Institute of Control and Computation Engineering

2008 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 research 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. Subsequently the Institute was headed by professors: Wiesław Traczyk (1981–1984), Krzysztof Malinowski (1984–1996) and Piotr Tatjewski (1996–2008). In August 2008 the last term in office of Prof. P. Tatjewski ended, thus I was chosen to substitute him from 1st September. Taking the opportunity of writing this text I want to thank him for the twelve years of his service to the Institute and the academic community. With this change Prof. Włodzimierz Ogryczak took over from me the responsibilities of the Deputy Director for Research, while Dr Tomasz Traczyk agreed to continue his splendid work as the Deputy Director for Academic Affairs.

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 and Robotics. This standard educational offer was supplemented in the academic year 2007/2008 by postgraduate studies in *Management of Information Technology Resources* organized by Dr Andrzej Zalewski and Dr Tomasz Traczyk. There is a growing interest in this form of studies. In the period 2007/2008 23 persons took part in this course, however 2008/2009 edition attracted 63 listeners. Besides that our Institute, as the representative of the Faculty of Electronics and Information Technology, jointly with the Faculty of Power and Aeronautical Engineering started an *Erasmus Mundus Masters Program in Robotics*. The partners of Warsaw University of Technology in this Program are Ecole Centrale de Nantes (Nantes, France) – the coordinator and Universita Degli Studi di Genova (Genova, Italy). The students from within and outside of the EU study for two years, each year in one of the partner institutions and obtain a double diploma from those universities upon successful completion of the studies.

Warsaw University of Technology was successful to secure funds from EU European Social Fund for *Program of Development of WUT*. Our Institute participates in the realization of the task: *Development of 2nd level studies in Control and Robotics in WUT*, for which Prof. Piotr Tatjewski is responsible. Four faculties of WUT participate in this task, which is scheduled for the years 2008–2012.

In 2008 the group headed by Prof. Ewa Niewiadomska-Szynkiewicz was involved in organizing *The 11-th National Conference on Evolutionary Algorithms and Global Optimization*, June 2–4, 2008, Szymbark, Poland, which gathered Polish scientists working in the area of artificial intelligence, modeling and optimization. Moreover, the group headed by Prof. Andrzej Pacut, representing both our Institute and NASK, organized *The IEEE Workshop on Bio-Inspired Signal and Image Processing*, May 17, 2008, Warsaw.

Prof. Piotr Tatjewski, the former director, was awarded the prize of Ministry of Science and Higher Education for the book *Advanced Control of Industrial Processes, Structures, Algorithms* published by Springer Verlag.

Two distinguished professors of our staff were designated to head two important committees of our Faculty for a 4 year term. Prof. Krzysztof Malinowski heads *Committee for advancement of academic staff* and Prof. Piotr Tatjewski heads *Committee for studies.*

As usual in September the Institute took part in the annual event called the Science Festival. Prof. W. Kasprzak delivered a lecture entitled *Computational Image and Speech Analysis.* Moreover three laboratory presentations were organized by Mr T. Winiarski, Mr Ł. Czajka, and Mr A. Wilkowski. On 2nd December 2008 the second mobile robot race competition called 'Bionikalia' was organised by the Student Robotics Club *Bionic* supervised by Dr W. Szynkiewicz and Mr T. Winiarski. The event attracted 26 teams presenting their vehicles.

In the year 2008 the Group of Robot Programming and Pattern Recognition, headed by me, obtained a grant within the 7th Framework Program of the Commission of the European Union from NHP-2007-3.2-1. The project named *Self Reconfigurable Intelligent Swarm Fixtures* (SwarmItFIX) is directed at the development of a universal fixturing device that can be used by aeroengineering and car manufacturing industries. The partners of WUT in this project are DIMEC University of Genova (Italy, the coordinator), Exechon (Sweden), PIAGGO Aero Industries Spa. (Italy), ZTS-VVU Vyskumno-vyvojovy Ustav Kosice a.s. (Slovakia), Centro Ricerche FIAT S.C.P.A. (Italy).

In the year 2008 Prof. Eugeniusz Toczyłowski obtained an industry-sponsored research grant from the Polish Transmission System Operator, PSE-Operator S.A., for the development of new theoretical market models and algorithms to support efficient and incentive-compatible solutions in the Polish energy balancing market.

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 staff of the institute for their efforts and contributions to our achievements in teaching and research.

Cezary Zieliński

Contents

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, 2008.

1.1 Directors

Professor Cezary Zieliński, Director
Professor Włodzimierz Ogryczak, Deputy Director for Research
Dr. Tomasz Traczyk, Deputy Director for Academic Affairs

1.2 Organization of the Institute

Systems Control Division

Division Head:	Professor Krzysztof Malinowski
Professors:	Włodzimierz Kasprzak, Krzysztof Malinowski, Andrzej Pacut, Cezary Zieliński
Professors, retired:	Władysław Findeisen, Radosław Ładziński, Jacek Szymanowski
Reader:	Adam Woźniak
Assistant Professors:	Piotr Arabas, Adam Czajka, Mariusz Kamola, Andrzej Karbowski, Adam Kozakiewicz, Tomasz J. Kruk, Bartłomiej Kubica, Ewa Niewiadomska-Szynkiewicz, Wojciech Szynkiewicz, Paweł Wawrzyński
Assistants:	Tomasz Kornuta (since Oct. 2008), Maciej Staniak (until Sept. 2008), Przemysław Strzelczyk (since April 2008), Tomasz Winiarski
Senior Lecturer:	Andrzej Rydzewski, Michał Warchoł
Ph.D. Students:	Marcin Chochowski, Małgorzata Kudelska, Andrzej Igielski, Michał Karpowicz, Tomasz Kornuta, Michał Kudelski, Piotr Kwaśniewski, Marek Majchrowski, Michał Marks, Roman Bartosz Nowicki (until March 2008), Joanna Putz-Leszczyńska, Łukasz Stasiak, Przemysław Strzelczyk, Anna Sibilska, Piotr Trojanek, Rafał Wardziński (until March 2008), 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, A. Kozakiewicz, T. J. Kruk, B. Kubica, A. Woźniak, M. Warchoł, 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.

Biometrics and Machine Learning Group (**Andrzej Pacut**, A. Czajka, P. Wawrzyński, P. Strzelczyk, M. Chochowski, M. Kudelska, M. Kudelski, R. B. Nowicki, J. Putz-Leszczyńska, Ł. Stasiak, 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, face image, 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, applied to adaptive control, and multi-agent systems. Also, learning in neural networks and modeling granularity is investigated.

Robot Programming and Pattern Recognition Group (**C. Zieliński**, W. Kasprzak, W. Szynkiewicz, A. Rydzewski, T. Winiarski, T. Kornuta, A. Sibilska, 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 speach 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.

Control and Software Engineering Division

Division Head:	Professor Piotr Tatjewski
Professors:	Piotr Tatjewski, Krzysztof Sacha
Assistant Professors:	Paweł Domański, Maciej Ławryńczuk, Piotr Marusak, Marcin Szlenk, Andrzej Zalewski
Senior Lecturers:	Jerzy Gustowski, Zygmunt Komor, Urszula Kręglewska
Senior Engineer:	Włodzimierz Macewicz
Ph.D. Students:	Ali Mhammed Benniran, Adam Działak, Anna Felkner, Andrzej Grudzień (since Nov. 2008), Maciej Grula, Marcin Ludzia (since Nov. 2008), Andrzej Ratkowski, Łukasz Szejba, Piotr Sztandera, Maciej Szumski, Marek Zalewski (until Oct. 2008)

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, Ł. Szejba, M. Szumski)

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 first of all on fuzzy systems and neural nets. Theoretical considerations are combined with simulation analysis and investigations. Computer Control Systems Laboratory is equipped with programmable controllers, industrial computers and workstations with software tools, including Matlab with Toolboxes and SCADA systems.

Software Engineering Group (**K. Sacha**, A. Zalewski, W. Macewicz, M. Szlenk, A. Felkner, A. Grudzień, M. Ludzia, A. Ratkowski, P. Sztandera)

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.

Operations Research and Management Systems Division

Division Head:	Professor Eugeniusz Toczyłowski
Professor:	Eugeniusz Toczyłowski
Reader:	Tomasz Traczyk
Assistant Professors:	Krzysztof Fleszar, Mariusz Kaleta, Krzysztof Pieńkosz, Grzegorz Płoszajski, Izabela Żółtowska
Ph.D. Students:	Przemysław Kacprzak, Kamil Kołtyś, Robert Kuźmiuk, Andrzej Midera, Piotr Modliński (since March 2008), Piotr Pałka, 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 network structure development, deregulated electric power industry, IP networks, computer integrated manufacturing, etc. 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.

Optimization and Decision Support Division

Division Head:	Professor Włodzimierz Ogryczak
Professors:	Włodzimierz Ogryczak, Wiesław Traczyk
Reader:	Jerzy Paczyński
Assistant Professors:	Janusz Granat, Adam Krzemienowski (on leave until July 2008), Andrzej Stachurski, Tomasz Śliwiński
Senior Lecturers:	Tadeusz Rogowski, Jerzy Sobczyk
Lecturer:	Grzegorz Wójcik (until Sept. 2008)
Ph.D. Students:	Krzysztof Bareja, Bartosz Kozłowski, Michał Majdan, Paweł Markowski (since March 2008), 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.

1.3 Research Areas

Complex Systems Group

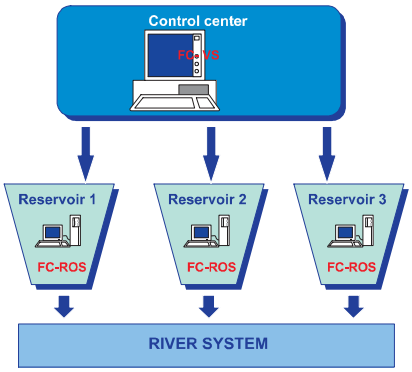
Instytut Automatyki i Informatyki Stosowanej

Software for complex systems simulation

Flood Control

FC-ROS & FC-VS (*Flood Control*)

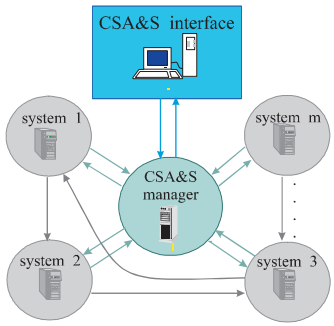
decision support systems for flood control in multireservoir systems.



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

Instytut Automatyki i Informatyki Stosowanej

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.

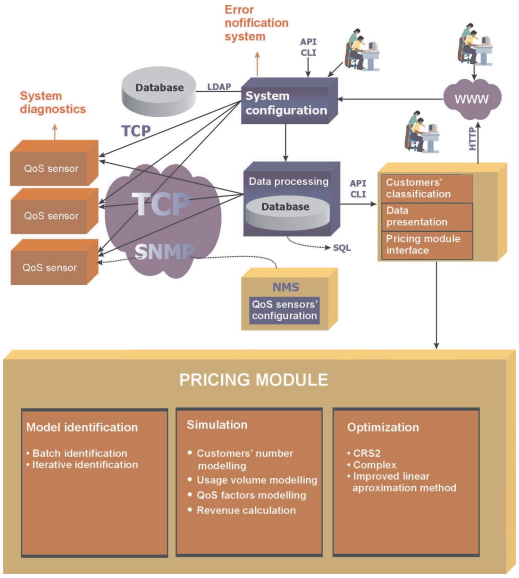
BrokerSim – a C++ pricing simulation package for OPNET:
- traffic generator for user profiles
- short-term traffic demand approximator
- broker module: pricing decisions and traffic shaping
- router pricing module augmenting OPNET's router model

Complex Systems Group

Instytut Automatyki i Informatyki Stosowanej

Quality of Service in IP Networks

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

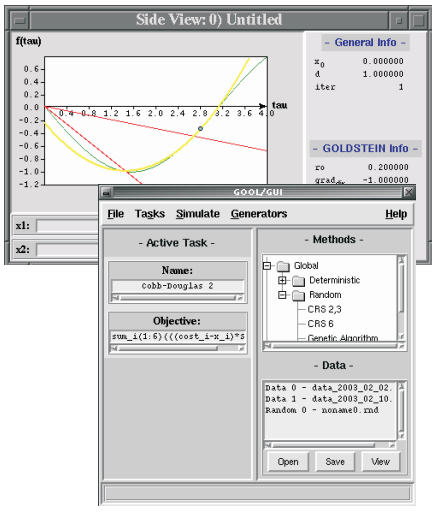


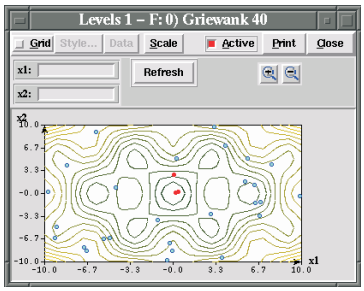
Complex Systems Group

Instytut Automatyki i Informatyki Stosowanej

Global optimization

GOOL - Global Optimization Object–Oriented Library





GOOL

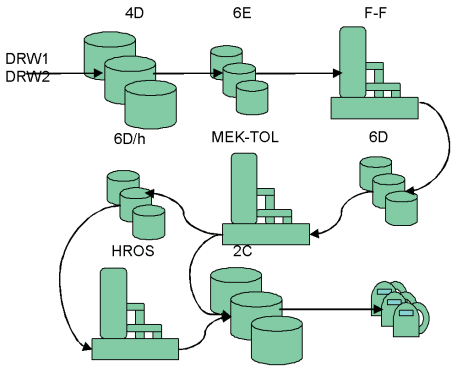
library of random search generators and optimization algorithms for convex and nonconvex, unconstrained and constrained problems

Complex Systems Group

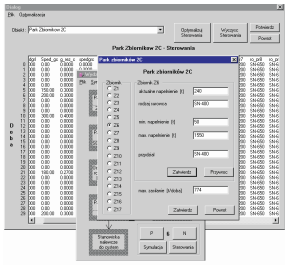
Instytut Automatyki i Informatyki Stosowanej

Operations scheduling using Constraint Programming

Solution of a scheduling problem in an Oil Refinery Division



Oil Refinery Division



Simulation and optimization system

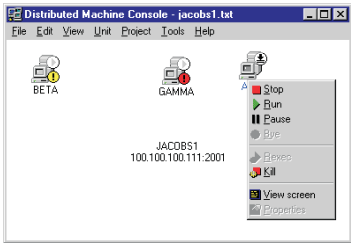
Goals:
- Simulation of an Oil Refinery Division
- Finding all feasible solutions
- Meeting all technical requirements
- Constraint scheduling methods
- Very fast computations

Complex Systems Group

Instytut Automatyki i Informatyki Stosowanej

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:

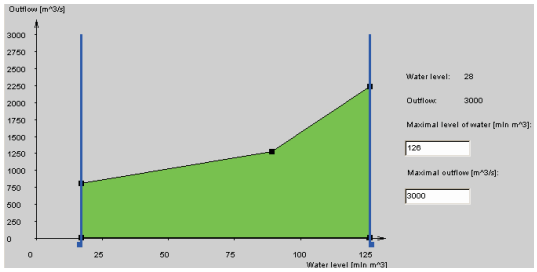
- **WDM** (windows distributed machine) – a software environment for performing distributed computations in a cluster of machines working under windows
- **GEPAS** (generic parallel suite) – an implementation of distributed shared memory in network
- **NONOS** (nonlinear optimization solver) – an ASP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

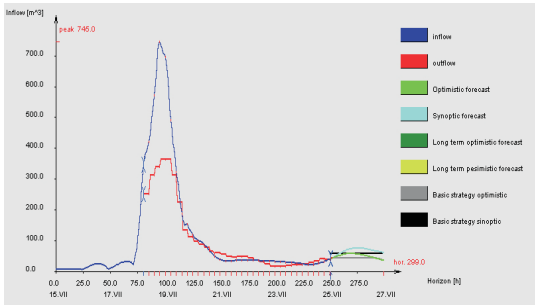
Complex Systems Group

Instytut Automatyki i Informatyki Stosowanej

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



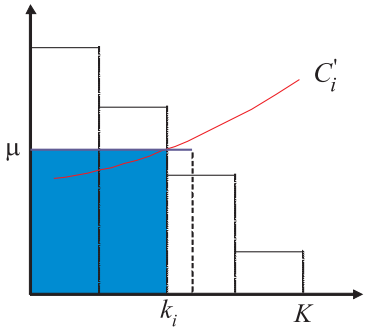


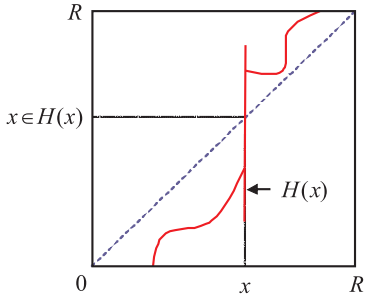
Complex Systems Group

Instytut Automatyki i Informatyki Stosowanej

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

Instytut Automatyki i Informatyki Stosowanej

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:

$$a \in \boldsymbol{a} = [\underline{a}, \overline{a}],\ b \in \boldsymbol{b} = [\underline{b}, \overline{b}],$$
$$\circ \in \{+, -, \cdot, /\} \Rightarrow a \circ b \in \boldsymbol{a} \circ \boldsymbol{b}$$

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

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

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

Interval (inclusion) function:

$$f(x) = x^2 + 2x + 1$$
$$\mathbf{f}(\boldsymbol{x}) = \boldsymbol{x}^2 + 2\boldsymbol{x} + 1$$
$$x \in \boldsymbol{x} = [\underline{x}, \overline{x}] \Rightarrow f(x) \in \mathbf{f}(\boldsymbol{x})$$
$$\mathbf{f}([-5, 1]) = [-5, 1]^2 + 2 \cdot [-5, 1] + 1 = [-9, 28] \supseteq [0, 16]$$

Interval tools:

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

Problems that can be solved:

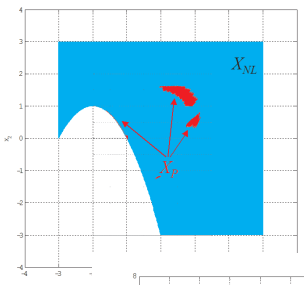
- systems of nonlinear equations
- constraint satisfaction problems
- global optimization problems
- multicriterial optimization problems (convex and nonconvex)

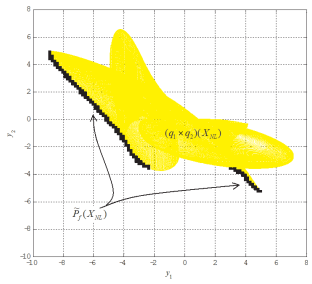
Complex Systems Group

Instytut Automatyki i Informatyki Stosowanej

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

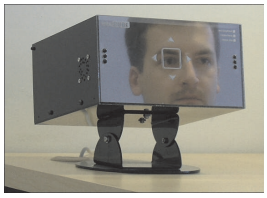
Instytut Automatyki i Informatyki Stosowanej

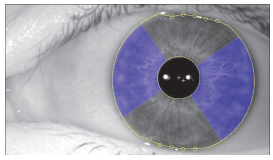
Biometrics

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



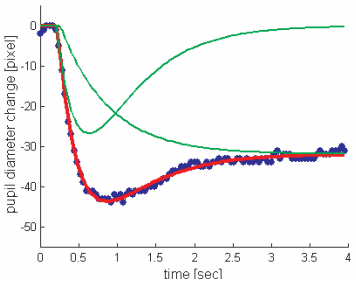


Iris coding

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



Biometrics and Machine Learning Group

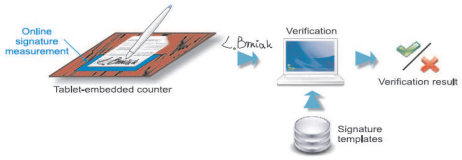
Instytut Automatyki i Informatyki Stosowanej

Biometrics

Handwritten signature-based identity verification

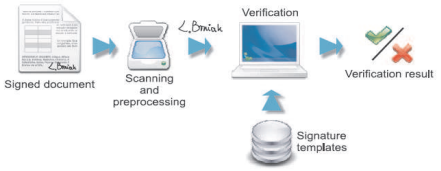
Verification of on-line signatures

- 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

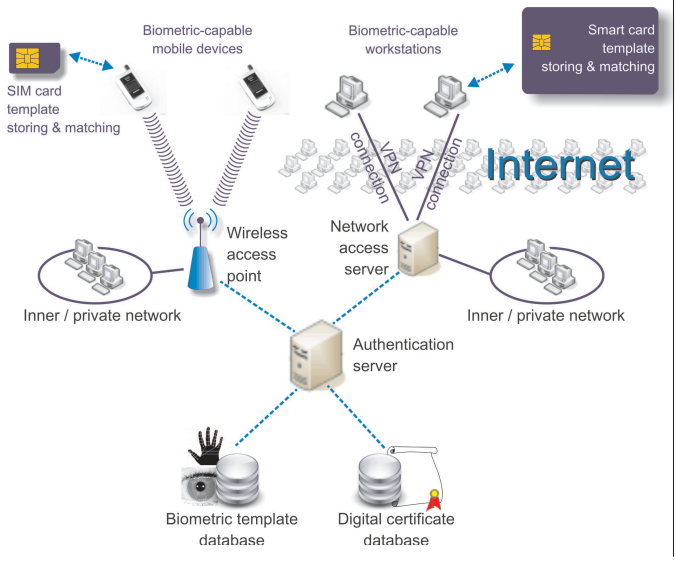


Biometrics and Machine Learning Group

Instytut Automatyki i Informatyki Stosowanej

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

Instytut Automatyki i Informatyki Stosowanej

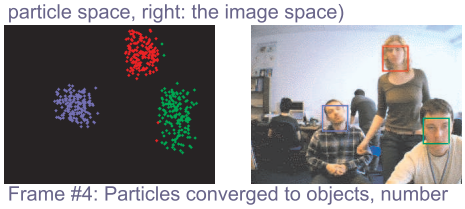
Biometrics

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

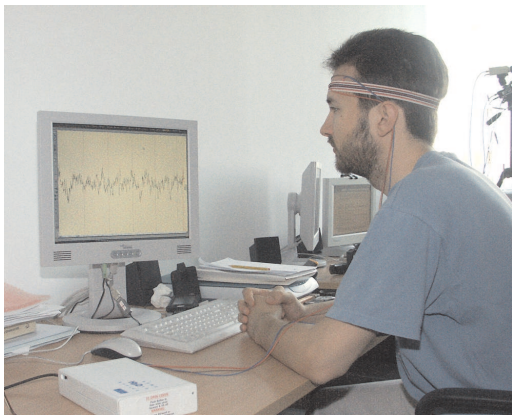
Biometrics and Machine Learning Group

Instytut Automatyki i Informatyki Stosowanej

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

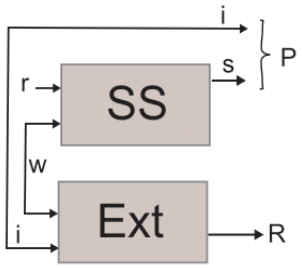


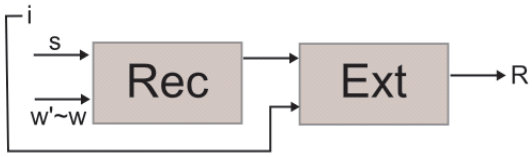
Biometrics and Machine Learning Group

Instytut Automatyki i Informatyki Stosowanej

Biometrics

Biometric cryptography





- Assesing 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 extracotrs***
  - characterization of errors for different algorithms and modalit ies
  - proposition of error correcting codes best fitting bio -cryptography schemas

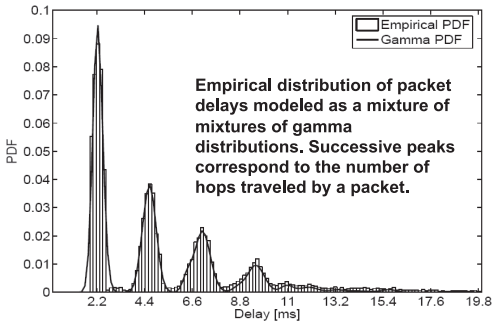
Biometrics and Machine Learning Group

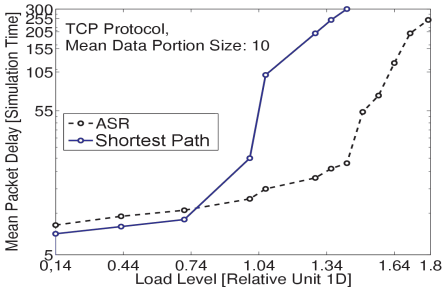
Instytut Automatyki i Informatyki Stosowanej

Machine Learning

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)

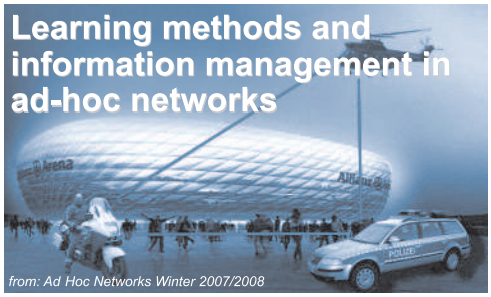




Biometrics and Machine Learning Group

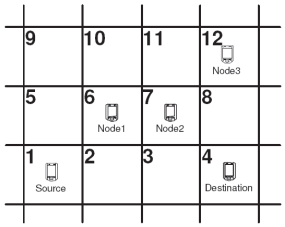
Instytut Automatyki i Informatyki Stosowanej

Machine Learning

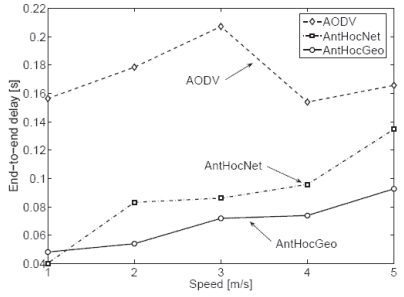


- Highly dynamic environment
- Strong need for adaptive mechanisms to solve routing problems, topology control, QoS provisioning, etc.
- We propose *geographical cells* (Fig. right) as an information management system, together with learning algorithms

Geographical cells comprise the information within a geographical location



Lowest delays achieved (mobile robots network)



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

Biometrics and Machine Learning Group

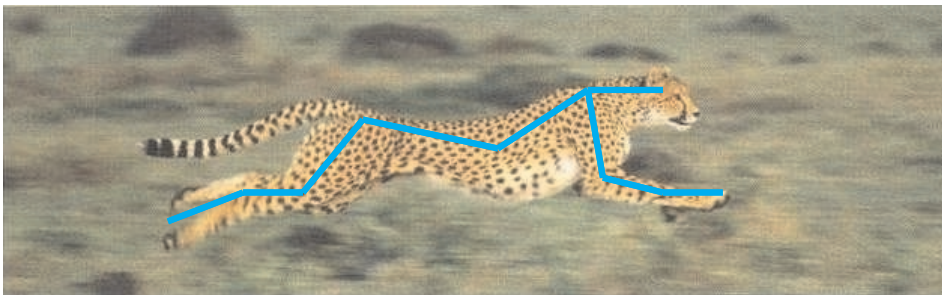
Instytut Automatyki i Informatyki Stosowanej

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.



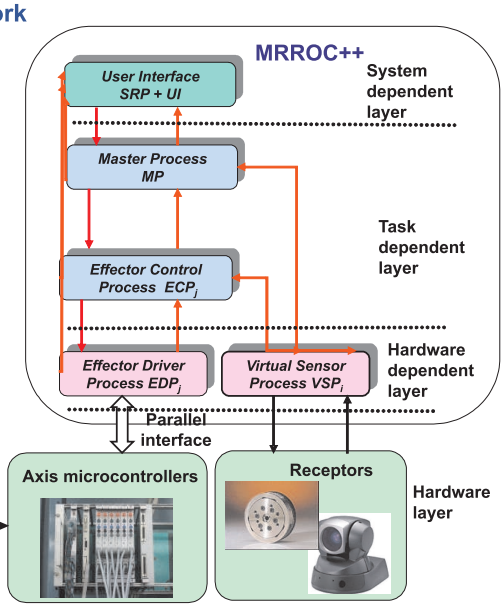
Robot Programming and Pattern Recognition Group

Instytut Automatyki i Informatyki Stosowanej

MRROC++ robot programming framework

- a collection of: C++ classes, QNX processes, and a design pattern
- designed for building open modular robot control systems
- network distributed
- requires custom built axis controllers and parallel interface to a host PC within an Ethernet network

Two co-operating IRp-6 robots



Robot Programming and Pattern Recognition Group

Instytut Automatyki i Informatyki Stosowanej

RNT and POLYCRANK prototype robots

- **RNT robot:** high stifness, 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:

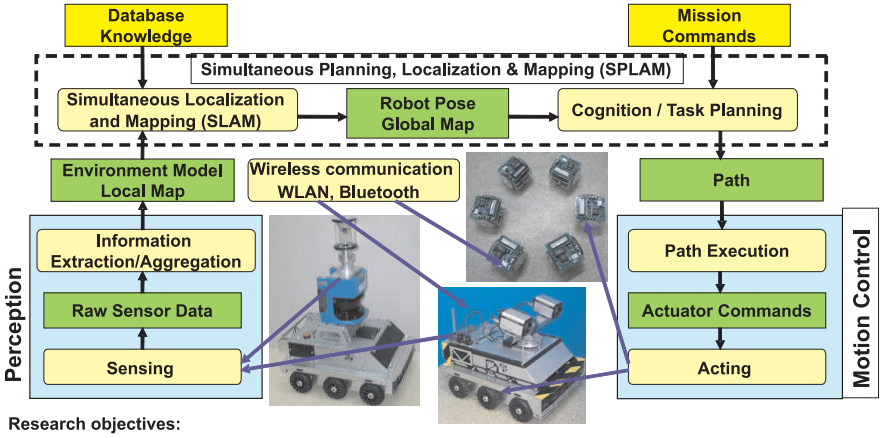
Control systems based on MRROC++ programming framework

POLYCRANK robot

Robot Programming and Pattern Recognition Group

Instytut Automatyki i Informatyki Stosowanej

Control architecture for autonomous mobile robot teams



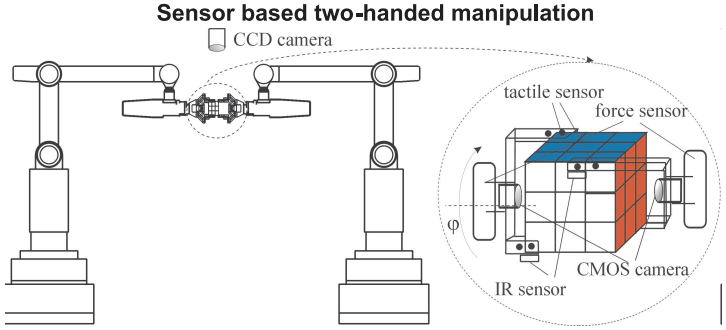
Research objectives:

- 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

Instytut Automatyki i Informatyki Stosowanej

Sensor based two-handed manipulation



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

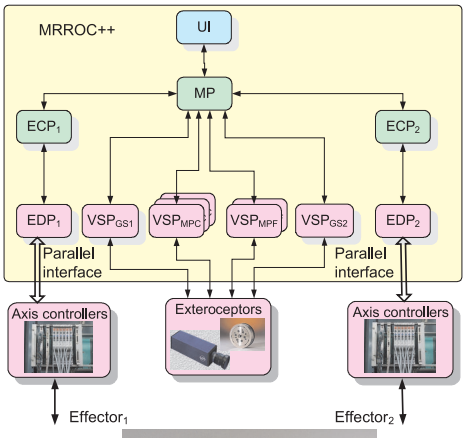
Solution of the benchmark task requires:

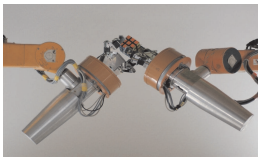
- **Two-handed manipulation skill to efficiently turn the faces of the cube**
- **Visual sensing capability to locate the cube and identification of its initial state**
- **Visual servomechanism to approach the cube and to get hold of it**
- **Using tactile and force sensors to avoid jamming of the cube 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

Instytut Automatyki i Informatyki Stosowanej

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)

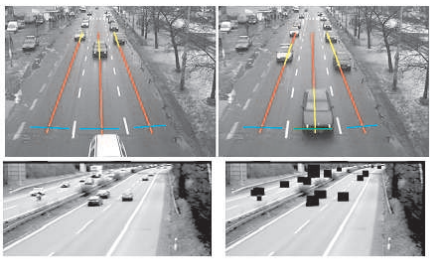
Robot Programming and Pattern Recognition Group

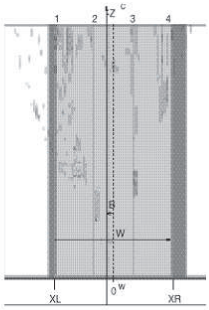
Instytut Automatyki i Informatyki Stosowanej

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.



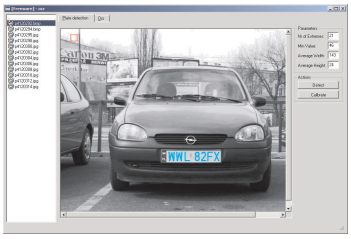


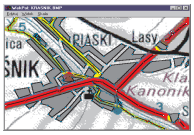
Robot Programming and Pattern Recognition Group

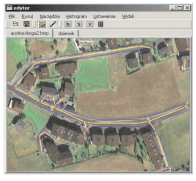
Instytut Automatyki i Informatyki Stosowanej

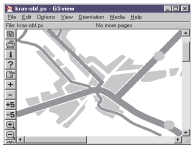
2-D object recognition in digital images

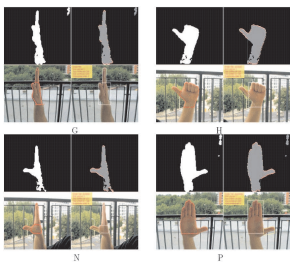
- **Licence plate recognition** (cars, containers)
- **Hand gesture recognition**
- **The analysis** of aerial and cartographic images









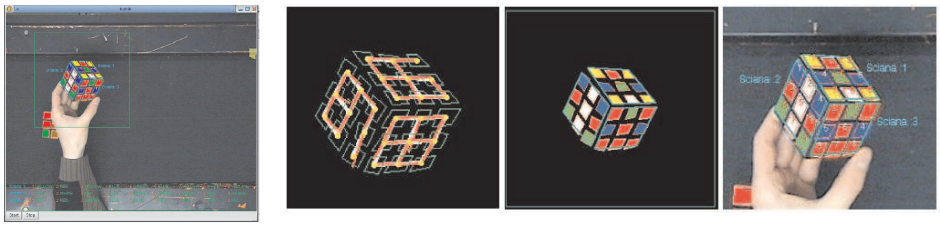


Robot Programming and Pattern Recognition Group

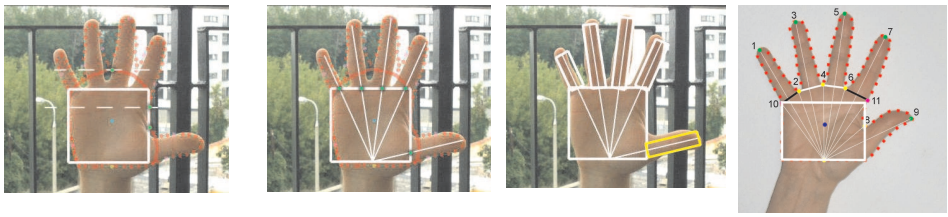
Instytut Automatyki i Informatyki Stosowanej

3-D object reconstruction in digital images

- **Rubik's cube reconstruction**



- ***Free* hand reconstruction and measurement**

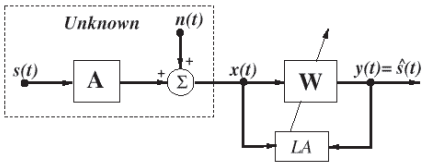


Robot Programming and Pattern Recognition Group

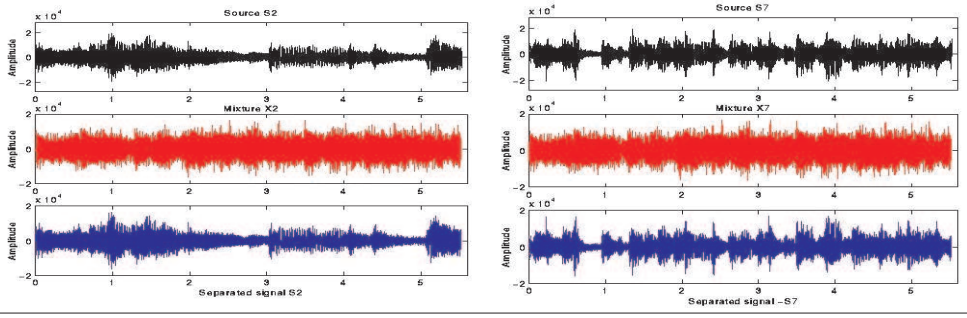
Instytut Automatyki i Informatyki Stosowanej

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 (sensored signal) and the appropriate output signal (which is the separated source).

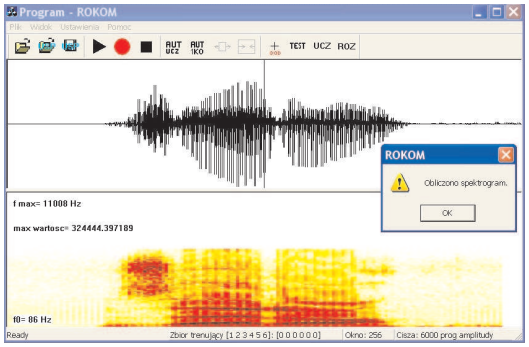


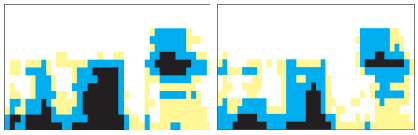
Robot Programming and Pattern Recognition Group

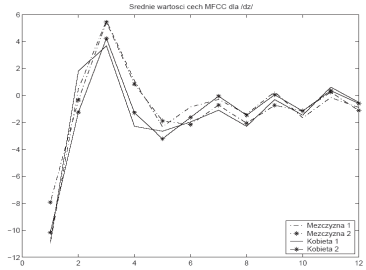
Instytut Automatyki i Informatyki Stosowanej

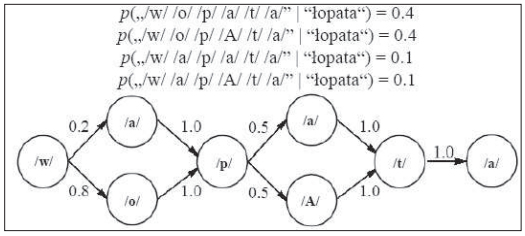
The recognition of polish speech

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







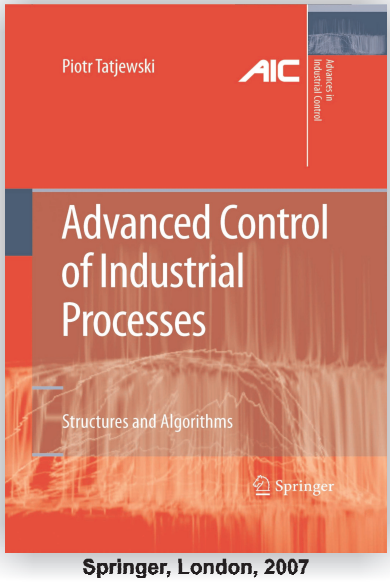


Control Engineering Group

Instytut Automatyki i Informatyki Stosowanej

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

Instytut Automatyki i Informatyki Stosowanej

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

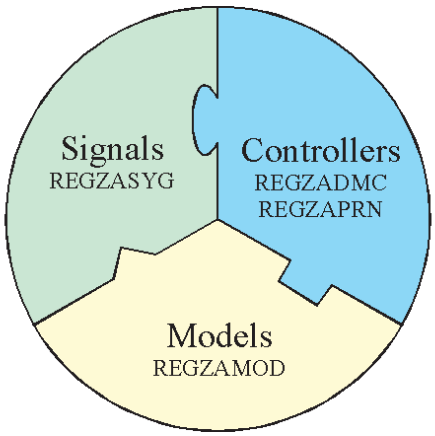
Control Engineering Group

Instytut Automatyki i Informatyki Stosowanej

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

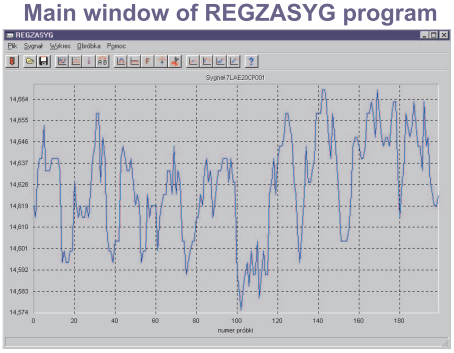
Instytut Automatyki i Informatyki Stosowanej

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

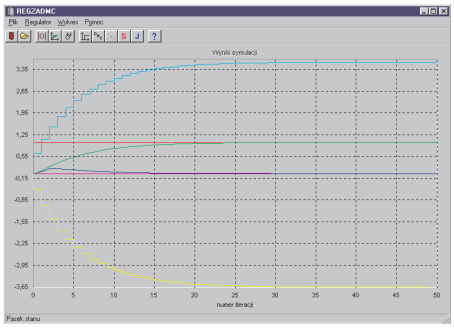
Nonlinear predictive control structures based on fuzzy and neural models

- 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

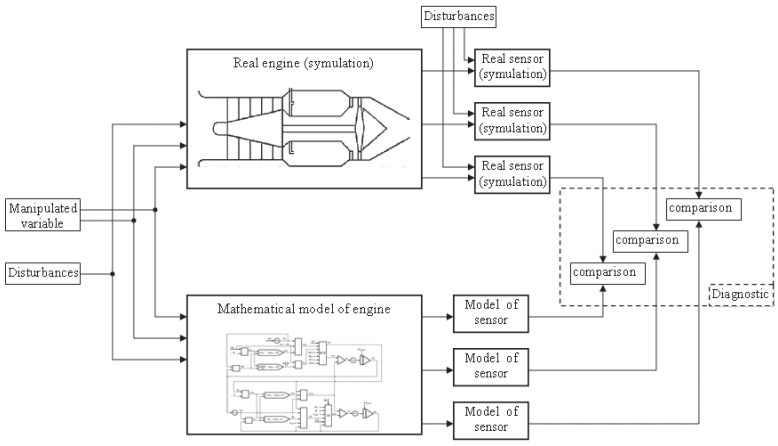


Control Engineering Group

Instytut Automatyki i Informatyki Stosowanej

Sensors diagnostic system

mathematical modeling and simulation of a gas turbine engine and sensors, sensors diagnostic system design based on neural networks



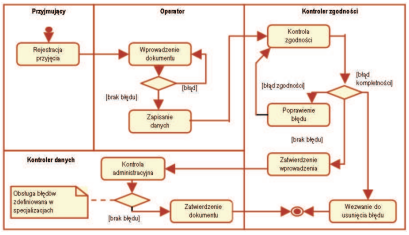
Software Engineering Group

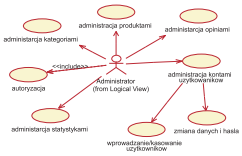
Instytut Automatyki i Informatyki Stosowanej

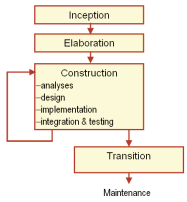
Software development

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

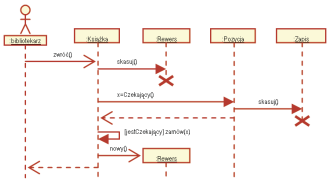


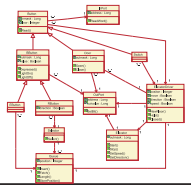




Systems and tools :

- Rational Rose
- Rational RequisitePro
- Structured Architect





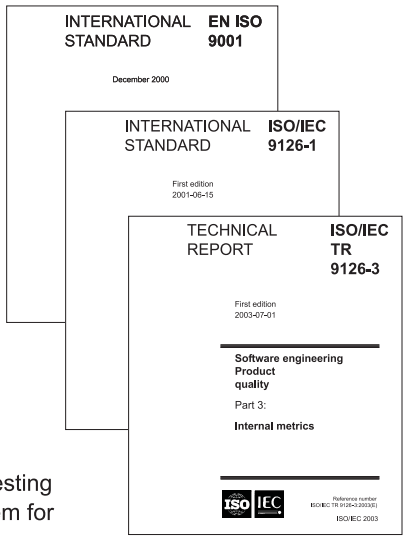
Software Engineering Group

Instytut Automatyki i Informatyki Stosowanej

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

Instytut Automatyki i Informatyki Stosowanej

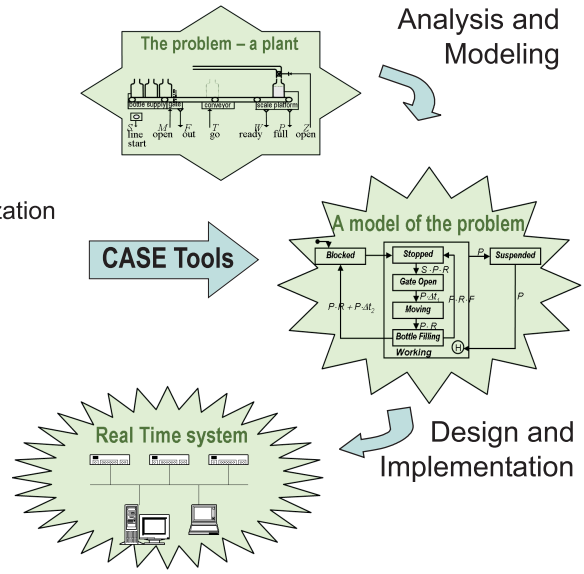
Real time systems

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



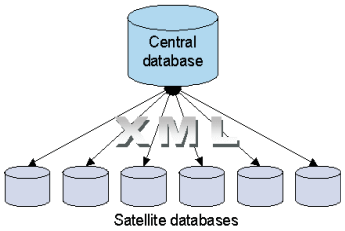
Operations Research and Management Systems Division

Instytut Automatyki i Informatyki Stosowanej

ALICE Detector Construction Database Group

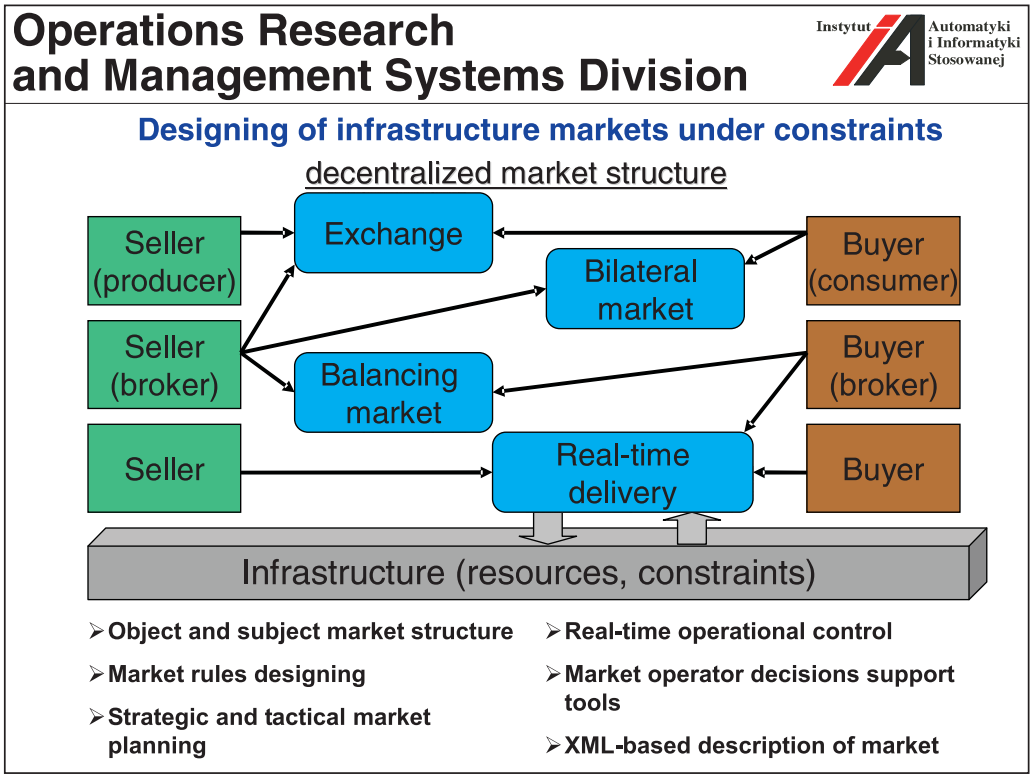
Detector Construction Database for A Large Ion Collider Experiment (ALICE)*

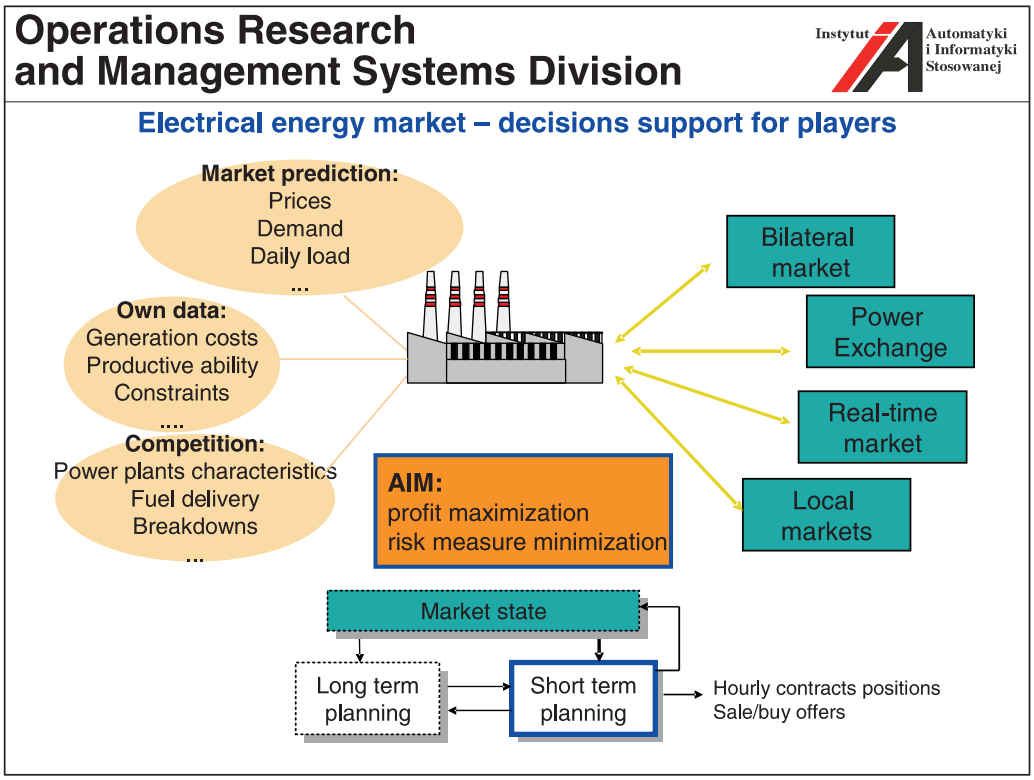
- The goal of the project:
  To create a database and an application environment for use in the initial construction of sub-detectors for ALICE and to facilitate the operation of the completed ALICE detector
- Solution:
  - Distributed heterogeneous database
    - satellite databases at participating laboratories
    - central repository at CERN
  - Flexible generic data structures
  - XML-based data interchange



ALICE 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

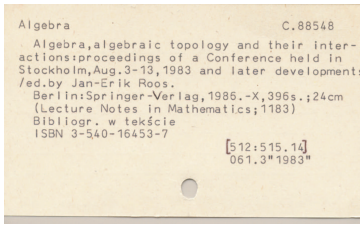

Operations Research
and Management Systems Division
Instytut Automatyki i Informatyki Stosowanej
Designing of infrastructure markets under constraints
decentralized market structure
Seller (producer)
Seller (broker)
Seller
Exchange
Bilateral market
Balancing market
Real-time delivery
Buyer (consumer)
Buyer (broker)
Buyer
Infrastructure (resources, constraints)
Object and subject market structure
Market rules designing
Strategic and tactical market planning
Real-time operational control
Market operator decisions support tools
XML-based description of market


Operations Research
and Management Systems Division
Instytut Automatyki i Informatyki Stosowanej
Electrical energy market – decisions support for players
Market prediction:
Prices
Demand
Daily load
...
Own data:
Generation costs
Productive ability
Constraints
....
Competition:
Power plants characteristics
Fuel delivery
Breakdowns
...
AIM:
profit maximization
risk measure minimization
Bilateral market
Power Exchange
Real-time market
Local markets
Market state
Long term planning
Short term planning
Hourly contracts positions
Sale/buy offers

Operations Research and Management Systems Division

Instytut Automatyki i Informatyki Stosowanej

Library catalogue digitization

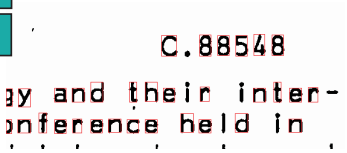


Skew correction

Binarization

Noise elimination

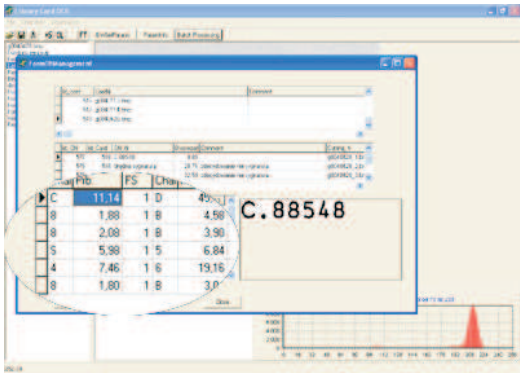
Segmentation



Framing

Recognition

C.88548



Operations Research and Management Systems Division

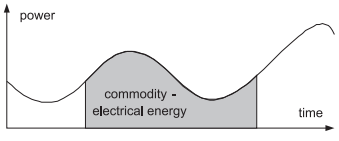
Instytut Automatyki i Informatyki Stosowanej

M^3 Multicommodity Market Model

M^3 is a flexible and universal market data and communication model
http://www.openm3.org

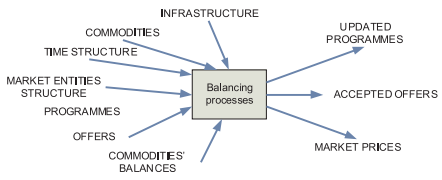
M^3 is mainly (but not only) designed for

- **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



M^3 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 M^3 describes the inputs and outputs of elementary balancing process:



M^3 helps markets' development by providing

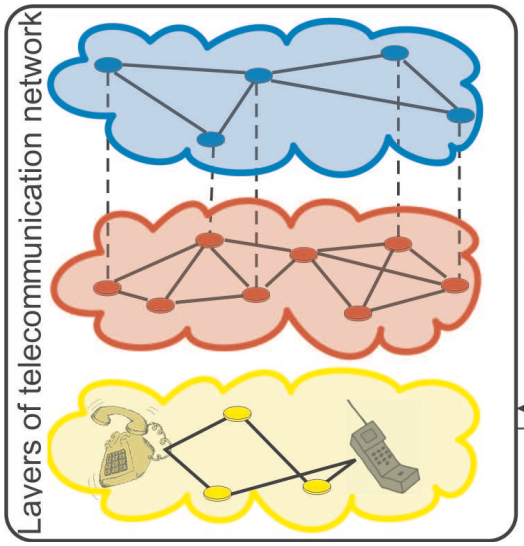
- flexible framework both for real-world market systems and for research projects
- possibilities for integration of software components
- possibilities for organizing benchmark data repository

Operations Research and Management Systems Division

Instytut Automatyki i Informatyki Stosowanej

Design of Multicommodity Market Model – M³

Application of M³ on the Communication Bandwidth Market



M³ model:

- may be used in information systems for market balancing in various infrastructure networks
- is a set of formal data models, which results in XML-derived information interchange specification
- may be used in a wide range of market-oriented network systems and may significantly facilitate communication, coordination and modelling procedures

Optimization and Decision Support Division

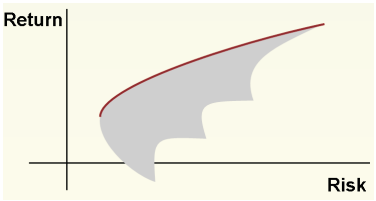
Instytut Automatyki i Informatyki Stosowanej

Risk Measures and Optimization under Risk

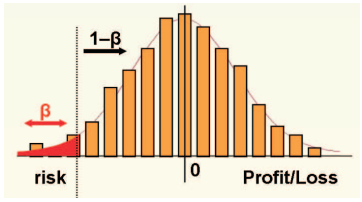
- focus on risk measures consistent with axiomatic models of preferences for choice under risk
- risk preference modeling from strongest risk aversion to complete risk neutrality
- optimization with linear programming: very large dimensions, fast and stable numerical implementations

Returns

Mean–risk analysis



Distribution approach

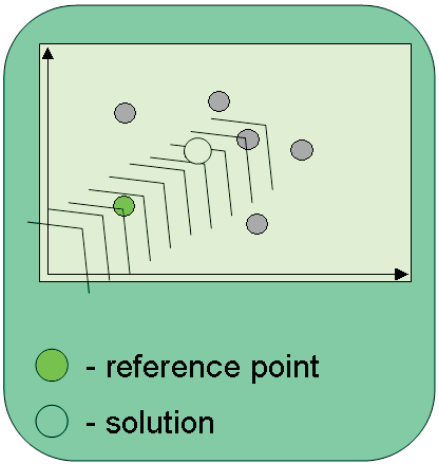


Optimization and Decision Support Division

Instytut Automatyki i Informatyki Stosowanej

Reference Point Method

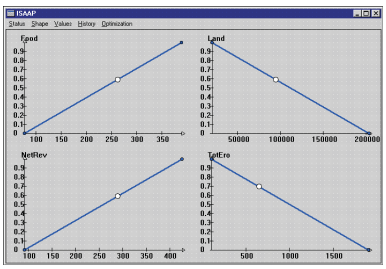
- interactive method for multicriteria model analysis
- guiding information by specification of the reference points
- a Pareto-optimal solution is selected for a given reference point

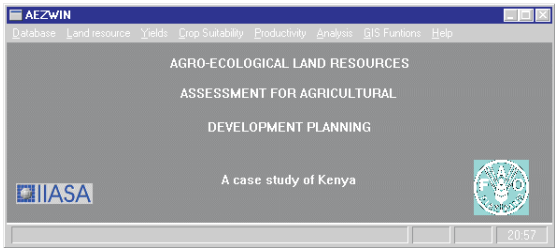


Optimization and Decision Support Division

Instytut Automatyki i Informatyki Stosowanej

Application of the reference point method to land resource assessment





1.4 Statistical Data

FACULTY and STAFF	2006		2007		2008	
	persons	FTE	persons	FTE	persons	FTE
Academic Staff	43(+2)	37.5(+2)	44(+2)	37.25(+2)	44(+1)	37.25(+1)
by titles/degrees						
Professors	4	4	4	3.75	4	3.5
D.Sc.-s	6	6	6	6	6	6
Ph.D.-s	24(+2)	21(+2)	25(+2)	21.5(+2)	27(+1)	23(+1)
M.Sc.-s	9	6.5	9	6	7	4.75
by positions						
Professors	9	9	9	8.75	9	8.5
Readers	0	0	1	1	3	2.5
Assistant Professors	22(+2)	20(+2)	23(+2)	20.5(+2)	23(+1)	20.5(+1)
Senior Lecturers	7	5.5	7	5	6	4
Lecturers	1	0.5	1	0.5	0	0
Assistants	4	2.5	3	1.5	3	1.75
Ph.D. Students	37		33		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	2006	2007	2008
Teaching activities			
standard teaching potential, hours	8 327.25	8 182.49	9 239.63
# hours taught	15 341.51	14 331.60	13 570.60
Degrees awarded			
D.Sc.	1	0	0
Ph.D.	5	2	3
M.Sc.	51	50	52
B.Sc.	53	54	57
Research projects			
granted by WUT	3	8	4
granted by State institutions	7	9	12
granted by international institutions	1	1	4
other	0	0	0
Reviewed publications			
monographs (authored or edited)	2	8	4
chapters in books	31	16	43
papers in journals	32	47	47
papers in conference proceedings	44	66	25
Reports, abstracts and other papers	28	13	7
Conferences			
participation (# of conferences)	40	45	39
participation (# of part. from ICCE)	73	81	59

RESOURCES	2005	2006	2007	2008
Space (sq.m.)				
laboratories	585	585	585	585
library + seminar room	74	74	74	74
faculty offices	724	724	724	724
Computers				
workstations*	14	9	15	5
personal computers*	245	165	269	331
Library resources				
books	4732	4814	4862	4030
booklets	1779	1885	1960	1915
journals subscribed	6	6	5	9

* 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, Readers, 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, 2008.

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 (2004-2007).

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) (1992-2004). 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. He is a member of the NASK Research Council (2006-). Expert of Technical Committee No. 182 on Information Security in IT Systems of Polish Normalization Committee (PKN) (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.

Adam Kozakiewicz Assistant (until Sept. 2008), Assistant Professor (since Oct. 2008, part-time)

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

M.Sc. 2001, Ph.D. 2008 from WUT

With WUT since 2006.

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

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

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

Ph.D. 2007 from WUT.

With WUT since 2007.

Bartłomiej Kubica Assistant Professor

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, parallel computing, multithreaded programming, real-time systems.

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). 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). Corresponding 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, fuzzy control.

Ewa Niewiadomska-Szynkiewicz 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. Expert, Tech. Committee No. 182 on Information Security in IT Systems 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 Reader (part-time)

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 Technology of the Main Library of WUT since 1996. Committee Member of 'Kasa Mianowskiego' since 2004. Member of the Digitization Group established by the Ministry of Culture and National Heritage

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, 2008–).

Interests: Computer network, programming languages, operating systems.

Andrzej Rydzewski Senior Lecturer (died August 1, 2008)

Systems Control Division, Robot Programming and Pattern Recognition Group

M.Sc. 1974 from WUT.

With WUT since 1974.

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 Alerton Integracja Serwis (1999-2002), Advisor to the President of Social Insurance Institution (2004–2008). Member of IEEE Computer Society. 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, Äbo Swedish Academy in Turku, 1987, Jyväskylä University, Finland, 1988, JSPS invitee at the Department of Control Engineering, Osaka University, Japan, 1988–89. Member of Polish Society of Operations and Systems Research. 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

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 until Aug. 2008, 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 professoship 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 1996–2008. Head of Control and Software Engineering Division, 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 (2005–2006). Member of EUCA (European Union Control Association) Administrative Council (2008–), member of IFAC Technical Committees TC 2.1 and TC 5.4.

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.Toczylowski@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 Reader (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 Warchoł 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 Reader

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 Graduate Distance Learning (2005–2008).

Interests: Control of complex systems, servomechanisms, robot control, multi-criteria optimization, game theory, multiagent systems including mechanism design and auctions, 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 until Aug. 2008, Director of the Institute since Sept. 2008, 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 (2003–2007). 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, 2004–2008). Deputy Director of ICCE for Research (2005–2008), Director of ICCE (2008–). 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

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

Tomasz Kornuta Assistant (since October 2008, part time)

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

M.Sc. 2005 from WUT

With WUT since 2008

Interests: Robot programming methods, behavioral control, computer vision, pattern classification, artificial intelligence

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 (until Sept. 2008)

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.

Przemysław Mirosław Strzelczyk Assistant (part-time)

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

M.Sc. 2005 from WUT

Received his M.Sc. in Information Technology in 2005 from Warsaw University of Technology. Since 2008 he is with Warsaw University of Technology, and since 2004 with Research and Academic Computer Network NASK working for Biometric Laboratories. He is a graduate student member of the IEEE (Institute of Electrical and Electronics Engineers, Inc., 2007-) and serves as the Publicity Committee Officer of the IEEE Poland Section (2007-).

Interests: Biometrics, pattern recognition, systems security.

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, http://robotics.ia.pw.edu.pl/tomaszwiniarski

M.Sc. 2— from WUT

With WUT since 2004

Interests: Robot control systems, artificial intelligence.

Grzegorz Wójcik Lecturer (until Sept. 2008, 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

Andrzej Grudzień Ph.D. Student (since Nov. 2008)

Control and Software Engineering Division, Software Engineering Group
room 556, tel. 22 234 7124
A.Grudzien@ia.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

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 (until Oct. 2008)

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
For activities see p. 45.

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

Marcin Paweł Ludzia Ph.D. Student (since Nov. 2008)

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

Supervisor: Krzysztof Sacha

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

Paweł Markowski Ph.D. Student (since March 2008)

Optimization and Decision Support Division
room 556, tel. 22 234 7124
P.Markowski@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 (until Oct. 2008)

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

Supervisor: Eugeniusz Toczyłowski

Piotr Modliński Ph.D. Student (since March 2008)

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

Supervisor: Eugeniusz Toczyłowski

Roman Bartosz Nowicki Ph.D. Student (until March 2008)

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

Anna Sibilska Ph.D. Student (until March 2008)

Systems Control Division, Robot Programming and Pattern Recognition Group
A.Sibilska@ia.pw.edu.pl

Supervisor: Cezary Zieliński

Kamil Smolira Ph.D. Student (until Nov. 2008)

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 Mirosław 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
For activities see p. 46.

Łukasz Szejba Ph.D. Student (since March 2008)

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

Supervisor: Piotr Tatjewski

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

Maciej Szumski Ph.D. Student (since March 2008)

Control and Software Engineering Division, Control Engineering Group
room 567, tel. 22 234 7673
M.Szumski@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 (until March 2008)

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 (until Oct. 2008)

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

Alicja Trojanowska Secretary, Student affairs.

room 23, tel. 22 234 7750, 22 825 5280
A.Trojanowska@ia.pw.edu.pl

Maria Graszka Office support (part-time).

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 Niedbało 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.

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 2007/2008

3.1 Undergraduate and Graduate Studies

Course Title	Course code	Hours per week	Class	Lecturer
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)
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)
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)
Decyzje w warunkach współzawodnictwa	DWW	2 – – 1	PZ-I, PZ-SID, OT	A. Woźniak (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	M. Ławryńczuk P. Marusak
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)
Information Project Management	ZPI	2 – – 1	BDSI, OT	K. Pieńkosz
Introduction to Robotics	WR	2 – 2 –	MUS, SCRJC,OT	W. Szynkiewicz
Inteligentne systemy robotyczne	ISR	2 – 1 –	MUS, PZ-A, PZ-SID, OT	C. Zieliński
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
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)

Course Title	Course code	Hours per week	Class	Lecturer
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	A. Woźniak (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).

Class

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

3.2 Extramural Graduate Studies

Postgraduate studies IT Resources Management: architectures, processes, standards, quality are designed to provide students with current knowledge necessary for successful management of IT in modern organizations. The programme comprises: IT project management, quality standards and assurance systems, development methodologies, system testing, IT audit, business process modeling, system architectures and managerial skills. The classes take form of lectures, workshops, exercises and laboratories. First two editions have attracted 86 students of various background.

3.3 Graduate Distance Learning

Starting from academic year 2005/2006 our institute is involved in graduate distance learning programme of WUT (named OKNO). We co-ordinate two specialisations: Engineering of Internet Systems and Decision and Management Support Systems. The graduates of the first one are prepared for designing, implementing and taking care of complex information technology and computing systems using possibilities offered by contemporary computer networks. They have also ability to manage the layers of technology involved in the next generation of massive system deployments. The graduates of the latter are prepared for designing and implementing software systems which assist in managing, planning and decision making. Their skills and knowledge enable to manage the layers of technology involved in the new generation of intelligent systems empowering every aspect of business operations. First Ms.Sc. degree was awarded in the year 2008.

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) was 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 was to provide the foundation that allows Europe to remain at the forefront of robotics both in terms of research and industrial products.

[PR2] Seventh Framework Programme (NMP-2007-3.2-1): **Self Reconfigurable Intelligent Swarm Fixtures (SwarmItFIX) FP7-214678**, granting period: 16.09.2008 – 15.09.2011. Partners: DIMEC University of Genova (Italy, coordinator), Exechon (Sweden), PIAGGO Aero Industries Spa. (Italy), ZTS-VVU Vyskumno-vyvojovy Ustav Kosice a.s. (Slovakia), Centro Ricerche FIAT S.C.P.A. (Italy).

A step beyond flexible/reconfigurable fixtures for higher continuous adaptation of production resources respect to production objectives and technical conditions in the knowledge-based factory is achievable today by synergic convergence of the NMP themes of flexible fixtures, parallel robots and new/smart materials with the ICT themes of robot swarms with networked embedded control. Today's smartest adaptable fixtures have limited adjustment capability, are mostly operated manually, are usually setup off-line with help of external measuring equipment, e.g. laser. Significant increase in effectiveness and decrease in cost may come from on-line fully actuated configuration/reconfiguration, large adaptability to different shapes and the capability to dynamically concentrate the support in the region where manufacturing is actually performed, doing that on-line and without moving/removing the part from the fixture. We are developing the new concept of self adaptable swarm fixtures composed of mobile agents that can freely move on a bench and reposition below the supported part behaving as a swarm, all without moving/removing the part from the fixture. Each fixture agent is composed of a mobile platform, a parallel robot fixed to the mobile platform, an adaptable head with phase-change fluid and an adhesion arrangement, to sustain/clamp the supported part perfectly adapting to the part local geometry. A hybrid control system is adopted and each robot is treated as an autonomous agent exhibiting its own behaviours. Behaviour based translocation of the robots to destination positions is adopted to reduce planner complexity, with no need to plan exact trajectories and no significant increase in complexity when extra units are removed/added. The area of manufacturing of thin metal sheets is considered (aircrafts and automotive bodies). The project objective is to develop a swarm fixture for a large range of sheet shapes to fully replace the specialized fixtures today used.

[PR3] Program of Development of WUT supported by EU (European Social Fund), National Cohesion Strategy, Operational Programme Human Capital. No. 50031281302. Task no.28: **Development of the 2nd level studies in Automation and Robotics**. Head of the task: Piotr Tatjewski, secretary: Maciej Ławryńczuk, granting period 2008-2012.

The aim of the task is to co-ordinate programs of 2nd level (postgraduate) studies in Automation and Robotics at four faculties of WUT (Electronics and Information Technology, Electrical Engineering, Mechatronics, Power and Aeronautical Engineering). In particular, development of the common part of the program and co-ordination of specialized programs for different faculties exploiting their expertise. An important part of the

task is to support development or modernization of 25 courses at participating faculties, including purchasing of certain computer equipment.

[PR4] Program of Development of WUT supported by EU (European Social Fund), National Cohesion Strategy, Operational Programme Human Capital. No. 5003121203. Task 21, Subtask: **Adaptation of the curriculum of Postgraduate Training 'Engineering of Management Information Systems' to current labour market needs and knowledge-based economy**. Granting period: 2008 – 2012. Subtask leader: Tomasz Traczyk. Contractors: Włodzimierz Ogryczak, Janusz Granat, Mariusz Kaleta, Marcin Szlenk, Tomasz Traczyk.

[PR5] Program of Development of WUT supported by EU (European Social Fund), National Cohesion Strategy, Operational Programme Human Capital. No. 50031214203. Task 21, Subtask: **Adjustment of the postgraduate professional training in 'IT Resource Management: Architectures, Processes, Standards, Quality' to the evolving needs of the contemporary labor market and knowledge-based economy**. Granting period: 2008 – 2012. Subtask leader: Krzysztof Sacha.

The main goal of this project is to elaborate an improved curriculum of the training and to prepare teaching materials for the courses listed in the curriculum.

[PR6] 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.

[PR7] MNiI Grant No. N51400332/0361 **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.

[PR8] MNiI Grant No. 1278/B/T02/2007/33 **A method of position-force control for utilisation in service robots**, granting period: 31.10.2007 – 30.10.2009. 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.

[PR9] MNiI Grant No. 1283/B/T02/2007/33 **Analysis of methods of hand-eye sensomotoric coordination in service robots**, granting period: 31.10.2007 – 30.10.2009. 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.

[PR10] 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.

[PR11] MNiSW grant No. PBZ-MNiSw-02/II/2007: **Models of trade in the telecommunication bandwidth market**, granting period: 02.01.2008 – 31.12.2010. Investigators: Przemysław Kasprzak, Mariusz Kaleta, Kamil Kołtyś, Robert Kuźmiak, Piotr Pałka, Eugeniusz Toczyłowski, Tomasz Traczyk, Izabela Żółtowska.

The aim of the project is to design innovative mechanisms for bandwidth trade in the market of telecommunications transport network. The mechanisms should be designed in the form of auctions and exchanges, that enhance the efficiency of resource allocation and support the development of bandwidth market toward competition. The expected results of the project will be: the analysis of the state of global research and application of bandwidth trading models; the innovative proposals for models and mechanisms for bandwidth trading; the platform for comparative analysis of specific options of research; project of the physical, operational and information architecture of the system supporting the processes of bandwidth trade.

[PR12] MNiSW grant No. PBZ-MEiN-1/2/2006: **Energetic safety of the country**, granting period: 01.04.2007 – 30.03.2010. Consortium of 4 technical universities. Coordinator: Gdansk University of Technology, Department of Electrical Power Engineering. Principal investigators from ICEE: Eugeniusz Toczyłowski, Przemysław Kacprzak, Mariusz Kaleta, Piotr Pałka, Mariusz Rogulski, Kamil Smolira, Tomasz Traczyk, Izabela Żółtowska.

The main goal of the project is to investigate the possibilities for improving energetic safety of the country within the range of generating, transmission and dispatching electrical energy on market conditions. A wide range of safety issues are considered, including strategic safety pertaining to investments, long-term safety pertaining to system utilization, mid-term and short-term safety related to system operating in normal and failure states. ICCE tasks can be grouped in two streams: 1) developing multi-commodity 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 multi-commodity mechanism are to be developed. Preliminary open environment for experiments and benchmark data repository of market balancing mechanism are proposed.

[PR13] MNiSW grant No. NN514 416934: **Parallel and distributed global optimization algorithms for large scale systems**, granting period: 21.04.2008 – 20.04.2010. Principal investigator: Ewa Niewiadomska-Szynkiewicz, investigators: Krzysztof Malinowski, Adam Woźniak, Andrzej Karbowski, Mariusz Kamola, Bartłomiej Kubica, Michał Marks, Jacek Błaszczyk.

The research is concerned with high performance computing (HPC). The general objective of the project is to develop, implement and test novel optimization methods. The designed and implemented solvers will be applied to solve real-life problems such as control of complex physical systems. Due to the complexity of the considered problems the attention is focused on parallel and distributed computation and issues associated with reduction of computer memory usage. A new data format for storing triangular and symmetric matrices is investigated. Particularly the research is addressed to: fast and minimal storage linear and nonlinear continuous optimization solvers, hierarchical methods applying various approaches to problem decomposition, deterministic and stochastic global optimization and algorithms applying interval arithmetic tools. The project addresses theoretical investigations, computer implementation of developed numerical algorithms and simulation experiments. The expected results of the project are novel optimization algorithms and their computer implementation accompanied with theoretical and experimental investigations. Two libraries of solvers involving parallel and distributed optimization algorithms applying recursive packed formats for storing matrices are planned. The first is the library of fast and effective linear and nonlinear solvers. The second library, called EPOCS (Environment for Parallel Optimization of Complex Systems) will be dedicated to complex convex and nonconvex optimization problems. The integrated software

platform EPOCS will provide tools for calculating local and global solutions on parallel and multi-core computers or computer clusters. It will contain algorithms for local and global optimization, and solvers based on interval analysis. The graphical interface will be provided to optimization problem definition and results presentation. The effectiveness of optimization algorithms will be tested through numerical experiments. Both planned libraries will be the useful tools for research and education. The results of the project will be described in the research papers, a book devoted to parallel computing, and presented on conferences.

[PR14] MNiSW grant No. 4147/B/T02/2008/34: **Scalar Mechanisms for Efficient Resource Allocation**, granting period: 08.05.2008 – 26.10.2009. Principal investigator: Krzysztof Malinowski, investigator: Michał Karpowicz.

The project is concerned with the formal analysis of the properties of the solutions to the games induced by the distributed resource allocation algorithms. Its goal relates to the problem of implementation of the choice rules, defined on the families of relational structures, in the form of mappings called mechanisms. A choice rule is said to be implemented by a mechanism under a given game solution oncept if the mechanism defines a game with the solutions, compatible with the selected concept, generating outcomes defined by choice rule. The research conducted within the project, mostly with use of the apparatus of set-theory and convex analysis, is aimed at investigating the necessary and sufficient conditions for implementation of the Pareto-optimal choice rules in Nash equilibria. In particular, the implementation problem is studied in the context of network resource allocation in the setting of price-anticipating agents. Necessary and sufficient conditions are formulated here for the auction algorithms based upon flow maximization games with efficient pure-strategy Nash equilibria. The conditions are then applied to design distributed network resource allocation algorithms.

[PR15] MNiSW Grant No. N N516 186035: **Decision support in problems with numerous and structured criteria**, granting period: 30.10.2008 – 30.12.2009. Principal investigator: Włodzimierz Ogryczak, investigator: Bartosz Kozłowski.

This project elaborates on how to deal with multicriteria decision problems characterized by numerous and structured criteria. Appropriate identification of the preferences of the DM is a critical aspect of the optimization problem. Based on objective satisfaction levels, the approximation of preferences on the whole set of decision alternatives is possible to be constructed. Developed approach enables usage of typical Reference Point Method achievement functions based on aspiration and reservation levels as well as a novel concept of the solidarity point. The method can be used on every level of hierarchical structure criteria.

[PR16] MNiSW Grant No. N N514 415534: **Optimization models for supporting effective electricity trade using multicommodity turnover mechanisms**, granting period 25.05.2008 – 25.05.2009. Principal investigator: Eugeniusz Toczyłowski, investigator: Przemysław Kacprzak.

The main goal of this project is development and evaluation of optimization models for supporting effective electricity markets. Multicomodity turnover mechanisms allows for joint balancing of many interdependent commodities considering infrastructure, individual and other (e.g. environmental) constraints. Proposed models will allow to achieve greter efficiency of market systems. Electricity markets were chosen because of their unique requirements and constraints. Proposed models could be used for other infrastructure markets (gas, telecommunication) after adaptation. The result of this project will include models for crossborder auctions, joint balancing of energy and options and creation of customized offers.

[PR17] MNiSW Grant No. 4144/B/T02/2008/34: **Incentive compatibility analysis in distributed market systems using multicommodity turnover mechanisms**, granting period 6.06.2008 – 20.05.2009. Principal investigator: Eugeniusz Toczyłowski, investigator: Piotr Pałka.

Many of market analyses are accomplished with assumption of perfect competition and absence of market power. This is a strong assumption, as there exist a number of the oligopolistic markets often strongly tied-up with a natural monopolistic economy (e.g. electricity energy markets, bandwidth allocation on telecommunication markets, railway slot allocation etc.). On such markets the market power does exist, and, which is more important, can be easily exploited by some market participants. Therefore, incentive compatibility analysis, and elaboration of incentive compatible mechanisms is an important regulation issue.

[PR18] MNiSW Grant No. N516 4307 33 **Universal Trust: new trust management algorithms and protocols**, granting period: 31.10.2007 – 30.10.2010. Coordinator: Polish Japanease Institute of Information Technology. Principal investigator: Włodzimierz Ogryczak, investigator: Michał Majdan.

The research aims to enhance the functionality of distributed information systems by providing a standard service for managing trust. uTrust (universal Trust) project is a first step on this path. The goal of uTrust is to develop a universal and formalized approach for trust management in a wide range of distributed information systems. Basing on this approach, the practical goal of the project is to provide a universal library of trust management functions.

[PR19] MNiSW grant No. 6ZR9 2007C/06956 **Development, realization and implementation of a trading decision support system on energy markets '8@decision'**, granting period: 1.10.2008 – 22.04.2009. Coordinators: ICCE, Octagonet SA. Principal investigators: Jarosław Arabas, Paweł Domański.

The role of the system is to support trading decision making taking into consideration the uncertainty of the business environment and of the technical factors. The system is design to perform the following operations:

- *long-term planning*: financial result planning for the market corporate operations over the year and longer horizon,
- *mid-term planning*: risk analysis and the optimization of the company participation in different market segment (monthly and quarterly horizon perspective),
- *short-term planning*: operational support considering of the trading decision risks (daily or even hourly perspective).

[PR20] Rector's Grant 503S0001007 **Heterogeneous network of cooperating mobile robots**, granting period: 31.10.2007 – 31.12.2008. 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.

[PR21] Rector's grant No. 503W0049008: **Mobile robot controlled via Internet**, granting period: 18.04.2008 – 31.12.2008. Principal investigator: Wojciech Szynkiewicz, investigators: Konrad Banachowicz, Antoni Kędracki, Krystian Marek, Piotr Miedzik, Piotr Trojanek.

The goal of the project was to develop a mobile robot (telerobot) that can be controlled remotely over the Internet. The robot hardware consists of a six-wheeled mobile platform equipped with PC-104+ based controller and two main sensors: a laser scanner and video camera. A video image from the on-board camera can be transmitted in real-time to the remote computer. The software is based on a client-server architecture. The remote user application is written in Java and uses Java Web Start technology and Java Network Launching Protocol.

[PR22] Dean's Grant No. 503G0050008: **Conception of ontologies' application for description of offers in multi-commodity market, in co-operation with Institute of Computer Science (ICS), WUT**, granting period: 01.06.2008 – 31.12.2008. Principal investigator: Tomasz Traczyk, investigators: P. Kacprzak, M. Kaleta, K. Kołtyś, J. Lewandowski (ICS), P. Łoziński (ICS), P. Modliński, K. Smolira, P. Palka, H. Rybiński (ICS), D. Ryżko (ICS), E. Toczyłowski, T. Traczyk, P. Więch (ICS), I. Żółtowska.

The research has proved an applicability of ontologies for description of offers and other elements of complex markets, especially in distributed environments. Methods for introducing ontologies into Multi-commodity Market Model M3 have been proposed, fields for future research have been determined, and exemplary fields of application, along with prototype ontology, have been shown.

[PR23] Dean's grant No. 51560019000: **Distributed discrete simulation with focus on computer networks**, granting period: 12.05.2008 – 31.12.2008. Principal investigator: Ewa Niewiadomska-Szynkiewicz, investigator: Andrzej Sikora.

The grant is devoted to distributed discrete event simulation. The principal objective is to present basic ideas related to parallel and distributed discrete event simulators design and implementation. The second is concerned with the design of software environments which provide framework for simulation experiments performed on parallel computers and computer network. The investigations in the field of parallel and distributed simulation led to the general purpose software tool ASim/Java (Asynchronous Simulation / Java) for asynchronous simulation, consisting of library of basic elements of discrete event simulator, library of synchronization protocols and graphical environment supporting the design of a given simulator and simulation results presentations. Three real life applications - simulators of three computer networks: ATM, Frame Relay and mobile ad hoc networks were implemented based on Asim/Java and tested.

[PR24] Dean's grant 503/G/1036/4930: **Models and optimization algorithms for survivable design of telecommunication networks**, granting period: 28.04.2008 – 31.12.2008. Coordinator: Institute of Telecommunications. Investigators from ICCE: Włodzimierz Ogryczak, 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.

[PR25] Dean's grant 503/G/1032/4500/008: **Experimental investigation of dependability of advanced control algorithms**. Principal Investigator: Piotr Gawkowski (Institute

of Computer Science), investigators: Maciej Ławryńczuk, Piotr Marusak, Piotr Tatjewski, Janusz Sosnowski (Institute of Computer Science).

The objective of research was to study dependability of numerical model predictive control (MPC) algorithms in presence of software implemented faults. The GPC (Generalized Predictive Control) version of the MPC algorithm was investigated. Improved software implementations of algorithms were formulated. Fault sensitivity of the proposed implementations of the GPC algorithm was verified in example control systems of chemical plants and compared to the operation of the algorithm in analytical version. The obtained results demonstrate efficiency of the proposed software improvements.

[PR26] Dean's grant 503G10344086: **Research of chosen predictive control algorithms of insulin administration for diabetic patients**. Principal Investigator: Dariusz Radomski (Institute of Radioelectronics), investigators: Maciej Ławryńczuk, Piotr Marusak, Piotr Tatjewski, Krzysztof Zaremba (Institute of Radioelectronics).

The aim of the project was to design the reliable and computationally effective model predictive control (MPC) algorithms for glucose concentration stabilization in diabetic patients. The first part of research consisted in design of simplified fuzzy and neural models of the diabetic patient. Then these models were used to develop effective MPC algorithms. The efficiency and reliability of the proposed algorithms is the result of their formulation as the quadratic optimization problem solved on-line at each algorithm iteration. The simulation tests proved the excellent performance of the proposed algorithms.

[PR27] Statutory Grant 504G036300: **Development of methodology of control, decision support and production management**, granting period 1.09.2007 – 31.12.2008 and 1.09.2008 – 15.04.2009. Principal investigators: Ewa Niewiadomska-Szynkiewicz, Andrzej Pacut, Włodzimierz Ogryczak, Krzysztof Sacha, Piotr Tatjewski, Eugeniusz Toczyłowski, Cezary Zieliński.

5 Degrees Awarded

5.1 Ph.D. Degrees

Advisor: **Krzysztof Malinowski**

Adam Kozakiewicz
Effective Bandwidth Theory for Pricing and QoS Control of Computer Networks
Degree awarded on February 12, 2008

Jacek Błaszczyk
Obiektowa biblioteka algorytmów optymalizacji dynamicznej; badanie efektywności metod sekwencyjnego programowania kwadratowego i punktu wewnętrznego dla zadań nieliniowych
Degree awarded on April 8, 2008

Andrzej Bartosiewicz
Wykorzystanie platformy ENUM w celu optymalizacji funkcjonowania sieci teleinformatycznych
Degree awarded on February 19, 2008

5.2 M.Sc. Degrees

Advisor: **Maciej Ławryńczuk**

M. Hulbuj
Metody sterowania produkcyjnego z optymalizacją ofline
Degree awarded on November 2007

Ł. Szejba
Modelowanie, symulacja i regulacja pracy oraz dedykowana baza danych dla silnika lotniczego SO-3
Degree awarded on January 2008

P. Simiński
Pakiet oprogramowania do identyfikacji i optymalizacji sieci neuronowych
Degree awarded on September 2008

K. Marszał
Środowisko programowe do projektowania i symulacji nieliniowych algorytmów regulacji predykcyjnej z modelami neuronowymi
Degree awarded on October 2008

J. Bielecki
System informatyczny do zarządzania szpitalem
Degree awarded on October 2008

Advisor: **Jerzy Sobczyk**

A. Łobodzki
Automatyczne wykrywanie anomalii w ruchu sieciowym sieci akademickiej
Degree awarded on December 2007

Advisor: **Andrzej Pacut**

J. Greczka
Indeksowanie obrazu twarzy przy użyciu elementów portretów pamięciowych
Degree awarded on February 2008

F. Sulkowski
Weryfikacja tożsamości na podstawie charakteru pisma przy wykorzystaniu ukrytych modeli Markowa
Degree awarded on October 2008

Advisor: **Andrzej Rydzewski**

P. Franusiak
Sprzętowy sterownik dalmierza 3D
Degree awarded on March 2008

Advisor: **Włodzimierz Ogryczak**

A. Urbanowicz
Wielokryterialne podejście do sprawiedliwego rozdziału zasobów w sieci
Degree awarded on April 2008

Ł. Baran
Wykorzystanie teorii dualności programowania liniowego w konstrukcji efektywnych modeli wyboru portfela inwestycji
Degree awarded on July 2008

K. Ostrowski
Interaktywna metoda rozkładu referencyjnego dla zagadnień rozdziału inwestycji
Degree awarded on March 2008

P. Piwowarski
Optymalizacja portfela inwestycji i model udziałowy a model kwotowy
Degree awarded on April 2008

B. Wójcikiewicz
Metody wyznaczania rozwiązań odpornych w zagadnieniach lokalizacyjnych
Degree awarded on March 2008

Ł. Skierkowski
Wykorzystywanie modeli optymalizacji portfelowej przy wyborze projektów do realizacji
Degree awarded on April 2008

Ł. Baran
Wykorzystanie teorii dualności programowania liniowego w konstrukcji efektywnych modeli wyboru portfela inwestycji
Degree awarded on July 2008

M. Mikołajczuk
Algorytmy i modele rozmyte zarządzania zaufaniem w systemach rozproszonych
Degree awarded on July 2008

S. Więckowski
Odkrywanie reguł asocjacyjnych w hurtowniach danych- analiza koszyka zakupów
Degree awarded on October 2008

P. Karwowski
Dwukryterialne podejścia do sprawiedliwego przydziału zasobów w sieciach telekomunikacyjnych
Degree awarded on October 2008

K. Jelonkiewicz
System oceny ryzyka inwestycyjnego
Degree awarded on October 2008

Ł. Pytka
Zastosowanie algorytmów genetycznych do optymalizacji portfela inwestycyjnego z ograniczeniami ilościowymi
Degree awarded on October 2008

D. Kawka
Porządkowa średnia ważona miarą odporności dla zadań optymalizacji na grafach
Degree awarded on October 2008

Advisor: **Tomasz Traczyk**

P. Kaczor
Zastosowanie algorytmów pełnotekstowych w dopasowywaniu i uspójnianiu danych klientów
Degree awarded on April 2008 (with honors)

A. Grudzień
Zastosowanie techniki generatywnej XVCL do zarządzania ewolucją warstwy ORM w systemach opartych na JEE
Degree awarded on June 2008 (with honors)

A. Wardzińska
Diagramy UML w SVG
Degree awarded on September 2008 (with honors)

B. Orlewicz
Alternatives to Java lightweight Web frameworks
Degree awarded on September 2008 (with honors)

Advisor: **Cezary Szwed**

D. Kawa
Modele i metody wspomagające krótkookresowe prognozowanie zapotrzebowania na energię elektryczną
Degree awarded on April 2008

Advisor: **Waldemar Grabski**

K. Dziedziniewicz
Weryfikacja modelu systemu i generacja kodu na podstawie diagramów stanów UML 2.0
Degree awarded on March 2008 (with honors)

Advisor: **Janusz Granat**

K. Gurova
Wykrywanie i śledzenie zdarzeń w tekstach pochodzących z WWW
Degree awarded on March 2008

M. Wojnicki
Algorytmy wyszukiwania grafów częstych oraz ich zastosowanie do analizy routingu w sieciach komputerowych
Degree awarded on July 2008 (with honors)

P. Olender
Stochastyczne modele techno-ekonomiczne w analizie rozwoju szerokopasmowych światłowodowych sieci dostępowych
Degree awarded on October 2008 (with honors)

R. Bzoma
Modele do wspomagania analizy rynków telekomunikacyjnych
Degree awarded on October 2008 (with honors)

P. Rybiński
Analityczne metody prognozowania wykorzystujące komputerową reprezentację wiedzy eksperta
Degree awarded on October 2008

Advisor: **Ryszard Kossowski**

P. Rytka
Organizacja środowiska pracy dla Administratora Bezpieczeństwa Informacji w nawiązaniu do ochrony danych osobowych
Degree awarded on March 2008

Advisor: **Jacek Wytrębowicz**

M. Latosiewicz
Środowisko analizy behawioralnej programów typu malware
Degree awarded on March 2008

Advisor: **Piotr Marusak**

A. Polakowska
Rozmyta regulacja predykcyjna w warstwowych strukturach sterowania
Degree awarded on March 2008

Advisor: **Wojciech Szynkiewicz**

P. Maciąg
Algorytmy jednoczesnej lokalizacji i budowania map z wykorzystaniem rozszerzonego filtru Kalmana
Degree awarded on April 2008

Advisor: **Adam Kozakiewicz**

R. Tyszewski
Lokalizacje węzłów w sieciach sensorów za pomocą równoległych metod symulowanego wyżarzania w środowisku Unicore
Degree awarded on April 2008 (with honors)

Advisor: **Krzysztof Pieńkosz**

A. Biskup
Lokalne metody pamięciowe w zastosowaniu do problemów klasyfikacji
Degree awarded on June 2008

Advisor: **Eugeniusz Toczyłowski**

P. Modliński
Standard M3 a aukcje kombinatoryczne
Degree awarded on August 2008

P. Choruży
Wybrane metody i narzędzia zarządzania ryzykiem na rynku energii elektrycznej
Degree awarded on September 2008

Advisor: **Andrzej Zalewski**

M. Ludzia
Notacja graficzna dla dokumentowania decyzji architektonicznych
Degree awarded on June 2008

S.Pawlik
Prognozowanie wydajności aplikacji JEE
Degree awarded on November 2008

Advisor: **Cezary Zieliński**

F. Ubiria-Botta
FPGA implementation of camera colour model conversion
Degree awarded on June 2008 (with honors)

K. Rocki
Przetwarzanie obrazów w czasie rzeczywistym za pomocą GPU
Degree awarded on June 2008

Advisor: **Zygmunt Komor**

B. Goszczyński
Weryfikacja algorytmów samostrojenia w regulatorze LB-600 i projekt ich modyfikacji
Degree awarded on September 2008

Advisor: **Wiesław Traczyk**

M. Gwiazda
Zastosowanie antologii w systemach eksperckich na przykładzie prawa spadkowego
Degree awarded on October 2008

Advisor: **Ilona Bluemke**

A. Chabrowska
Odkrywanie wiedzy w danych z interakcji użytkownika z aplikacją internetową
Degree awarded on October 2008

Advisor: **Izabela Żółtowska**

E. Sałuda
Planowanie średnioterminowe kontraktów w warunkach ryzyka
Degree awarded on September 2008

Advisor: **Mariusz Kaleta**

J. Szajba
Wybrane zagadnienia wspomagania decyzji przedsiębiorstwa obrotu energią elektryczną
Degree awarded on September 2008

Advisor: **Grzegorz Płoszajski**

M. Wtykło
Porównanie wybranych algorytmów kategoryzacji tekstów na przykładzie ofert sklepów internetowych
Degree awarded on October 2008

R. Wieteska
Ujednolicanie danych w wybranych zagadnieniach praktycznych
Degree awarded on September 2008

Advisor: **Krzysztof Sacha**

M. Wyrzyk
Automatyczna generacja kodu sterownika PLC
Degree awarded on October 2008 (with honors)

Advisor: **Włodzimierz Kasprzak**

A. Nienałtowski
Wyszukiwarka internetowa wspomagana modelem sekwencji słów.
Degree awarded on December 2008

5.3 B.Sc. Degrees

Advisor: **Piotr Tatjewski**

M. Czubak
User interface and comparative study of simulation algorithms for dynamic systems
Degree awarded on January 2008

Advisor: **Wojciech Szynkiewicz**

K. Baranowski
Komunikacja bezprzewodowa z grupą robotów mobilnych z wykorzystaniem technologii Bluetooth
Degree awarded on February 2008

K. Przedniczek
Budowa i upraszczanie trójwymiarowych map otoczenia z wykorzystaniem skanera laserowego 3D
Degree awarded on February 2008

P. Piłaciński
Manipulacja obiektami przez roboty
Degree awarded on February 2008

R. Roguski
Microcomputer system for distance measurement using ultrasaunds
Degree awarded on October 2008

Advisor: **Piotr Gawkowski**

M. Iwaszkiewicz
System obsługi realizacji projektów
Degree awarded on February 2008

Advisor: **Janusz Granat**

J. Wojciechowski
Narzędzia do wspierania analizy modeli decyzyjnych
Degree awarded on February 2008

Advisor: **Ewa Niewiadomska-Szynkiewicz**

M. Bielski
Comparison of two Architektures of Mobile AD Hoc Networks
Degree awarded on February 2008

S. Karczmarczyk
Modelowanie i symulacja rozprzestrzeniania się robaków komputerowych. Robaki komputerowe typu Flash
Degree awarded on February 2008

A. Zawadzka
Równoległe wersje metod optymalizacji globalnej
Degree awarded on February 2008

E. Kutrzepa
Modelowanie i symulacja rozprzestrzeniania się robaka sieciowego. Model epidemiologoczny
Degree awarded on February 2008

I. Windyga
Algorytmy oszczędzania energii w sterowaniu topologią sieci ad hoc
Degree awarded on February 2008

A. Putz
Formaty pakowania macierzy w zadaniach programowania liniowego
Degree awarded on June 2008

M. Wardziński
Algorytmy wykorzystujące sąsiadów do wyznaczania energooszczędnych topologii sensorów
Degree awarded on September 2008

Advisor: **Mariusz Kaleta**

A. Ihnatowicz
Computer Aid Tools for Multicommodity Market Model M3
Degree awarded on February 2008

Advisor: **Piotr Salata**

T. Słomski
Music Mining:a music player utilizing cluster analysis
Degree awarded on February 2008

Advisor: **Michał Rudowski**

P. Talipski
Narzędzia i metody tworzenia kopii zapasowych i odtwarzania baz danych Oracle 10g
Degree awarded on February 2008

P. Adamczak
System rozproszony z wykorzystaniem RDBMS
Degree awarded on February 2008

Advisor: **Paweł Cichosz**

K. Przybylski
Algorytmy filtracji kooperatywnej
Degree awarded on February 2008

Advisor: **Piotr Arabas**

K. Studziński
Realistic Traffic Generator for IP Networks
Degree awarded on February 2008

Advisor: **Włodzimierz Kasprzak**

T. Szczepański
Wyszukiwanie informacji w dokumentach tekstowych i zasobach bazy danych wspomagane elementami sztucznej inteligencji
Degree awarded on February 2008

P. Zawistowski
Projekt i implementacje 3-warstwowej aplikacji WWW udostępniającej dane multimedialne
Degree awarded on February 2008

M. Najs
Analiza obrazów dla potrzeb autonomicznej nawigacji pojazdów
Degree awarded on February 2008

P. Frelek
Symulacja autonomicznego agenta w systemie wielorobotowym
Degree awarded on September 2008

Advisor: **Cezary Szwed**

K. Mysior
System informatyczny wspomagający wyszukiwanie połączeń w sieci komunikacyjnej
Degree awarded on February 2008

M. Wojtyniak
Wybrane modele i metody planowania rozkładów jazdy
Degree awarded on February 2008

K. Dylewski
System wspomagania decyzji na rynkach finansowych
Degree awarded on February 2008

Advisor: **Andrzej Zalewski**

K. Góral
Od modelu procesu do jego implementacji w języku BPEL- możliwości i ograniczenia, studium przypadku
Degree awarded on February 2008

A. Domagalik
Wykorzystanie sematycznego opisu usług w architekturze usługowo- zorientowanej
Degree awarded on February 2008

P. Michalak
Projektowanie, implementacja i publikowanie usług sieciowych na przykładzie wybranych metod numerycznych i zagadnień optymalizacyjnych
Degree awarded on February 2008

A. Wymysłowska
Porównanie technologii tworzenia WebServices (JAX-WS i JAX-RPC)
Degree awarded on February 2008

P. Siłaczuk
Automatyzacja testowania zapytań do baz danych
Degree awarded on October 2008

Advisor: **Andrzej Stachurski**

K. Sokołowska
Kodowanie Peano w przetwarzaniu obrazów
Degree awarded on February 2008

M. Mądry
Inteligencja roju w poszukiwaniu optimum w połączeniu z metodami poszukiwań lokalnych
Degree awarded on September 2008

J. Dawidowicz
Particle Swarm Opimization
Degree awarded on September 2008

K. Dziąg
Constraint Logic Programming w zagadnieniach transportowych
Degree awarded on September 2008

Ł. Lech
Komputerowe wspomaganie procesu rozmieszczania nadajników sieci komórkowej przy wykorzystywaniu metod programowania matematycznego
Degree awarded on September 2008

Advisor: **Bartłomiej Kubica**

R. Dąbrowski
Analiza porównawcza bibliotek przedziałowych
Degree awarded on February 2008

Advisor: **Tomasz Winiarski**

P. Szufladowicz
Wizualizacja pracy robotów w systemie MRROC++
Degree awarded on February 2008

J. Kuryło
Graficzna konsola sterownicza systemu MRROC++ stworzona w oparciu o platformę Java
Degree awarded on October 2008

M. Kisiel
Język opisu i realizacja zadań przez automat skończony w systemie MRROC++
Degree awarded on December 2008

Advisor: **Adam Woźniak**

P. Wójcik
Dylematy społeczne: Jak uniknąć pasażera na gapę?
Degree awarded on February 2008

Advisor: **Michał Nowacki**

K. Jastrzębski
Remote laboratory
Degree awarded on February 2008

Ł. Szczap
Remote laboratory
Degree awarded on February 2008

Advisor: **Włodzimierz Ogryczak**

P. Vyontsek
Optymalizacja decyzji w zarządzaniu instrumentami dłużnymi Skarbu Państwa
Degree awarded on February 2008

K. Dudziński
Implementacja metody punktu odniesienia z agregacją WOWA
Degree awarded on September 2008

Advisor: **Henryk Rybiński**

M. Kwietniewski
Baza danych multimedialnych osadzonych w przestrzeni
Degree awarded on June 2008 (with honors)

Advisor: **Marcin Szlenk**

E. Kepucka
Narzędzia analizy złożności modeli obiektowych
Degree awarded on June 2008

P. Kozak
Rozwój biblioteki Win32::GuiTest
Degree awarded on October 2008

Advisor: **Grzegorz Płoszajski**

K. Chodnicki
Wspomaganie przetwarzania i przechowywania metadanych technicznych w procesie dygitalizacji dóbr archiwalnych, muzealnych, bibliotecznych
Degree awarded on September 2008

J. Kmiecicki
Klasyfikacje zestawu czcionek na podstawie obrazu rastrowego
Degree awarded on September 2008

M. Talak
Metody komputerowej analizy językowej w aspekcie wykrywania fragmentów obcych w pracach studentów
Degree awarded on September 2008

Advisor: **Paweł Wawrzyński**

J. Miszkurka
Zastosowanie uczenia maszynowego w warcabach
Degree awarded on October 2008

Advisor: **Grzegorz Wójcik**

W. Wydrzyński
Wykrywanie włamań do sieci za pomocą wolnego oprogramowania
Degree awarded on October 2008

M. Kucharczyk
Automatyczna dystrybucja zadań w systemach wirtualizacyjnych Xen
Degree awarded on October 2008

Advisor: **Cezary Zieliński**

M. Rogalski
Implementacja klasycznych regulatorów PD,PID,PII2 dla członu ramienia robota
Degree awarded on October 2008

Advisor: **Tomasz Kruk**

A. Biłas
Laboratorium SSL/TLS na przykładzie pakietu Open SSL
Degree awarded on December 2008

6 Publications

6.1 Monographs

[B1] Recent Advances in Control and Automation. (K.Malinowski, L.Rutkowski, Eds.) (pub.: Akademicka Oficyna Wydawnicza EXIT). Warszawa, 2008. ISBN 978-83-60434-42-0.

[B2] Sterowanie i automatyzacja: aktualne problemy i ich rozwiązania. (K.Malinowski, L.Rutkowski, Eds.) (pub.: Akademicka Oficyna Wydawnicza EXIT). Problemy współczesnej nauki. Sterowanie i automatyzacja. Warszawa, 2008. ISBN 978-83-60434-42-0.

[B3] Standardy w procesie digitalizacji obiektów dziedzictwa kulturowego. (G.Płoszajski, Ed.) (pub.: Oficyna Wydawnicza PW). Warszawa, 2008. ISBN 978-83-7207-797-4.

[B4] Problemy robotyki. (K.Tchoń, C.Zieliński, Eds.) (publ.: Oficyna Wydawnicza PW). Prace Naukowe Elektronika. Warszawa, 2008. Vol. 166.

6.2 Chapters in Scientific or Technical Books

[C1] K.Bareja: Modele wyboru portfela aktywów przy inwestycjach długookresowych (in: Modelowanie preferencji a ryzyko'07; pub.: Wydawnictwo Uczelniane AE Katowice). 2008. pp. 19–28.

[C2] M.Dzida, M.Zagożdżon, M.Pióro, W.Ogryczak, T.Śliwiński: Technika generacji kolumn w zadaniach wymiarowania sieci odpornych (in: Sterowanie i automatyzacja: aktualne problemy i ich rozwiązania; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 285–294.

[C3] E.Figielska, W.Kasprzak: An evolutionary programming based algorithm for HMM training (in: Computational Intelligence: Methods and Applications; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 166–175.

[C4] P.Gawkowski, M.Ławryńczuk, P.Marusak, J.Sosnowski, P.Tatjewski: Improving dependability of an explicit DMC algorithm software implementation. (in: Recent Advances in Control and Automation.; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 332–432.

[C5] P.Gawkowski, M.Ławryńczuk, P.Marusak, P.Tatjewski, J.Sosnowski: Software implementation of explicit DMC algorithm with improved dependability (in: Novel Algorithms and Techniques in Telecommunications, Automation and Industrial Electronics.; pub.: Springer). 2008. pp. 214–219.

[C6] P.Kacprzak, M.Kaleta, P.Pałka, K.Smolira, E.Toczyłowski, T.Traczyk: Procesor decyzyjno–obliczeniowy dla rynkowego modelu danych M3 (in: Bazy Danych Rozwój Metod i Technologii. Architektura, metody formalne i zaawansowana analiza danych; pub.: Wydawnictwa Komunikacji i Łączności). 2008. pp. 215–226.

[C7] M.Kaleta, T.Śliwiński: Analiza symulacyjna procesów biznesowych w złożonych systemach logistycznych (in: Zarządzanie – zasoby, ich dobór i sposoby wykorzystania; pub.: Wydawnictwo Politechniki Poznańskiej). 2008. pp. 75–86.

[C8] M.Kaleta, E.Toczyłowski: Computing the Path Generated Cost Allocations for the Generalized LP Games (in: Badania operacyjne i systemowe: decyzje, gospodarka, kapitał ludzki i jakość; pub.: Polska Akademia Nauk, Instytut Badań Systemowych, Warszawa). 2008. pp. 141–152.

[C9] M.Kaleta, K.Smolira, E.Toczyłowski: Optymalizacja struktury procesów rynkowych dla rynków czasu rzeczywistego (in: Sterowanie i automatyzacja: aktualne problemy i ich rozwiązania; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 303–311.

[C10] T.Kornuta, C.Zieliński: Wykorzystywanie przez robota aktywnej wizji do identyfikacji obiektów (in: Problemy robotyki; pub.: Oficyna Wydawnicza PW). 2008. Vol. II. pp. 661–670.

[C11] B.Kubica: Can interval computations be applied over spaces of non–numbers? (in: Evolutionary Computation and Global Optimization 2008; pub.: Oficyna Wydawnicza PW). 2008. pp. 103–112.

[C12] B.Kubica, A.Woźniak: Interval Componentwise Newton Operator in Computing the Pareto–front of Constrained Multicriterial Problems (in: Recent Advances in Control and Automation.; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 293–301.

[C13] M.Ławryńczuk: Neural Models Training for Predictive Control (in: Recent Advances in Control and Automation.; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 232–241.

[C14] M.Ławryńczuk, P.Marusak, P.Tatjewski: Optymalizujące sterowniki predykcyjne w układach sterowania z ograniczeniami (in: Sterowanie i automatyzacja: aktualne problemy i ich rozwiązania; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 437–446.

[C15] M.Ławryńczuk: RBF Neural Models in Steady–State Target Optimisation and Predictive Control (in: Recent Advances in Control and Automation.; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 353–362.

[C16] M.Ławryńczuk: Suboptimal Nonlinear Predictive Control with Neural Multi–Models (in: Computational Intelligence: Methods and Applications; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 45–56.

[C17] M.Marks, E.Niewiadomska–Szynkiewicz: Distance–based Localization Scheme for Ad Hoc Network (in: Evolutionary Computation and Global Optimization 2008; pub.: Oficyna Wydawnicza PW). 2008. pp. 113–120.

[C18] P.Marusak: Analitycal Predictive Controllers with Efficient Handling of Output Constraints (in: Recent Advances in Control and Automation.; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 131–14.

[C19] P.Marusak: DMC Algorithm with Basis Functions (in: Recent Advances in Control and Automation.; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 141–150.

[C20] P.Marusak: On Design of Fuzzy Analytical Predictive Controllers: a Case Study (in: Computational Intelligence: Methods and Applications; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 93–102.

[C21] E.Niewiadomska–Szynkiewicz, A.Zawadzka: Integrated Software Platform for Parallel Global Optimization (in: Evolutionary Computation and Global Optimization 2008; pub.: Oficyna Wydawnicza PW). 2008. pp. 147–155.

[C22] W.Ogryczak, B.Kozłowski: Reference Point Method with Importance Weighted Ordered Achievements (in: D.Ruan: Computational Inteligence in Decision and Control; pub.: World Scientific Publishing). 2008. pp. 495–500.

[C23] W.Ogryczak: Reference Point Method with Lexicographic Min–Ordering of Individual Achievements (in: Multiple Criteria Decision Making '07; pub.: Publisher of the Karol Adamiecki University of Economics in Katowice). 2008. pp. 155–174.

[C24] K.Pieńkosz: Problem ograniczonej alokacji zasobu i właściwości jego rozwiązań (in: Sterowanie i automatyzacja: aktualne problemy i ich rozwiązania; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 323–329.

[C25] G.Płoszajski: Formułowanie zaleceń odnośnie do standardów metadanych technicznych (in: Standardy w procesie digitalizacji obiektów dziedzictwa kulturowego; pub.: Oficyna Wydawnicza PW). 2008. pp. 72–94.

[C26] G.Płoszajski: Metadane techniczne i strukturalne (in: Standardy w procesie digitalizacji obiektów dziedzictwa kulturowego; pub.: Oficyna Wydawnicza PW). 2008. pp. 113–186.

[C27] G.Płoszajski: O digitalizaji dziedzictwa kulturowego (in: Standardy w procesie digitalizacji obiektów dziedzictwa kulturowego; pub.: Oficyna Wydawnicza PW). 2008. pp. 24–70.

[C28] G.Płoszajski: Technical Metadata and Standards for Digitisation of Cultural Heritage in Poland (in: New Trends in Multimedia and Network Information Systems.; pub.: IOS Press). 2008. pp. 155–171.

[C29] G.Płoszajski: Ważniejsze wzorce, na których oparto propozycje zaleceń (in: Standardy w procesie digitalizacji obiektów dziedzictwa kulturowego; pub.: Oficyna Wydawnicza PW). 2008. pp. 187–198.

[C30] G.Płoszajski: Wymagania techniczne zagadnienia szczegółowe (in: Standardy w procesie digitalizacji obiektów dziedzictwa kulturowego; pub.: Oficyna Wydawnicza PW). 2008. pp. 95–112.

[C31] K.Sacha: An Approach to the Evaluation of Sotware Quality (in: Software Quality Measurement. Concepts and Approaches; pub.: The ICFAI University Press). 2008. pp. 45–58.

[C32] K.Sacha: Kryteria i mierniki oceny jakości oprogramowania (in: Inżynieria oprogramowania – metody wytwarzania i wybrane zastosowania; pub.: Wydawnictwo Naukowe PWN SA). 2008. pp. 249–263.

[C33] W.Szynkiewicz, K.Przedniczek: Upraszczanie map trójwymiarowych z użyciem metody rozszerzania obszaru (in: Problemy robotyki; pub.: Oficyna Wydawnicza PW). 2008. Vol. I. pp. 111–120.

[C34] T.Śliwiński, E.Toczyłowski: Preemptive Job Scheduling on Parallel Machines with Setup Times and Renewable Resources (in: Lean Business Systems and Beyond; pub.: Springer Science). 2008. pp. 29–39.

[C35] P.Trojanek, C.Zieliński: A Method of Integrating Robot Programming Frameworks (in: ROMANSY 17 Robot Design, Dynamics, and Control). 2008. pp. 485–492.

[C36] P.Trojanek: Mechanizmy komunikacji jawnej w programowych strukturach ramowych (in: Problemy robotyki; pub.: Oficyna Wydawnicza PW). 2008. pp. 369–378.

[C37] A.Wilkowski: En Efficient System for Continuous Hand Posture Recognition in Video Sequences (in: Computational Intelligence: Methods and Applications; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 411–422.

[C38] T.Winiarski, M.Staniak, C.Zieliński: Równoległe siłowo-wizyjne sterowanie robotami (in: Sterowanie i automatyzacja: aktualne problemy i ich rozwiązania; pub.: Akademicka Oficyna Wydawnicza EXIT). 2008. pp. 593–602.

[C39] T.Winiarski, C.Zieliński: Sterowanie interakcja manipulatora ze środowiskiem – część pierwsza (in: Problemy robotyki; pub.: Oficyna Wydawnicza PW). 2008. Vol. II. pp. 473–482.

[C40] T.Winiarski, C.Zieliński: Sterowanie interakcją manipulatora ze środowiskiem – część druga (in: Problemy robotyki; pub.: Oficyna Wydawnicza PW). 2008. Vol. II. pp. 483–492.

[C41] A.Zalewski, M.Ludzia: Notacja graficzna dla dokumentowania decyzji architektonicznych (in: Inżynieria oprogramowania – od teorii do praktyki.; pub.: Wydawnictwa Komunikacji i Łączności). 2008. pp. 73–82.

[C42] C.Zieliński: Roboty w służbie starszych ludzi (in: Polska w obliczu starzenia się społeczeństwa. Diagnoza i program działania; pub.: Polska Akademia Nauk). 2008. pp. 137–153.

[C43] I.Żółtowska, E.Toczyłowski: Application of Compensation-Based Pricing Scheme (in: Badania operacyjne i systemowe: decyzje, gospodarka, kapitał ludzki i jakość; pub.: Polska Akademia Nauk, Instytut Badań Systemowych, Warszawa). 2008. pp. 153–160.

6.3 Scientific and Technical Papers in Journals

[J1] K.Bareja, W.Ogryczak: Reference distribution based decision support platform (in: Journal of Telecommunications and Information Technology). 2008. Vol. 3/2008. pp. 5–14.

[J2] I.Bluemke, A.Chabrowska: Projekt systemu odkrywania wiedzy z interakcji użytkownika. (in: Zeszyty Naukowe Wydziału ETI Politechniki Gdańskiej). 2008. Vol. 16. No. 6. pp. 287–292.

[J3] J.Błaszczyk, E.Niewiadomska–Szynkiewicz, M.Marks: Application of Rectangular Full Packed and Blocked Hybrid Matrix Formats in Semidefinite Programming for Sensor Network Localization (in: Lecture Notes in Computer Science). 2008. Vol. 4967. pp. 649–658.

[J4] K.Fleszar, K.Hindi: An effective VNS for the capacitated p–median problem (in: European Journal of Operational Research). 2008. Vol. 191. pp. 612–622.

[J5] P.Gawkowski, M.Ławryńczuk, P.Marusak, J.Sosnowski, P.Tatjewski: Dependability of the software implementation of the explicit DMC algorithm. (in: IADIS International Journal on Computer Science and Information System). 2008. Vol. 3. No. 1. pp. 44–58.

[J6] J.Granat, A.Wierzbicki: Objective classification of empirical probability distributions and the issue of event detection (in: Journal of Telecommunications and Information Technology). 2008. Vol. 3/2008. pp. 24–27.

[J7] M.Kaleta, E.Toczyłowski: Restriction techniques for the unit–commitment problem with total procurement costs (in: Energy Policy). 2008. Vol. 36. pp. 2439–2448.

[J8] M.Kamola, P.Arabas: Sieć z giełdowym systemem zawierania kontraktów na usługi przesyłowe – propozycja architektury (in: Przegląd Telekomunikacyjny– wiadomości telekomunikacyjne). 2008. Vol. 8/9 2008. pp. 1142–1154.

[J9] K.Kołtyś, P.Pałka, E.Toczyłowski, I.Żółtowska: Multicommodity Auction Model for Indivisible Network Resource Allocation (in: Journal of Telecommunications and Information Technology). 2008. Vol. 4/2008. pp. 60–66.

[J10] B.Kubica, A.Woźniak: Interval Methods for Computing the Pareto–front of a Multicriterial Problem (in: Lecture Notes in Computer Science). 2008. Vol. 4967. pp. 1382–1391.

[J11] M.Kudelska: Algorytmy mrówkowe w zastosowaniu do adaptacyjnego rutingu w sieciach telekomunikacyjnych (in: Przegląd Telekomunikacyjny– wiadomości telekomunikacyjne). 2008. Vol. 8–9/2008. pp. 1173–1181.

[J12] M.Kudelski: Sterowanie rutingiem w sieciach ad–hoc z wykorzystaniem algorytmów mrówkowych z geograficzną lokalizacją wiedzy (in: Przegląd Telekomunikacyjny– wiadomości telekomunikacyjne). 2008. Vol. 8–9/2008. pp. 1183–1193.

[J13] M.Ławryńczuk: Suboptimal Nonlinear Predictive Control Based on Neural Wiener Models (in: Lecture Notes in Artificial Intelligence). 2008. Vol. 5253. pp. 410–414.

[J14] M.Ławryńczuk, W.Tadej: A computationally efficient stable dual–mode type nonlinear predictive control algorithm (in: Control and Cybernetics). 2008. Vol. 37. No. 1. pp. 99–132.

[J15] M.Ławryńczuk, P.Marusak, P.Tatjewski: Cooperation of model predictive control with steady–state economic optimisation (in: Control and Cybernetics). 2008. Vol. 37. No. 1. pp. 133–158.

[J16] M.Ławryńczuk, P.Tatjewski: Efficient Predictive Control Integrated with Economic Optimisation Based on Neural Models (in: Lecture Notes in Artificial Intelligence). 2008. Vol. 5097. pp. 111–122.

[J17] M.Ławryńczuk: Identyfikacja rekurencyjnych modeli neuronowych typu RBF (in: Pomiary Automatyka Robotyka PAR). 2008. Vol. 2/2008. pp. 558–570.

[J18] M.Ławryńczuk: Modelling and Nonlinear Predictive Control of a Yeast Fermentation Biochemical Reactor Using Neural Networks (in: Chemical Engineering Journal). 2008. Vol. 145. pp. 290–307.

[J19] M.Ławryńczuk: Optimising Predictive Control Based on Neural Models (in: Lecture Notes in Artificial Intelligence). 2008. Vol. 5253. pp. 118–129.

[J20] M.Ławryńczuk: Suboptimal Non–Linear Predictive Control Based on MLP and RBF Neural Models with Measured Disturbance Compensation (in: Journal of Automation, Mobile Robotics and Intelligent Systems). 2008. Vol. 2. No. 2. pp. 54–64.

[J21] M.Ławryńczuk: Suboptimal Nonlinear Predictive Control with MIMO Neural Hammerstein Models (in: Lecture Notes in Artificial Intelligence). 2008. Vol. 5027. pp. 225–234.

[J22] M.Ławryńczuk: Suboptymalny algorytm regulacji predykcyjnej z modelami neuronowymi typu FIR (in: Pomiary Automatyka Robotyka PAR). 2008. Vol. 2/2008. pp. 548–557.

[J23] M.Majdan: On Subjective Trust Management (in: Journal of Telecommunications and Information Technology). 2008. Vol. 4/2008. pp. 26–31.

[J24] P.Marusak, P.Tatjewski: Actuator Fault Tolerance in Control Systems with Predictive Constrained Set-Point Optimizers (in: International Journal of Applied Mathematics & Computer Science). 2008. Vol. 14. No. 4. pp. 539–551.

[J25] P.Marusak: Easily Reconfigurable Analytical Fuzzy Predictive Controllers: Actuator Faults Handling (in: Lecture Notes in Computer Science). 2008. Vol. 5370. pp. 396–405.

[J26] P.Marusak: Efficient Fuzzy Predictive Economic Set-Point Optimizer (in: Lecture Notes in Artificial Intelligence). 2008. Vol. 5097. pp. 273–284.

[J27] P.Marusak: Regulatory predykcyjne z założoną trajektorią przyrostów sterowania i uwzględnianiem ograniczeń sygnału sterującego (in: Pomiary Automatyka Robotyka PAR). 2008. Vol. 2/2008. pp. 581–590.

[J28] P.Marusak: Rozmyte modele Takagi-Sugeno w układach zintegrowanej regulacji predykcyjnej i optymalizacji punktu pracy (in: Pomiary Automatyka Robotyka PAR). 2008. Vol. 2/2008. pp. 571–580.

[J29] K.Miettinen, K.Deb, J.Jahn, W.Ogryczak, K.Shimoyama, R.Vetschera: Future Challenges (in: Lecture Notes in Computer Science). 2008. Vol. 5252. pp. 435–461.

[J30] W.Ogryczak: Reference Point Method with Importance Weighted Partial Achievements (in: Journal of Telecommunications and Information Technology). 2008. Vol. 4/2008. pp. 17–25.

[J31] W.Ogryczak: WOWA Enhancement of the Preference Modeling in the Reference Point Method (in: Lecture Notes in Artificial Intelligence). 2008. Vol. 5285. pp. 38–49.

[J32] K.Pieńkosz: Heurystyczne algorytmy ograniczonej alokacji zasobu (in: Przegląd Elektrotechniczny). 2008. Vol. 9/2008. pp. 89–92.

[J33] M.Pióro, T.Śliwiński, M.Zagożdżon, M.Dzida, W.Ogryczak: Path Generation Issues for Survivable Network Design (in: Lecture Notes in Computer Science). 2008. Vol. 5073. pp. 820–835.

[J34] M.Rodzewicz, G.Czerwiński, B.Kubica: Spektrum obciążeń – archiwizacja, analiza i odtwarzanie sekwencji zdarzeń (in: Mechanika w Lotnictwie). 2008. Vol. ML-XIII. No. 1. pp. 43–55.

[J35] P.Rzepakowski: Supporting telecommunication product sales by conjoint analysis (in: Journal of Telecommunications and Information Technology). 2008. Vol. 3/2008. pp. 28–34.

[J36] K.Sacha: Model-Based Implementation of Real–Time Systems (in: Lecture Notes in Computer Science). 2008. Vol. 5219. pp. 332–345.

[J37] A.Sikora: Modelowanie, symulacja i przykładowe zastosowania mobilnej bezprzewodowej sieci typu ad–hoc (in: Zeszyty Naukowe Wyższej Szkoły Informatyki w Łodzi). 2008. Vol. 7. No. 1. pp. 98–104.

[J38] W.Stańczuk, J.Lubacz, E.Toczyłowski: Trading Links and Paths on a Communication Bandwith Market (in: Journal of Universal Computer Science). 2008. Vol. 5(2008). pp. 642–652.

[J39] M.Szlenk: UML Static Models in Formal Approach (in: Lecture Notes in Computer Science). 2008. Vol. 5082. pp. 129–142.

[J40] P.Tatjewski: Advanced Control and On-line Process Optimization in Multilayer Structures (in: Annual Reviews in Control). 2008. Vol. 32(2008). pp. 71–85.

[J41] E.Toczyłowski, I.Żółtowska: A New Pricing Scheme for a Multi-Period Pool-Based Electricity Auction (in: European Journal of Operational Research). 2008. pp. 1–13.

[J42] E.Toczyłowski: Efektywność ekonomiczna mechanizmów rynkowych i regulacyjnych w energetyce (in: Rynek Energii). 2008. Vol. 1(II). pp. 7–26.

[J43] P.Wawrzyński, J.Arabas, P.Cichosz: Predictive Control for Artificial Intelligence in Computer Game (in: Lecture Notes in Artificial Intelligence). 2008. Vol. 5097. pp. 1137–1148.

[J44] A.Wilkowski: Analiza obrazu i rozpoznawanie wzorców w identyfikacji gestów (in: Przegląd Techniczny (Gazeta Inżynierska)). 2008. Vol. 1. pp. 18–20.

[J45] T.Winiarski, C.Zieliński: Podstawy sterowania siłowego w robotach (in: Pomiary Automatyka Robotyka PAR). 2008. Vol. 6/2008. pp. 5–10.

[J46] A.Zalewski, M.Ludzia: Diagrammatic Modeling of Architectural Decisions (in: Lecture Notes in Computer Science). 2008. Vol. 5292. pp. 350–353.

[J47] A.Zalewski, P.Sztandera, M.Ludzia, M.Zalewski: Modeling and Analyzing Disaster Recovery Plans as Business Processes (in: Lecture Notes in Computer Science). 2008. Vol. 5219. pp. 113–125.

6.4 Scientific and Technical Papers in Conference Proceedings

[P1] A.Czajka, A.Pacut: Replay Attack Prevention for Iris Biometrics (in: Proceedings 42nd Annual 2008 IEEE International Carnahan Conference on Security Technology ICCST; pub.: IEEE). 2008. pp. 247–253.

[P2] P.Domański, P.Kalbarczyk: Zarządzanie bezpieczeństwem produkcji: efektywność a ryzyko (in: Konferecja Naukowo-Techniczna Nowoczesne Technologie Spalania Wegla i Paliw Odpadowych). 2008. pp. 53–67.

[P3] M.Dzida, M.Zagożdżon, M.Pióro, T.Śliwiński, W.Ogryczak: Path Generation for a Class of Survivable Network Design Problems (in: 4th EURO-NGI Conference on Next Generation Internet Networks; pub.: IEEE). 2008. pp. 31–38.

[P4] A.Felkner: Set-Theoretic Semantics of Role-Based Trust Management (in: X International PHD Workshop OWD'2008). 2008. pp. 567–572.

[P5] A.Felkner: System wnioskowania rodziny języków 'Role-based Trust Management' (in: III Konferencja naukowo-techniczna Młodzi naukowcy wobec wyzwań współczesnej techniki). 2008. pp. 331–337.

[P6] O.Hurtado, L.Pozo, A.Pacut: A New Algorithm for Signature Verification System Based on DTW and GMM (in: Proceedings 42nd Annual 2008 IEEE International Carnahan Conference on Security Technology ICCST; pub.: IEEE). 2008. pp. 206–213.

[P7] M.Karpowicz, K.Malinowski: Efficiency loss and uniform-price mechanism (in: Proceedings of the 47th IEEE Conference on Decision and Control (CDC)). 2008. pp. 4466–4473.

[P8] A.Kozakiewicz, K.Malinowski: Network Traffic Routing Using Effective Bandwith Theory (in: Proceedings of the 5th Polish-German Teletraffic Symposium PGTS'08; pub.: Berlin University of Technology). 2008. pp. 185–194.

[P9] A.Kozakiewicz, A.Felkner, T.Kruk: Simulation of Critical ICT Infrastructure for Municipal Crisis Management (in: 3rd Internationational Workshop on Critical Information Infrastructures Security). 2008. pp. 403–409.

[P10] M.Kudelska, M.Kudelski, A.Pacut: Statistical Analysis of Packet Delay in Ad–Hoc Networks of Mobile Robots (in: SIBIRCON 2008 International Conference on Computational Technologies in Electrical and Engineering; pub.: IEEE). 2008. pp. 463–468.

[P11] M.Kudelski, M.Kudelska: Geographical Cells Routing in Ad–Hoc Networks of Mobile Robots (in: MELECON'2008 The 14th IEEE Mediterranean Electrotechnical Conference; pub.: IEEE). 2008. Vol. CD. pp. 374–379.

[P12] P.Kwaśniewski: Algorytmy oszczędzania energii w bezprzewodowych sieciach ad hoc z wykorzystaniem technik podziału sieci (in: VI Sympozjum Modelowanie i Symulacja Komputerowa w Technice; pub.: Wyższa Szkoła Informatyki). 2008. pp. 69–74.

[P13] M.Ławryńczuk, P.Marusak, P.Tatjewski: Piecewise Linear Steady-State Target Optimization for Control Systems with MPC: A Case Study (in: Proceedings of the 17th World Congress IFAC; pub.: IFAC). 2008. pp. 13169–13174.

[P14] M.Marks: Metody lokalizacji węzłów w bezprzewodowych sieciach sensorów (in: VI Sympozjum Modelowanie i Symulacja Komputerowa w Technice; pub.: Wyższa Szkoła Informatyki). 2008. pp. 81–86.

[P15] W.Ogryczak: Fair and Efficient Resource Allocation Bicriteria Models for Equitable Optimization (in: ICINCO 2008 Fifth International Conference on Informatics in Control, Automation and Robotics). 2008. pp. 149–156.

[P16] W.Ogryczak: WOWA Enhancement of the Reference Point Method (in: Proceedings of IPMU'08 12th Intl Conference Information Processing and Management of Uncertainty in Knowledge-Based Systems). 2008. pp. 274–281.

[P17] P.Paulski, M.Kamola: Optimal Bandwidth Allocation in IP Network; the case of QoS-sensitive user utility functions (in: Summer Computer Simulation Conference SCSC'08). 2008. pp. 421–427.

[P18] J.Putz-Leszczyńska, A.Pacut: Hidden signature – a new solution for on-line verification using DTW (in: Proceedings 42nd Annual 2008 IEEE International Carnahan Conference on Security Technology ICCST; pub.: IEEE). 2008. pp. 162–166.

[P19] K.Sacha: Verification and Implementation of Dependable Controllers (in: Proceedings of International Conference on Dependability of Computer Systems DepCoS – RELCOMEX 2008). 2008. pp. 143–151.

[P20] A.Sikora, E.Niewiadomska-Szynkiewicz: MobASim: A Software Platform for Mobile Ad Hoc Networks Modeling and Simulation (in: 4th IEEE International Conference on Wireless & Mobile Computing, Networking & Communication WiMob 2008; pub.: IEEE). 2008. pp. 625–630.

[P21] A.Sikora: Modelowanie i symulacja mobilnej bezprzewodowej sieci typu ad-hoc (in: VI Sympozjum Modelowanie i Symulacja Komputerowa w Technice; pub.: Wyższa Szkoła Informatyki). 2008. pp. 129–134.

[P22] M.Staniak, T.Winiarski, C.Zieliński: Parallel Visual-Force Control (in: IEEE/RSJ 2008 International Conference on Intelligent Robots and Systems IROS 2008; pub.: IEEE). 2008. pp. 1–6.

[P23] Ł.Stasiak, A.Pacut: Particle Filtering in Multilevel Color Context for Face Detection and Tracking in Real-Time Video Sequences (in: Proceedings 42nd Annual 2008 IEEE International Carnahan Conference on Security Technology ICCST; pub.: IEEE). 2008. pp. 214–220.

[P24] T.Traczyk: XForms. Formularze w aplikacjach internetowych (in: XIV Konferencja użytkowników i deweloperów Oracle, Systemy informatyczne. Projektowanie, imolementowanie, eksploatowanie.; pub.: Stowarzyszenie Polskiej Grupy Użytkowników Systemu Oracle). 2008. pp. 35–44.

[P25] A.Wilkowski: A HMM-Based System for Real-Time Gesture Recognition in Movie Sequences, Proceedings of the International Conference on Human System Interaction, Kraków, 2008, pp. 737-742

6.5 Abstracts

[A1] W.Ogryczak: Conditional Median as a Robust Solution for Location Problems (in: EWGLA XVII EURO Working Group on Locational Analysis). 2008. pp. 81–81.

[A2] A.Stachurski: Convergence of a Class of Quasi-Newton Methods with Affine Projections Updates (in: S.Nenov: Fifth International Conference of Applied Mathematics and Computing). 2008. pp. 437–437.

6.6 Reports and Other Papers

[R1] W.Kasprzak: Rozpoznawanie sekwencji cech w sygnale mowy z wykorzystaniem modelu HMM (pub.: Instytut Automatyki i Informatyki Stosowanej PW). 2008.

[R2] E.Niewiadomska-Szynkiewicz: Algorytmy optymalizacji globalnej: realizacje sekwencyjne i równoległe (pub.: Instytut Automatyki i Informatyki Stosowanej PW). 2008.

[R3] W.Ogryczak, T.Śliwiński: On Efficient Optimization of the LP Computable Risk Measures for Portfolio Selection (pub.: Instytut Automatyki i Informatyki Stosowanej PW). 2008.

[R4] A.Wilkowski: Rozpoznawanie gestów dłoni w sekwencji obrazów – wyznaczanie sekwencji cech dłoni (pub.: Instytut Informatyki Uniwersytetu Śląskiego w Katowicach). 2008.

[R5] C.Zieliński, W.Szynkiewicz, P.Trojanek, A.Rydzewski, T.Winiarski, M.Staniak: Badania eksperymentalne pracy zespołu heterogenicznych robotów wspomagających człowieka (pub.: Instytut Automatyki i Informatyki Stosowanej PW). 2008.