod względem lojalności

Degree awarded on June 2007

K. DUDZIŃSKI

Implementacja grupowania na podstawie zbiorów częstych w systemach SAS oraz SQL Server 2005

Degree awarded on October 2007

Advisor: **Andrzej Rydzewski**

P. MOCHOCKI

Układ ręcznego sterowania robotem IRp-6

Degree awarded on June 2007

P. BERDYCHOWSKI

Obstacle detecting radar incorporating ultrasonic distance measurement

Degree awarded on September 2007

Advisor: **Tomasz Winiarski**

P. NAJGEBAUER

Serwomechanizm wizyjny w systemie MRROC++

Degree awarded on October 2007

M. SKRZĘDZIEJEWSKI

Mouse for the cat-a specialized mobile robot

Degree awarded on September 2007

Advisor: **Jerzy Sobczyk**

E. KAMIŃSKI

Programowanie sieciowe – system pomiarowy

Degree awarded on September 2007

6 Publications

6.1 Monographs

- [B1] U.Kręglewska, M.Ławryńczuk, P.Marusak: Control, Laboratory exercises (Ed. Oficyna Wydawnicza PW). 2007.
- [B2] B.Kubica, A.Kozakiewicz: Architektury i technologie systemów internetowych. (Ed. Kopipol). Opracowanie multimedialne. 2007.
- [B3] K.Malinowski, A.Karbowski: Synteza Mechanizmów Decyzyjnych. (Ed. Kopipol). Opracowanie multimedialne. 2007.
- [B4] E.Niewiadomska-Szynkiewicz, A.Kozakiewicz, A.Karbowski: Obliczenia rozproszone w klastrach i gridach. (Ed. Kopipol). Opracowanie multimedialne. 2007.
- [B5] W.Ogryczak: Wspomaganie decyzji. (Ed. Kopipol). Opracowanie multimedialne. 2007.
- [B6] P.Tatjewski: Advanced Control of Industrial Processes, Structures and Algorithms (Ed. Springer Science). Advances in industrial Control. London, 2007. ISBN 9781846286346.
- [B7] A.Woźniak: Metody optymalizacji. (Platforma edukacyjna e-informatyka, <http://wazniak.mimuw.edu.pl>). Opracowanie multimedialne. 2007.
- [B8] A.Zalewski, M.Szlenk: Organizacja i zarządzanie projektami informatycznymi. (Ed. Kopipol). Opracowanie multimedialne. 2007.

6.2 Chapters in Scientific or Technical Books

- [C1] M.Gadomska, A.Pacut: Recent Progress in Ant Algorithms for Fixed Telecommunication Networks: A Review (w: Evolutionary Computation and Global Optimization 2007). Prace Naukowe PW. Elektronika. 2007. pp. 79–89.
- [C2] P.Kacprzak, M.Kaleta, P.Pałka, K.Smolira, E.Toczyłowski, T.Traczyk: M3-Model danych dla otwartego systemu wielotowarowego (w: P.Kasprowski: Bazy danych. Nowe technologie. Bezpieczeństwo, wybrane technologie i zastosowania.; Ed.: Wydawnictwa Komunikacji i Łączności). 2007. Vol. 2. pp. 289–300.
- [C3] P.Kacprzak, M.Kaleta, P.Pałka, K.Smolira, E.Toczyłowski, T.Traczyk: Modeling Distributed Multilateral Markets Using Multi-Commodity Market Model (w: Information Systems Architecture and Technology: Decision Making Models.; Ed.: Oficyna Wydawnicza Politechniki Wrocławskiej). 2007. pp. 15–22.
- [C4] J.Kowalski, T.Traczyk: Zastosowanie języka XVCL do zarządzania ewolucją schematu relacyjnej bazy danych (w: P.Kasprowski: Bazy danych. Nowe technologie. Bezpieczeństwo, wybrane technologie i zastosowania.; Ed.: Wydawnictwa Komunikacji i Łączności). 2007. p. 1.
- [C5] B.Kubica, W.Szynkiewicz: CuikSLAM with Unknown Correspondence - Preliminary Results (w: Evolutionary Computation and Global Optimization 2007). Prace Naukowe PW. Elektronika. 2007. pp. 143–151.
- [C6] M.Kudelski, A.Pacut: Learning methods in ad hoc networks: a review (w: Evolutionary Computation and Global Optimization 2007). 2007. Prace Naukowe PW. Elektronika. pp. 153–163.
- [C7] P.Kwaśniewski, E.Niewiadomska-Szynkiewicz: Optimization and control problems in wireless ad hoc networks (w: Evolutionary Computation and Global Optimization 2007). Prace Naukowe PW. Elektronika. 2007. pp. 175–184.
- [C8] M.Ławryńczuk, P.Tatjewski: A Computationally Efficient Nonlinear Predictive Control Algorithm with RBF Neural Models and Its Application (w: Rough Sets and Intelligent Systems Paradigms.; Ed.: Springer Verlag). 2007. pp. 603–612.
- [C9] M.Ławryńczuk, P.Tatjewski: Neural network steady-state modelling of a distillation column for economic optimisation (w: Fault Diagnosis and Fault Tolerant Control; Ed.: Akademicka Oficyna Wydawnicza EXIT). 2007. pp. 319–328.

- [C10] K.Malinowski: Elastyczna wycena usług sieciowych (in: Techniki informacyjne w badaniach systemowych; Ed.: Wydawnictwa Naukowo - Techniczne). 2007. pp. 1–15.
- [C11] M.Marks, E.Niewiadomska-Szynkiewicz: Genetic Algorithm and Simulated Annealing Approach to Sensor Network Localization (w: Evolutionary Computation and Global Optimization 2007). Prace Naukowe PW. Elektronika. 2007. pp. 193–203.
- [C12] P.Marusak: Predictive controllers integrated with economic optimization tolerating actuator faults: application to a nonlinear plant (w: Fault Diagnosis and Fault Tolerant Control; Ed.: Akademska Oficyna Wydawnicza EXIT). 2007. pp. 173–185.
- [C13] W.Ogryczak, M.Opolska-Rutkowska: Coherent Risk Measures and Stochastic Dominance (w: Mathematical, Econometrical and Computational Methods in Finance and Insurance; Ed.: Publisher of the Karol Adamiecki University of Economics in Katowice). 2007. pp. 137–147.
- [C14] W.Traczyk, A.Wierzbicki, V.Huynh: Knowledge Representation and Multiple Criteria Aggregation (w: Creative Environments; Ed.: Springer Verlag). 2007. pp. 279–318.
- [C15] A.Woźniak: Global Optimization With the Use of Optimal Covering (w: Evolutionary Computation and Global Optimization 2007). Prace Naukowe PW. Elektronika. 2007. pp. 309–316.
- [C16] A.Zalewski: Architectural Control of Design Risk in Large Scale Software Developments (w: Software Engineering in Progress; Ed.: Wydawnictwo Nakom Poznań). 2007. pp. 54–64.

6.3 Scientific and Technical Papers in Journals

- [J1] J.Błaszczak, A.Karbowski, K.Malinowski: Object Library of Algorithms for Dynamic Optimization Problems: Benchmarking SQP and Nonlinear Interior Point Methods (in: International Journal of Applied Mathematics & Computer Science). 2007. z. 4. pp. 515–537.
- [J2] R.Chojecki, M.Olszewski, W.Szynkiewicz, P.Trojaneek: Laboratoryjny robot mobilny ELEKTRON i jego aplikacje (in: Pomiar Automatyka Robotyka PAR). 2007. z. 2 2007 CD. pp. 1–10.
- [J3] W.Czajewski, M.Staniak: Real-Time Image Segmentation for Visual Servoing (in: Lecture Notes In Computer Science). 2007. z. 4432. pp. 633–640.
- [J4] A.Czajka, A.Pacut: Iris Recognition with Adaptive Coding (in: Lecture Notes in Artificial Intelligence). 2007. z. 4481. pp. 195–202.
- [J5] A.Czajka, P.Strzelczyk, A.Pacut: Making Iris Recognition More Reliable and Spoof Resistant (Ed. SPIE). doi: 10.1117/2.1200706.0614. Newsroom, 2007. pp. 1–3.
- [J6] A.Felkner: Model kontroli dostępu opartej na rolach i jego rozszerzenie (in: Elektronika). 2007. z. 2/2007. pp. 16–17.
- [J7] M.Gadomska, A.Pacut: Performance of Ant Routing Algorithms When Using TCP (in: Lecture Notes In Computer Science). 2007. z. 4448. pp. 1–10.
- [J8] P.Kacprzak, M.Kaleta, P.Pałka, K.Smolira, E.Toczyłowski, T.Traczyk: Application of open multi-commodity market data model on the communication bandwidth market (in: Journal of Telecommunications and Information Technology). 2007. pp. 45–50.
- [J9] P.Kacprzak, M.Kaleta, P.Pałka, K.Smolira, E.Toczyłowski, T.Traczyk: M3 – wspólny język dla różnych platform obrotu energią (in: Rynek Energii). 2007. z. 2(69) – 2007. pp. 12–18.
- [J10] P.Kacprzak, M.Kaleta, E.Toczyłowski: Open Data Model for the Electrical Energy Market Trading Systems (in: Archiwum Energetyki). 2007. pp. 216–225.
- [J11] M.Kamola: Hybrid Approach to Design Optimisation: Preserve Accuracy, Reduce Dimensionality (in: International Journal of Applied Mathematics & Computer Science). 2007. vol. 17, z. 1. pp. 53–71.
- [J12] A.Karbowski, P.Magiera: Optimal control of water reservoir with expected value–variance criteria (in: Optimal Control Applications & Methods). 2007. z. 2007;28. pp. 3–20.
- [J13] M.Karpowicz, K.Malinowski: On Efficient Resource Allocation in Communication Networks (in: Lecture Notes In Computer Science). 2007. z. 4362. pp. 624–635.

- [J14] W.Kasprzak, W.Szynkiewicz, Ł.Czajka: Rubik's Cube Reconstruction from Single View for Service Robots (in: Machine Graphics and Vision). 2007. vol. 15, z. 3/4,2006. pp. 451–459.
- [J15] A.Kozakiewicz, A.Felkner, P.Kijewski, T.Kruk: Application of Bioinformatics Methods to Recognition of Network Threats (in: Journal of Telecommunications and Information Technology). 2007. z. 4/2007. pp. 23–27.
- [J16] B.Kozłowski: Wavelet Enhanced Analytical and Evolutionary Approaches to Time Series Forecasting (in: Lecture Notes In Computer Science). 2007. z. 4431. pp. 49–57.
- [J17] B.Kubica, E.Niewiadomska–Szynkiewicz: An Improved Interval Global Optimization Method and its Application to Price Management Problem (in: Lecture Notes In Computer Science). 2007. pp. 1055–1064.
- [J18] P.Kwaśniewski: Problem oszczędzania energii w sieciach ad hoc i przykładowe rozwiązania (in: Przegląd Telekomunikacyjny). 2007. z. 8–9/2007. pp. 411–418.
- [J19] M.Ławryńczuk: A Family of Model Predictive Control Algorithms with Artificial Neural Networks (in: International Journal of Applied Mathematics & Computer Science). 2007. z. 2. pp. 217–232.
- [J20] M.Ławryńczuk: Advanced predictive control of a distillation column with neural models (in: Archives of Control Sciences). 2007. pp. 121–148.
- [J21] M.Ławryńczuk: Jet Engine Turbine and Compressor Characteristics Approximation by Means of Artificial Neural Networks (in: Lecture Notes In Computer Science). 2007. z. 4432. pp. 143–152.
- [J22] M.Ławryńczuk: Neural Models on Computationally Efficient Predictive Control Cooperating with Economic Optimisation (in: Lecture Notes In Computer Science). 2007. z. 4669. pp. 650–659.
- [J23] M.Ławryńczuk: Rekurencyjne sieci neuronowe w modelowaniu nieliniowych procesów dynamicznych (in: Pomiary Automatyka Robotyka PAR). 2007. z. 2/2007. pp. 1–12.
- [J24] M.Ławryńczuk, P.Marusak, P.Tatjewski: Struktury i algorytmy współdziałania regulacji predykcyjnej i bieżącej optymalizacji ekonomicznej (in: PAK Pomiary–Automatyka–Kontrola). 2007. vol. 53, z. 10/2007. pp. 55–61.
- [J25] M.Ławryńczuk: Suboptimal Nonlinear Predictive Control with Structured Neural Models (in: Lecture Notes In Computer Science). 2007. z. 4669. pp. 630–639.
- [J26] M.Majchrowski, W.Szynkiewicz: Algorytm unikania kolizji przez roboty mobilne bazujący na przeszukiwaniu przestrzeni prędkości (in: Pomiary Automatyka Robotyka PAR). 2007. z. 2 2007 CD. pp. 1–11.
- [J27] R.Mansini, W.Ogryczak, M.G. Speranza: Conditional value at risk and related linear programming models for portfolio optimization (in: Annals of Operations Research). 2007. z. 152 (2007). pp. 227–256.
- [J28] M.Marks, E.Niewiadomska–Szynkiewicz: Lokalizacja węzłów w bezprzewodowych sieciach sensorów (in: Przegląd Telekomunikacyjny). 2007. z. 8–9/2007. pp. 266–270.
- [J29] P.Marusak: Układy regulacji predykcyjnej tolerujące uszkodzenia elementów wykonawczych: dokładna stabilizacja wybranego wyjścia (in: Pomiary Automatyka Robotyka PAR). 2007. z. 2 2007 CD. pp. 1–11.
- [J30] P.Marusak: Układy sterowania z regulatorami predykcyjnymi tolerujące uszkodzenia elementów wykonawczych: modyfikacja warstwy optymalizacji (in: Pomiary Automatyka Robotyka PAR). 2007. z. 2 2007 CD. pp. 1–11.
- [J31] W.Ogryczak, A.Wierzbicki, M.Milewski: A multi-criteria approach to fair and efficient bandwidth allocation (in: Omega). 2007. z. 36(2008). pp. 451–463.
- [J32] W.Ogryczak: Multicriteria models for fair resource allocation (in: Control and Cybernetics). Vol. 36. 2007. z. 2. pp. 303–331.
- [J33] W.Ogryczak, T.Śliwiński: On Decision Support Under Risk by the WOWA Optimization (in: Lecture Notes in Artificial Intelligence). 2007. z. 4724. pp. 779–790.
- [J34] W.Ogryczak, A.Romaszkiewicz: On Fuzzy Driven Support for SD-Efficient Portfolio Selection (in: Lecture Notes In Computer Science). 2007. z. 4431. pp. 578–587.

- [J35] W.Ogryczak, T.Śliwiński: On Optimization of the Importance Weighted OWA Aggregation of Multiple Criteria (in: Lecture Notes In Computer Science). 2007. z. 4705. pp. 804–817.
- [J36] K.Sacha: Translatable Finite State Time Machine (in: Lecture Notes In Computer Science). 2007. z. 4745. pp. 117–132.
- [J37] A.Sikora, E.Niewiadomska–Szynkiewicz: A Federated Approach to Parallel and Distributed Simulation of Complex Systems (in: International Journal of Applied Mathematics & Computer Science). 2007. vol.17, z. 1. pp. 99–106.
- [J38] W.Stańczuk, J.Lubacz, E.Toczyłowski: Giełdy przepustowości na rynku zasobów transportowych sieci telekomunikacyjnych (in: Przegląd Telekomunikacyjny). 2007. z. 8–9/2007. pp. 274–277.
- [J39] P.Tatjewski: Znaczenie i efektywne realizacje algorytmów regulacji predykcyjnej (in: Napędy i sterowanie). 2007. z. 4, kwiecień 2007. pp. 122–127.
- [J40] E.Toczyłowski: Mechanizmy przejrzystości i efektywności rynku energii (in: Rynek Energii). 2007. z. Zeszyt tematyczny nr 1. pp. 65–75.
- [J41] P.Wawrzyński: Reinforcement Learning in Fine Time Discretization (in: Lecture Notes In Computer Science). 2007. z. 4431. pp. 470–479.
- [J42] K.Wojdan, K.Świrski, G.Jarmoszewicz, M.Warchoł: Zastosowanie systemu SILO (Algorytmy immunologiczne) do optymalizacji procesu spalania w elektrowni Newton (in: Prace Naukowe PW seria Konferencje). 2007. z. 25. pp. 701–711.
- [J43] A.Zalewski: Beyond ATAM: Architecture Analysis in the Development of Large Scale Software Systems (in: Lecture Notes In Computer Science). 2007. z. 4758. pp. 92–105.
- [J44] C.Zieliński, T.Winiarski, K.Mianowski, A.Rydzewski, W.Szynkiewicz: End–Effector Sensors’ Role in Service Robots (in: Lecture Notes in Control and Information Sciences). 2007. z. 360. pp. 401–413.
- [J45] C.Zieliński: Perspektywy wykorzystania robotów (in: Przyszłość Świat–Europa–Polska.Biuletyn Komitetu Prognoz Polska 2000 Plus przy Prezydium PAN). 2007. z. 2/16/2007. pp. 67–80.
- [J46] C.Zieliński, W.Szynkiewicz, T.Winiarski, W.Czajewski, M. Staniak, T.Kornuta: Rubik’s cube as a benchmark validating MRROC as an implementation tool for service robot control systems (in: Industrial Robot–An International Journal). 2007. z. 34/5 (2007). pp. 368–375.

6.4 Scientific and Technical Papers in Conference Proceedings

- [P1] P.Arabas, K.Malinowski: Coordination Strategies for Hierarchical Missile Defense System (in: 11th IFAC/IFORS/IMACS/IFIP Symposium on Large Scale Systems Theory and Applications). 2007. z. CD. pp. 1–6.
- [P2] A.Czajka, P.Strzelczyk, M.Chochowski, A.Pacut: Iris Recognition with Match-on-Card (in: 15 th European Signal processing Conference: EURASIP 2007). 2007. pp. 189–192.
- [P3] P.Domański: CO2 Emission Trade Management (in: 12th Power Generation Summit,). 2007. p. 1.
- [P4] P.Domański: Predictive vs Preventive Maintenance Increasing Profits and Minimising Losses through Technology (in: 7th Power Transmission and Generation Forum,). 2007. p. 1.
- [P5] P.Domański: Reconfigurable Control Strategy: Evolutionary Approach (in: 8th European Advanced Equipment Control / Advanced Process Control (AEC/APC) Conference). 2007. p. 1.
- [P6] A.Felkner: Modeling Trust Mangement in Computer Systems (in: IX International PHD Workshop OWD 2007). 2007. z. 1. pp. 65–70.
- [P7] A.Felkner: Modelowanie zarządzania zaufaniem w systemach informatycznych (in: II Konferencja Młodzi naukowcy wobec wyzwań współczesnej techniki). 2007. pp. 124–130.
- [P8] P.Gawkowski, M.Ławryńczuk, P.Marusak, J.Sosnowski, P.Tatjewski: Dependability of Eexplicit DMC and GPC Algorithms. (in: Proceedings of the II International Multiconference on Computer Science and Information Technology). 2007. pp. 903–912.

- [P9] P.Gawkowski, M.Ławryńczuk, P.Marusak, J.Sosnowski, P.Tatjewski: Dependability of the Explicit DMC Algorithm for a Rectification Procepp. (in: Proceedings of the II International Multiconference on Computer Science and Information Technology). 2007. vol. 2. pp. 779–788.
- [P10] A.Grudzień, T.Traczyk, S.Jarząbek: Application of Generative Programming to Evolution of Object-Relational Mapping Layer (in: Proceedings of the second AIS SIGSAND European Symposium on Systems Analysis and Design). 2007. pp. 64–71.
- [P11] P.Kacprzak, M.Kaleta, P.Pałka, K.Smolira, E.Toczyłowski, T.Traczyk: Communication Model for M3 - Open Multi-commodity Market Data Model (in: II Krajowa Konferencja Naukowa Technologie Przetwarzania Danych). 2007. pp. 139–150.
- [P12] P.Kacprzak, M.Kaleta, P.Pałka, K.Smolira, E.Toczyłowski, T.Traczyk: Data Model Standarization for Real-Time E-commerce (in: Proceedings of the II International Multiconference on Computer Science and Information Technology). 2007. pp. 579–588.
- [P13] P.Kacprzak: Flowgate Rights in Contingency Networks (in: 4th International Conference The European Electricity Market. EEM-07, Challenge of the Unification). 2007. pp. 41–47.
- [P14] P.Kacprzak, M.Kaleta, P.Pałka, K.Smolira, E.Toczyłowski, T.Traczyk: M3: Open Multi-Commodity Market Data Model for Network Systems (in: 16th International Conference on Systems Science). 2007. z. III. pp. 309–319.
- [P15] P.Kacprzak, E.Toczyłowski: Trade on Regional Power Markets with Flow-Based Methods (in: The XIII-th International Scientific Conference on Present-Day Problems of Power Engineering; Ed. Gdańsk University of Technology). 2007. pp. 103–111.
- [P16] M.Kaleta: Subsize-free Cost Allocation Method for Infrastructure Market Game (in: Proceedings of the 13th IEEE IFAC International Conference on Methods and Models in Automation and Robotics; Ed.: IEEE). 2007. pp. 1171–1175.
- [P17] M.Kamola: Shared Memory for Matlab and Octave: Another Package for Distributed Programming (in: 11th IFAC/IFORS/IMACS/IFIP Symposium on Large Scale Systems Theory and Applications). 2007. z. CD. pp. 1–6.
- [P18] A.Karbowski: Parallel Algorithms for Multicore Routers in Large Computer Networks - A Review (in: 11th IFAC/IFORS/IMACS/IFIP Symposium on Large Scale Systems Theory and Applications). 2007. z. CD. pp. 1–6.
- [P19] M.Karpowicz, K.Malinowski: Characterization of Scalar Strategy Mechanisms for Efficient Resource Allocation: Supply Side Case (in: The 46th IEEE Conference on Decision and Control). 2007. pp. 1–6.
- [P20] M.Karpowicz, K.Malinowski: Characterization of Scalar-Strategy Mechanisms for Efficient Resource Allocation: Demand Side Case (in: 11th IFAC/IFORS/IMACS/IFIP Symposium on Large Scale Systems Theory and Applications). 2007. pp. 1–6.
- [P21] N.Koh, C.Zieliński, M.Ang, S.Lim: Job-agents: How to coordinate them? (in: 2007 IEEE International Conference on Robotics and Automation). 2007. pp. 4436–4441.
- [P22] B.Kozłowski: Methodology template for acquiring user preferences and decision-making based on hierarchically organized criteria (in: CSM'07: The 21st Workshop on Methodologies and Tools for Complex Systems Modeling). 2007. pp. 20–21.
- [P23] B.Kozłowski, W.Ogryczak: Multicriteria Decision Support for Problems with Numerous and Structured Criteria (in: 23rd IFIP TC 7 Conference on System Modelling and Optimization; Ed.: Akademia Górniczo-Hutnicza). 2007. pp. 305–306.
- [P24] M.Kudelski, A.Pacut: Geographical Cells: Location-Aware Adaptive Routing Scheme for Ad-Hoc Networks (in: EUROCON 2007: The International Conference on Computer as a Tool; Ed.: IEEE). 2007. pp. 649–656.
- [P25] M.Ławryńczuk: A Suboptimal Nonlinear Predictive Control Algorithm Based on Neural Models with Measured Disturbance Compensation (in: Proceedings of the 13th IEEE IFAC International Conference on Methods and Models in Automation and Robotics; Ed.: IEEE). 2007. pp. 509–516.

- [P26] M.Ławryńczuk, P.Marusak, P.Tatjewski: An Efficient MPC Algorithm Integrated with Economic Optimisation for MIMO Systems (in: Proceedings of the 13th IEEE IFAC International Conference on Methods and Models in Automation and Robotics; Ed.: IEEE). 2007. pp. 295–302.
- [P27] M.Ławryńczuk: An Efficient Nonlinear Predictive Control Algorithm with Neural Models Based on Multipoint On-Line Linearisation (in: EUROCON 2007: The International Conference on Computer as a Tool; Ed.: IEEE). Warsaw, 2007. pp. 777–784.
- [P28] M.Ławryńczuk, P.Marusak, P.Tatjewski: An Integrated Structure with Economic Optimisation and Constrained Model Predictive Control: an Application to a MIMO pH Reactor (in: EUROCON 2007: The International Conference on Computer as a Tool; Ed.: IEEE). Warsaw, 2007. pp. 785–792.
- [P29] M.Ławryńczuk: Computational Efficiency of Suboptimal Nonlinear Predictive Control with Neural Models (in: Proceedings of the II International Multiconference on Computer Science and Information Technology). 2007. vol. 2. pp. 257–266.
- [P30] M.Ławryńczuk, P.Marusak, P.Tatjewski: Economic Efficacy of Multilayer Constrained Predictive Control Structures: an Application to a MIMO Neutralisation Reactor (in: 11th IFAC/IFORS/IMACS/IFIP Symposium on Large Scale Systems Theory and Applications). 2007. z. CD. pp. 1–6.
- [P31] M.Ławryńczuk, P.Marusak, P.Tatjewski: Efficient Model Predictive Control Integrated with Economic Optimisation (in: Proceedings of the 15th Mediterranean Conference on Control and Automation). 2007. z. CD. pp. 1–6.
- [P32] M.Ławryńczuk, P.Marusak, P.Tatjewski: Multilayer and Integrated Structures for Predictive Control and Economic Optimisation (in: 11th IFAC/IFORS/IMACS/IFIP Symposium on Large Scale Systems Theory and Applications). 2007. z. CD. pp. 1–8.
- [P33] M.Ławryńczuk, P.Marusak, P.Tatjewski: Set-Point Optimisation and Predictive Constrained Control for Fast Feedback Controlled Processes (in: Proceedings of the 13th IEEE IFAC International Conference on Methods and Models in Automation and Robotics; Ed.: IEEE). 2007. pp. 357–362.
- [P34] M.Ławryńczuk: Suboptimal Nonlinear Predictive Control with Structured RBF Neural Models (in: Proceedings of the 13th IEEE IFAC International Conference on Methods and Models in Automation and Robotics; Ed.: IEEE). 2007. pp. 527–534.
- [P35] M.Ławryńczuk: Two Nonlinear Predictive Control Algorithms Based on Structured Neural Models (in: 3rd IFAC Workshop on Advanced Fuzzy and Neural Control AFNC 2007). 2007. z. CD. pp. 1–6.
- [P36] R.Mansini, W.Ogryczak, M.Speranza: Tail Gini’s Risk Measures and Related Linear Programming Models for Portfolio Optimization (in: The 8th Hellenic European Research on Computer Mathematics & its Applications, Conference Proceedings). 2007. z. CD. pp. 1–8.
- [P37] M.Marks, E.Niewiadomska-Szynkiewicz: Two-phase Stochastic Optimization to Sensor Network Localization (in: International Conference on Sensor Technologies and Applications SENSOR-COMM 2007; Ed.: IEEE). 2007. pp. 134–139.
- [P38] P.Marusak: Actuator Fault Toleration in Control Systems with Analytical Predictive Controllers and Output Constrains (in: Proceedings of the 13th IEEE IFAC International Conference on Methods and Models in Automation and Robotics; Ed.: IEEE). 2007. p. 825–832.
- [P39] P.Marusak: Advantages of an Easy to Design Fuzzy Predictive Algorithm: Application to a Nonlinear Chemical Reactor (in: Proceedings of the II International Multiconference on Computer Science and Information Technology). 2007. vol. 2. pp. 327–336.
- [P40] P.Marusak: Efficient Fuzzy Predictive Algorithms with Integrated Economic Optimization: A Case Study (in: 3rd IFAC Workshop on Advanced Fuzzy and Neural Control AFNC 2007). 2007. z. CD. pp. 1–6.
- [P41] P.Marusak: Predictive Controllers Integrated with Economic Optimization in Constrained Control Systems Tolerating Sensor Faults (in: Proceedings of the 13th IEEE IFAC International Conference on Methods and Models in Automation and Robotics; Ed.: IEEE). 2007. pp. 535–542.

- [P42] W.Ogryczak, M.Milewski, A.Wierzbicki: Fair and Efficient Bandwidth Allocation with the Reference Point Methodology (in: INOC 2007 International Network Optimization Conference Proceedings). 2007. z. CD. pp. 1–6.
- [P43] W.Ogryczak, T.Śliwiński: Lexicographic Max–Min Optimization for Efficient and Fair Bandwidth Allocation (in: INOC 2007 International Network Optimization Conference Proceedings). 2007. z. CD. pp. 1–6.
- [P44] W.Ogryczak, M.Opolska–Rutkowska: On Primal–Dual Third Degree Stochastic Dominance (in: 23rd IFIP TC 7 Conference on System Modelling and Optimization; Ed.: Akademia Górniczo–Hutnicza). 2007. pp. 51–52.
- [P45] P.Pałka, M.Kaleta, K.Smolira, E.Toczyłowski: Analysis of Agents Speculation on Settlement Results for Different Types of Pricing (in: Proceedings of the 13th IEEE IFAC International Conference on Methods and Models in Automation and Robotics, Ed.: IEEE). 2007. pp. 219–224.
- [P46] J.Putz–Leszczyńska, M.Chochowski, Ł.Stasiak, R.Wardziński, A.Pacut: Two–stage classifier for off–line signature verification (in: 13th Biennial Conference of the International Graphonomics Society). 2007. pp. 138–141.
- [P47] M.Rogulski, E.Toczyłowski: Balancing Real and Reactive Power with Real and Reactive Regulation Reserves in Power Systems (in: Proceedings of the 13th IEEE IFAC International Conference on Methods and Models in Automation and Robotics; Ed.: IEEE). 2007. pp. 193–224.
- [P48] A.Sikora, E.Niewiadomska–Szykiewicz: Parallel and Distributed Simulation of Frame Relay Networks (in: 11th IFAC/IFORS/IMACS/IFIP Symposium on Large Scale Systems Theory and Applications). 2007. z. CD. pp. 1–6.
- [P49] K.Smolira, M.Kaleta, E.Toczyłowski: Pricing Methods for Infrastructure Utilization on the Intra–Day Electric Power Markets (in: The XIII–th International Scientific Conference on Present–Day Problems of Power Engineering; Ed. Gdańsk University of Technology). 2007. pp. 111–118.
- [P50] K.Smolira, M.Kaleta, E.Toczyłowski: Intra–day Power Market Balancing with Network Constraints Cost Allocation (in: 6th Conference on Applied Infrastructure Research INFRADAY). 2007. pp. 1–18.
- [P51] A.Stachurski: Orthogonal Projections in the Quasi–Newton Variable Metric Updates (in: International Conference on Modelling & Optimization of Structures, Processes & Systems). 2007. z. CD. pp. 1–12.
- [P52] W.Stańczuk, J.Lubacz, E.Toczyłowski: Trading Transport Resources of Communication Networks on Bandwidth Exchanges (in: Proc. 46th FITCE Congress). 2007. pp. 121–125.
- [P53] Ł.Stasiak, A.Pacut: Particle Filters for Multi–Face Detection and Tracking with Automatic Clustering (in: 2007 IEEE International Workshop on Imaging Systems and Techniques). 2007. pp. 1–6.
- [P54] P.Strzelczyk, A.Czajka, A.Pacut: Iris recognition with Match–on–card (in: 15 th European Signal processing Conference: EURASIP 2007). 2007. pp. 1–1.
- [P55] K.Świrski, K.Wojdan, M.Warchoł: Zastosowanie optymalizatora opartego na teorii sztucznych systemów immunologicznych do sterowania procesem spalania w elektrowni (in: II Konferencja Naukowo–Techniczna Kontrola, Sterowanie i Automatyzacja Procesu Spalania w Kotłach Energetycznych). 2007. pp. 203–219.
- [P56] P.Tatjewski: Advanced Control and On–line Process Optimization in Multilayer Structures (in: 11th IFAC/IFORS/IMACS/IFIP Symposium on Large Scale Systems Theory and Applications). 2007. z. CD. pp. 1–14.
- [P57] T.Traczyk: SVG – wizualizacje w XML (in: Materiały XIII Konferencji PLOUG Systemy informatyczne. Projektowanie, implementowanie; Ed.: Stowarzyszenie Polskiej Grupy Użytkowników Systemu Oracle). 2007. pp. 11–26.
- [P58] T.Traczyk: Zarządzanie ewolucją systemu informacyjnego za pomocą programowania generatywnego i języka XVCL (in: II Krajowa Konferencja Naukowa Technologie Przetwarzania Danych). 2007. pp. 378–388.

- [P59] P.Trojanek, C.Zieliński, W.Szynkiewicz: Definition and Composition of Individual Robot Behaviours in Cooperative Box Pushing (in: Proceedings of the 13th IEEE IFAC International Conference on Methods and Models in Automation and Robotics; Ed.: IEEE). 2007. pp. 1137–1141.
- [P60] P.Wawrzyński: Learning to Control a 6–Degree–of–Freedom Walking Robot (in: EUROCON 2007: The International Conference on Computer as a Tool; Ed.: IEEE). 2007. pp. 698–705.
- [P61] P.Wawrzyński, A.Pacut: Truncated Importance Sampling for Reinforcement Learning with Experience Replay (in: Proceedings of the II International Multiconference on Computer Science and Information Technology). Paris. 2007. vol. 2. pp. 305–315.
- [P62] A.Wilkowski: Współczesne techniki analizy obrazu i rozpoznawania wzorców w zagadnieniu identyfikacji gestów (in: Mat. II Konferencji Naukowo–Technicznej Doktorantów i Młodych Naukowców – Młodzi naukowcy wobec wyzwań współczesnej techniki). 2007. pp. 444–450.
- [P63] K.Wojdan, K.Świrski, M.Warchoł, T.Chomiak: New Improvements of Immune Inspired Optimizer SILO (in: 19th IEEE International Conference on Tools with Artificial Intelligence – ICTAI 2007). 2007. pp. 49–52.
- [P64] A.Zalewski: A FMECA framework for Service Oriented Systems based on Web Services (in: Proceedings of International Conference on Dependability of Computer Systems DepCoS – REL-COMEX 2007). 2007. vol. 1. pp. 286–293.
- [P65] I.Żółtowska: A mixed–integer LP approach for pricing multiperiod auction on a pool–based electricity market with transmission capacity constraints (in: 4th International Conference The European Electricity Market. EEM–07, Challenge of the Unification). 2007. pp. 67–73.
- [P66] I.Żółtowska, E.Toczyłowski: Optimal integrated risk–constrained bidding and scheduling for price–taker power producers (in: The XIII–th International Scientific Conference on Present–Day Problems of Power Engineering; Ed. Gdańsk University of Technology). 2007. pp. 195–202.

6.5 Abstracts

- [A1] J.Błaszczczyk, M.Marks, E.Niewiadomska-Szynkiewicz: Application of Rectangular Full Packed and Blocked Hybrid Matrix Formats in Semidefinite Programming for Sensor Network Localization (in: 7th International Conference on Parallel Processing & Applied Mathematics). 2007. pp. 157–157.
- [A2] B.Kubica, A.Woźniak: Interval Methods for Computing the Pareto-Front of a Multicriterial Problem (in: 7th International Conference on Parallel Processing & Applied Mathematics). 2007. pp. 108–108.
- [A3] A.Pacut, A.Czajka, P.Strzelczyk, M. Chochowski,: Systemy biometrii (in: Biuletyn NASK).z.1/2007
- [A4] A.Pacut, A.Czajka, J. Putz-Leszczynska, Ł. Stasiak, R. Wardziński: Metody biometrii (in: Ochrona Mienia i Informacji). 2007. pp. 16–18
- [A5] M.Rodzewicz, B.Kubica: Ekstrapolacja stochastyczna spektrów obciążeń zmęczeniowych statków powietrznych (in: I Kongres Mechaniki Polskiej). 2007. p. 157.
- [A6] A.Stachurski: On the Structure of Variable Metric Updates (in: Forth International Conference of Applied Mathematics and Computing – FICAMC). 2007. p. 1.

6.6 Reports and Other Papers

- [R1] B.Kozłowski: Analysis of Weather Indicators and Crop Yields with Wavelets (Ed.: IIASA). 2007.
- [R2] A.Krzemienowski: Efficiency Analysis of Bicriteria Equitable Optimization for Location Problems (Ed. ICCE). 2007.
- [R3] W.Ogryczak: Conditional Median as a Robust Solution Concept for Location Problems (Ed.: ICCE). 2007.
- [R4] W.Ogryczak: Ordered Achievements Refinements of the Reference Point Method (Ed.: ICCE). 2007.
- [R5] K.Ostrowski: Implementacja i analiza interaktywnej metody rozkładu referencyjnego dla zagadnień rozdzielu inwestycji (Ed.: ICCE). 2007.

- [R6] A.Rydzewski: Projekt układu sterowania lekkim manipulatorem dla robota mobilnego (Ed.: ICCE). 2007.
- [R7] C.Zieliński, W.Szynkiewicz, P.Trojane, A.Rydzewski: Implementacja układów sterowania robotów w strukturze ramowej MRROC oraz system wymiany danych między agentami (Ed.: ICCE). 2007.