



Slovak University of Technology in Bratislava

Faculty of Electrical Engineering and Information Technology



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Introduction to the NIL project

Introduction

NIL Project:

Enhancing NO-SK Cooperation in
Automatic Control

Project overview

Support of broad spectrum of activities:

student mobilities at the MSc. and PhD. level,

staff mobilities,

organization of multilateral international summer school
and conferences,

joint development of teaching materials and publishing
scientific publications,

Project overview

Project is devoted to enhancing cooperation in academic research in the automatic control area in the partner institutions STU Bratislava and NTNU Trondheim

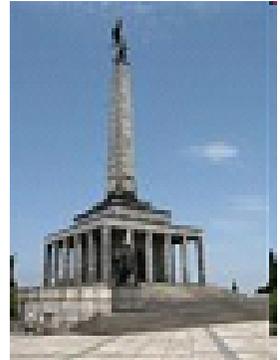
and through them also at broader regional, national and international levels.

Introduction

Where we are from?

Few pictures from Slovakia

Bratislava















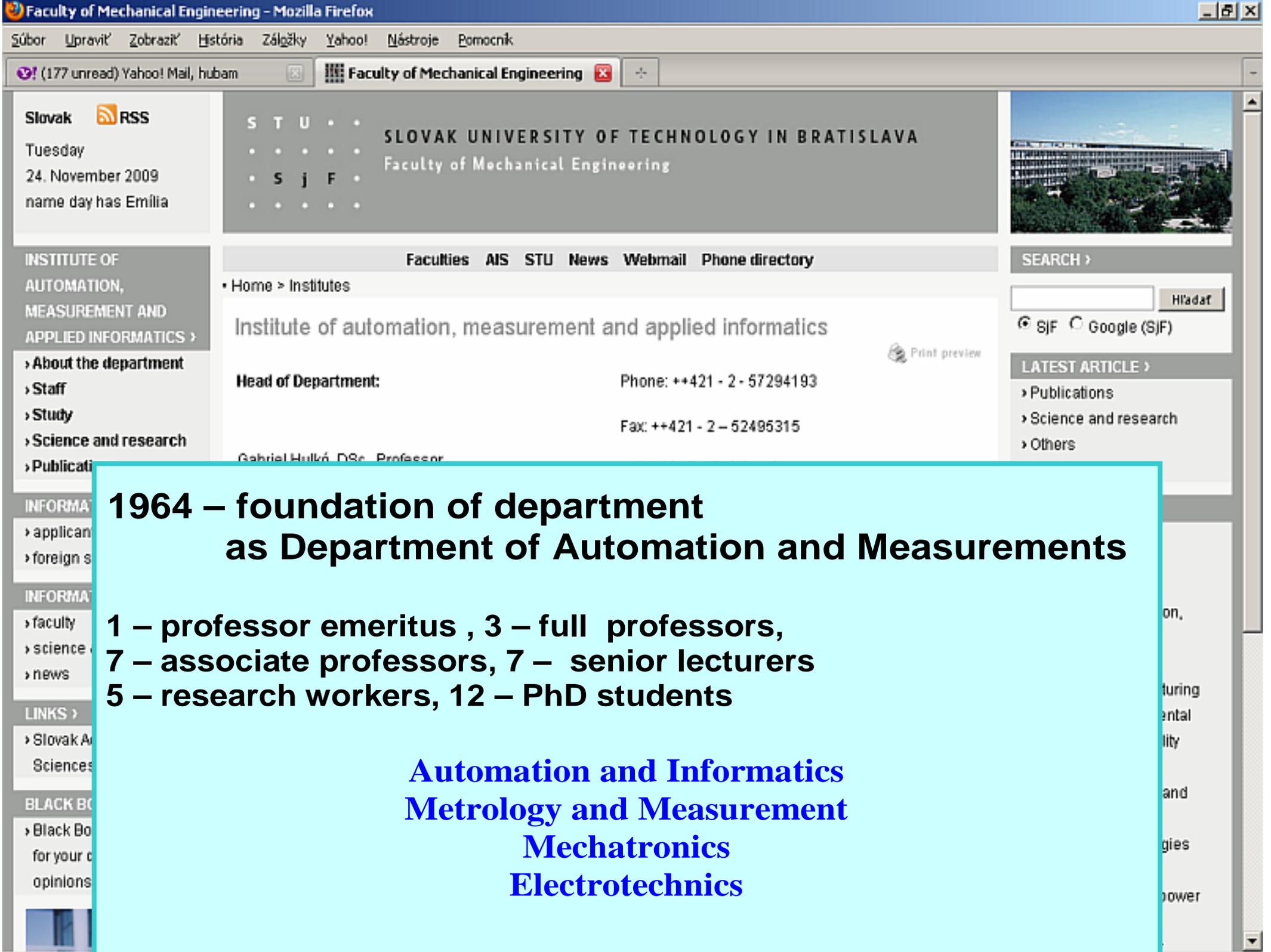






Slovak University of Technology in Bratislava

- 1762 Academy of Mining and Forestry in Banská Štiavnica (up to 1918)
- 1937 Technical University of M. R. Štefánik in Košice,
- 1938 Munich Treaty and Vienna Verdict, Košice annexed to Hungary, move to Martin
- 1939 renamed to Slovak Technical University (SVŠT) and moved to Bratislava
- 1991 renamed to “Slovak Technical University” (Slovak University of Technology) in Bratislava



1964 – foundation of department as Department of Automation and Measurements

1 – professor emeritus , 3 – full professors,
7 – associate professors, 7 – senior lecturers
5 – research workers, 12 – PhD students

Automation and Informatics
Metrology and Measurement
Mechatronics
Electrotechnics

TEACHING

Undergraduate level

Mechatronics

Graduate study

Automation and Informatics of Machines and Processes

Mechatronics

Postgraduate study

Metrology

Automation and Control

RESEARCH TARGETS

Automatic Control

Modeling and Control of Technological and Manufacturing Systems

Robust, Self-Tuning, Fuzzy and Intelligent Control

Control and Design of Distributed Parameter Systems

Predictive and Adaptive Control of Industrial Processes

Metrology and Sensors

Measuring Systems Calibration and Testing

Multicomponent Sensors for Robotics

Quality Control

Modern Educational tools for Measurement and Metrology

**ACTIVITIES FOR CENTRE OF EXCELLENCE
INDUSTRIAL INFORMATICS, AUTOMATION AND
MEASUREMENT FOR AUTOMOTIVE INDUSTRY**

- **Centre of Technological Transfer of Quality**
- **Modelling and Control of Technological Processes and Mechatronic Components for Automotive Industry**
- **Industrial Informatics and Automation**

Modelling and Control of Technological Processes and Mechatronic Components for Automotive Industry

**Department of Automation and Measurement
Department of Chemical Machines and Equipment
Department of Materials and Technologies
Department of Stretch and Strength of Materials
Department of Technical Mechanics**

**Experimental foundry of faculty,
Centre for processing of plastic products of STU
Development manufactory of STU**

**MATADOR, Inc. Púchov
PLASTIKA, Inc. Nitra
Foundries from Central Slovakia
resp. companies dealing with high-tech solutions
ABILITY Žiar nad Hronom – Kremnica and TEN Slovakia**

Modelling and Control of Technological Processes and Mechatronic Components for Automotive Industry

Build up a Simulation laboratory for numerical dynamical analysis and control of technological and production processes as casting, processing of plastics and rubber with software products as ANSYS, FEMLAB, FLUENT, STAR – CD, ProCAST, CALCOSOFT, PAM-CAST, PAM-FORM, PAM-RTM, MOLDFLOW, CADMOLD,...

Build up demonstration plants for demonstration possibilities of high-tech solutions

Pressure and gravitational casting into skillets prepared in the development manufactory of the faculty

Resin injection through fibrous reinforcements into moulds provided by industrial partner in the centre for processing of plastic products of STU

Rubber processing in skillets provided by industrial partner in the development manufactory of the faculty

Beam and plate of smart structures prepared in research-development laboratories of the faculty

For control of these processes, as systems given on complex 3D definition domains we have own control technologies, software products Distributed

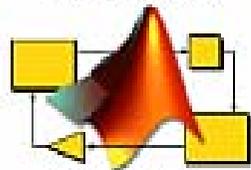
Parameter Systems Blockset for MATLAB & Simulink

WWW.DPSCONTROL.SK WWW.MATHWORKS.COM

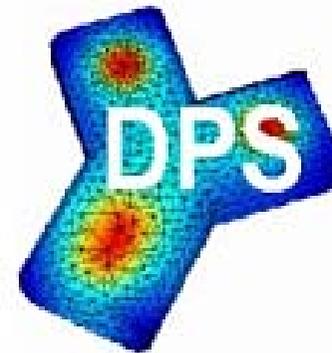


- **DPS Blockset**
- **Product Info**
- **DPS Library**
 - **Show**
 - **Demos**
 - **DPS Wizard**
- **Download**
- **Interactive Control**
- **Contact & Feedback**
- **Sales**
- **The MathWorks, Inc.**

SIMULINK
Enabled



MathWorks Partner



Blockset for MATLAB & Simulink

The Distributed Parameter Systems Blockset - DPS Blockset is a blockset for use with MATLAB & Simulink for distributed parameter system and design of dynamical systems given on complex 3D domains of definition.

The blockset features:

- Engineering methods for distributed parameter systems (DPS) modeling, control and design
- DPS models based on lumped-input/distributed-output systems, time/space analysis, synthesis and design tools
- Distributed parameter PID, algebraic, state space and robust control schemes,... internet monograph with demonstrations
- DPS Wizard demonstrates in step-by-step operation distributed parameter control loops arrangement and setting procedures
- Suite of blocks and schemes for DPS control practically in any field of technical practice
- Interactive Control Service for support DPS control solutions via the internet

Explosive development of information technologies supports further wide-ranging distribution of diverse methods and software products systems as distributed parameter systems in any field of technical practice ... Nowadays these sophisticated dynamical analysis methods and space animations "jumping" on computer screens is a big challenge for control community to control these processes. **DPS Blockset** off initiate a similar boom in the control of distributed parameter systems, given by numerical structures on complex 3D definition domains, for t

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Third-Party Products & Services

Distributed Parameter Systems Blockset for Simulink Suite of blocks for control of distributed parameter systems

Highlights:

- Engineering methods for Distributed Parameter Systems (DPS) control
- Lumped-input/distributed-output systems
- Time/space analysis, synthesis and design tools
- Suites of blocks for engineering control problems solutions
- DPS Wizard for step-by-step arrangement of control systems
- Internet monograph and interactive service for support solutions

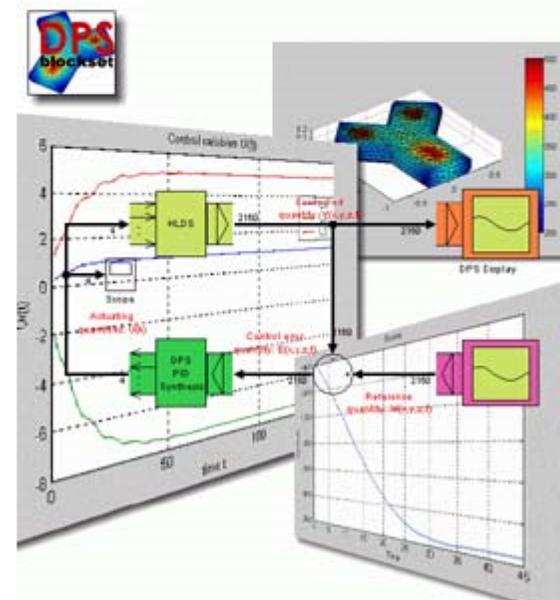
Description:

The Distributed Parameter Systems Blockset (DPS Blockset) extends Simulink with a comprehensive library for distributed parameter systems and their applications in modeling, control, and design of dynamical systems with complex 3-D domains of definition. An included demonstration presents some typical problems of DPS control from areas of technological and production processes, mechatronics, and protection of the environment. A tutorial and demos initiate users in DPS control problems. The DPS Wizard presents step-by-step procedures for arranging and setting control loops.

Blocks for time/space dynamical decomposition and synthesis offer flexible engineering methodology for DPS control. The DPS Blockset is designed for engineers, researchers, and students who deal with dynamics and control of real world phenomena and processes. **Platforms:** Windows

MathWorks products required: [MATLAB](#), [Simulink](#), [Control System Toolbox](#), [Partial Differential Equation Toolbox](#), [Robust Control Toolbox](#), [System Identification Toolbox](#)

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Slovak RSS
Tuesday
24. November 2009
name day has Emilia



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Home > Institutes and Departments

Institute of Information Engineering, Automation and Mathematics

Head of Institute
Prof. Miroslav Fikar, DSc.



Contact

Institute of Information Engineering, Automation and Mathematics,
Faculty of Chemical and Food Technology,
Slovak University of Technology in Bratislava,
Radlinského 9, 812 37 Bratislava
tel: +421 (2) 59 325 366, +421 (2) 52 495 269, +421 (2) 52 496 469
fax: +421 (2) 52 496 469
email: miroslav.fikar@stuba.sk

Departments

- INSTITUTES AND DEPARTMENTS
- Institute of Biotechnology and Food Science
- Department of Biochemical Technology
- Department of Food Science and Technology
- Institute of Biochemistry, Nutrition and...
- Department of Biochemistry and Microbiol...

DEAN'S OFFICE

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and Mathematics
Department of Information Engineering and
Process Control

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science & research
faculty
news

LINKS
telephone list
Slovak Academy of

Staff involved in NIL project

- Permanent staff:

Prof. Miroslav Fikar

Dr. Michal Kvasnica

- Students:

Ing. Martin Herceg

Ing. Radoslav Paulen

Ing. Marian Podmajersky

Bc. Ivana Rauova

Modelling and Control of Hybrid Systems

- Model predictive control of PWA (piece-wise affine) systems using explicit approach
- HYSDEL 3.0 (Hybrid Systems Description Language) – development of software tool for modelling of hybrid systems
- MPT (Multiparametric Toolbox) – development of software for predictive control of linear and hybrid systems

Optimal Process Control

- Dynamic optimisation of chemical processes (distillation columns, waste-water treatment plants, polymerisation reactors)
- Deterministic global optimisation of processes
- Real-time optimisation of processes based on neighbouring extremals

STRBSKE PLESO, HIGH TATRAS, SLOVAK REPUBLIC
JUNE 9 – 12, 2009

17TH INTERNATIONAL CONFERENCE ON PROCESS CONTROL
PROCESS CONTROL '09

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[Modelovani elektromechanických systému](#)

Matlab and Simulink Workshop, Presentation, Dr. Jirkovsky [PDF 2MB, web].

[Online optimizing control: The link between plant economics and process control](#)

Plenary Prof. Engell [PDF 2MB].

Photos from the conference will continuously be added to our [photo gallery](#).



Welcome to 17th International Conference on Process Control

organised by

Institute of Information Engineering, Automation, and Mathematics
Faculty of Chemical and Food Technology
Slovak University of Technology, Bratislava

&

Department of Process Control Faculty of Electrical Engineering and Informatics
University of Pardubice

sponsored by

Slovak Society for Cybernetics and Informatics, National Member Organisation of IFAC

will be held at Štrbské pleso, High Tatras, Slovak Republic

June 9 – 12, 2009

Slovak  RSS

Tuesday
24. November 2009
name day has Emília

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SLOVAK UNIVERSITY OF TECHNOLOGY IN BRATISLAVA
Faculty of Electrical Engineering and Information Technology



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INFORMATION FOR

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INSTITUTE OF CONTROL AND INDUSTRIAL INFORMATICS

• Home Departments

Institute of control and industrial informatics 

Address: Ilkovičova 3, SK-812 19, Bratislava, Slovak Republic
Phone:  +421 260 291 351   +421 265 429 521 

 Head of Department
prof. Ing. Ján Murgas, PhD.
Phone:  +421 (2) 60 291 781 
E-mail: jan.murgas@stuba.sk

Self-managed webpage: <http://www.urmi.eif.stuba.sk/?lang=2>

Department of applied informatics and information technology
 Department of electrical machines and devices

1. Department of Systems and Signals – prof. Jan Murgas

2. Department of Control Methods – prof. Mikulas Huba

3. Department of Informatics and Communication Technology - Dr. Martin Foltin

4. Department of Robotics and Artificial Intelligence – prof. Ladislav Jurisica

5. Department of Components and Technologies for Industrial Informatics – prof. Milan Zalman

Department of Control Methods

Assoc. Prof. K. Žáková

Assoc. Prof. A. Kozáková

M. Halás

P. Ťapák

P. Bisták

D. Sovišová

I. Oravec

PhD Students: I. Pestún, M. Sedlák, V. Žilka,
P. Bahník, F. Jelenčíak

Department of Control Methods

Research:

Robust Constrained PID Control

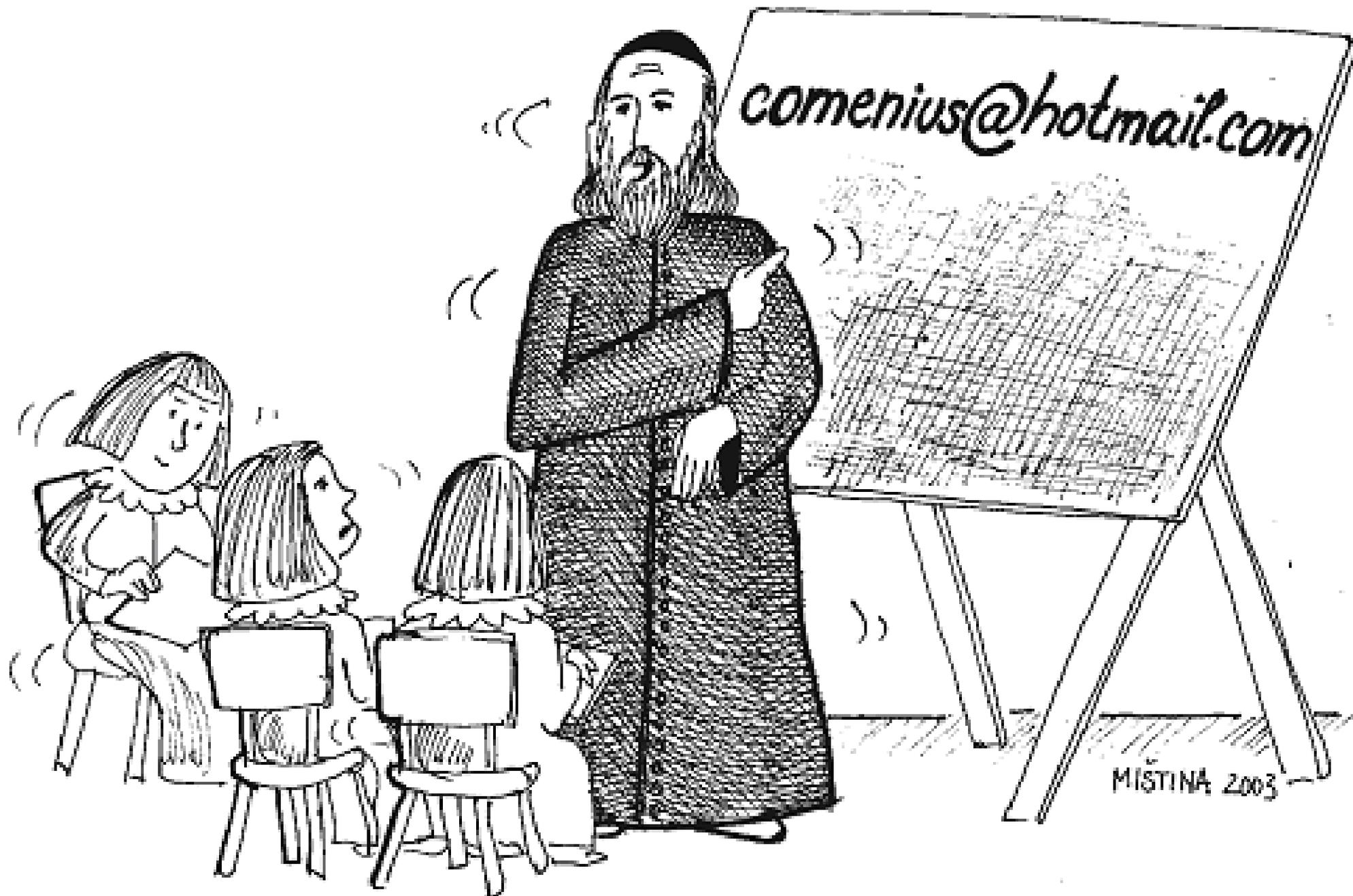
Nonlinear Control

M. Halás: An algebraic framework generalizing the concept of transfer functions to nonlinear systems. In: Automatica 44, 2008

Remote Control

e-Learning





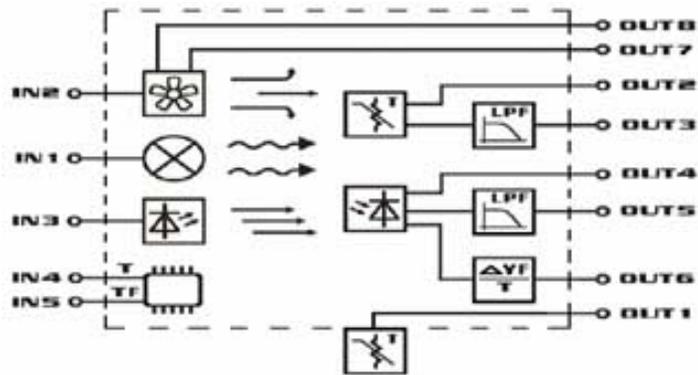
Department of Control Methods

Teaching:

MSc



Plant models



Thermo-optical plant

Optical channel – light intensity control (bulb, LED)

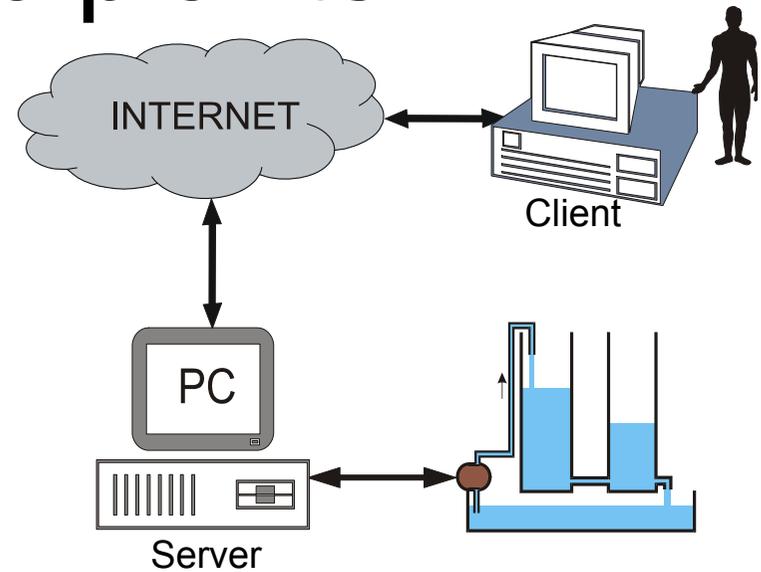
Thermal channel – temperature control (bulb, van)

Communication via USB

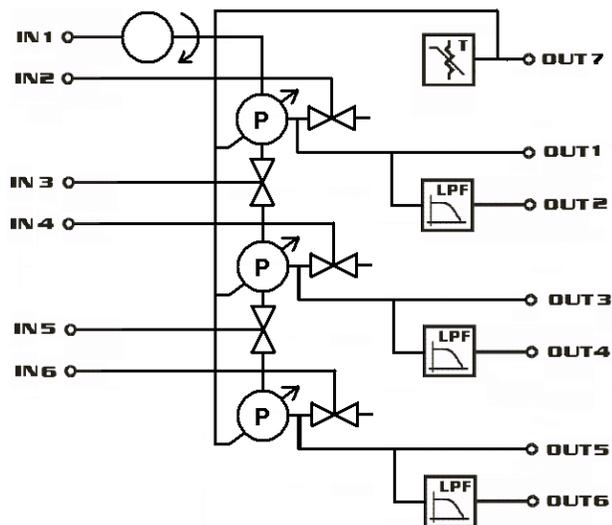
30 pcs, control via Internet



Hydraulic plants



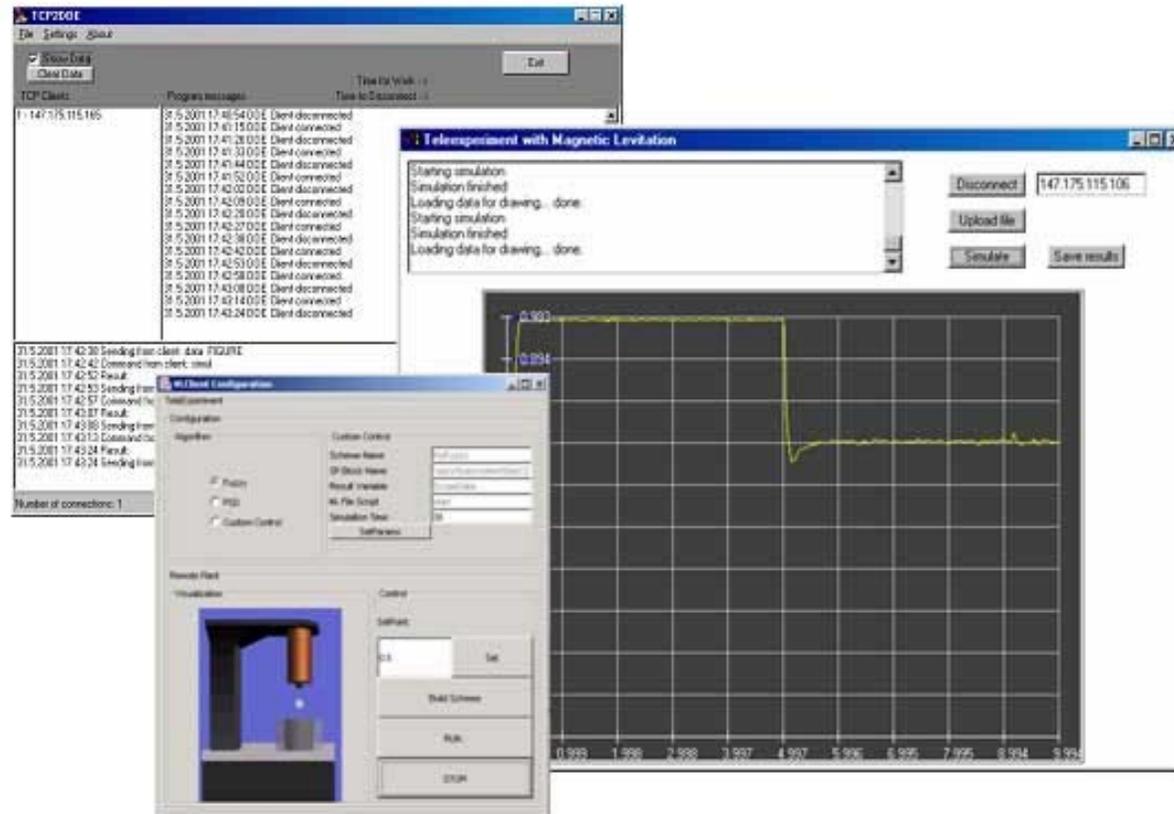
Communication via USB,
Internet Remote Control



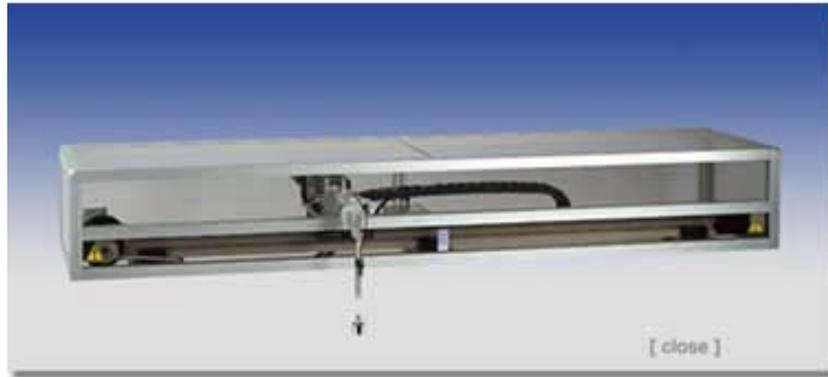
Plant models



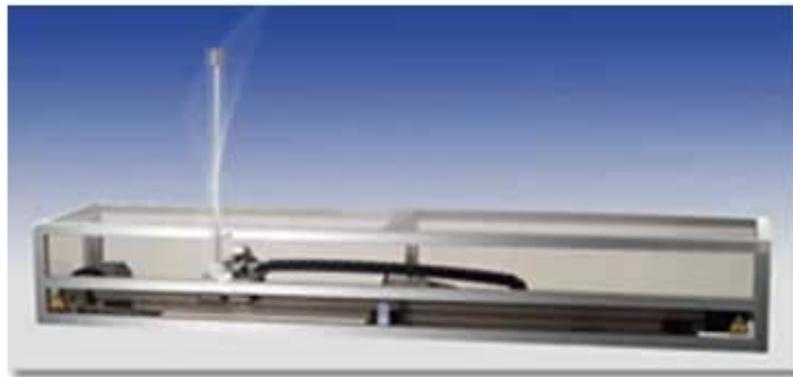
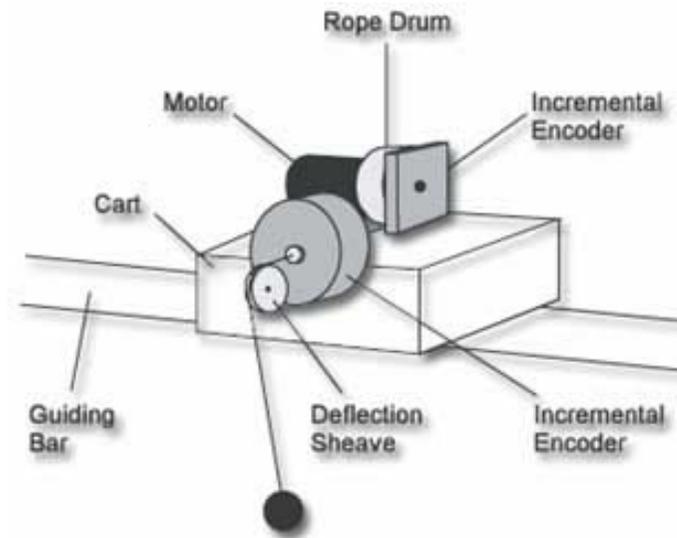
Magnetic levitation



Plant models



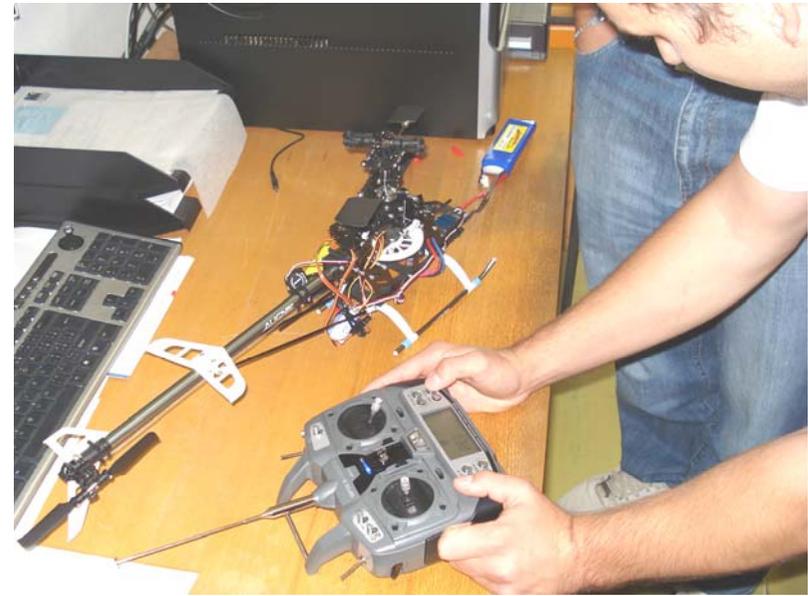
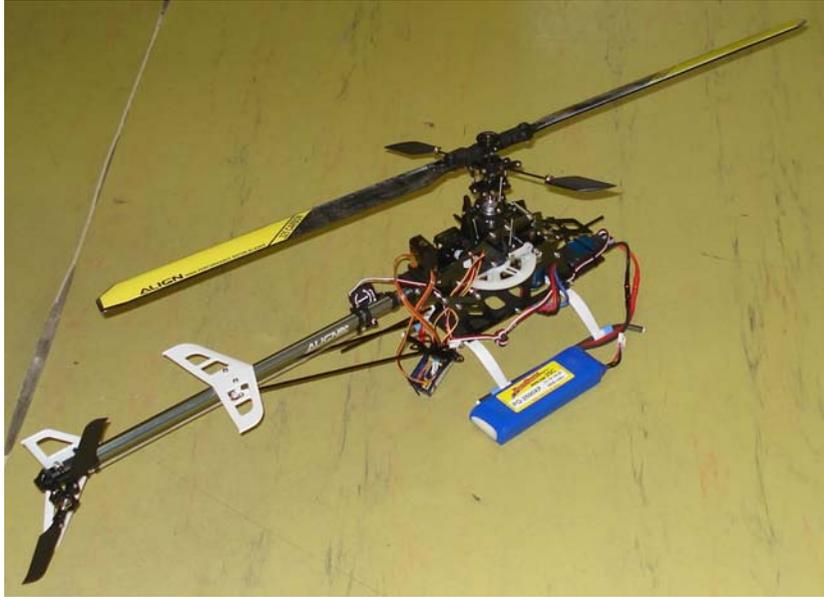
Gantry crane



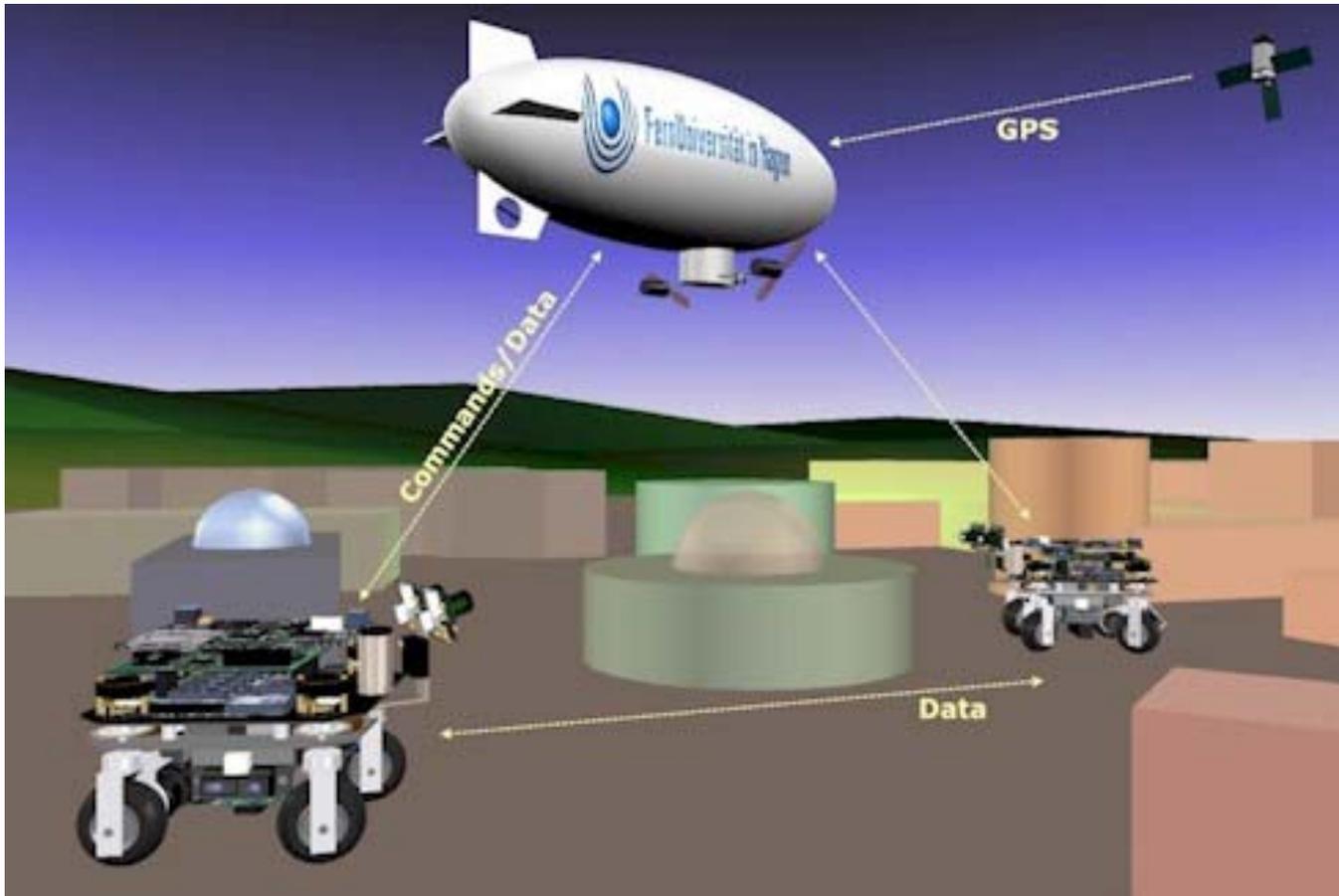
Inverted pendulum



Helicopter control



Airship Control



Project DAAD with FernUni Hagen

Department of Control Methods

Running projects:

VEGA 1/0369/10 Algebraic approach to controlling nonlinear systems: theory and applications.

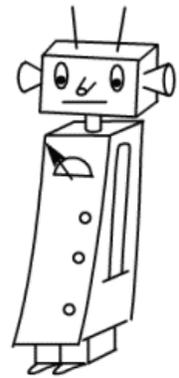
VEGA 1/0656/09: Integration and development of nonlinear and robust control methods and their application in controlling flying vehicles.

KEGA 3/7245/09 Building virtual and remote experiments for network of online laboratories

LPP-0127-06 Algebraic methods in nonlinear control systems and their application to autorotation problem

<http://www.urpi.elf.stuba.sk/projekty/helicopter/>

Robotika.SK
announces
9th international robotics contest
**ISTROBOT
2009**



APRIL 25th

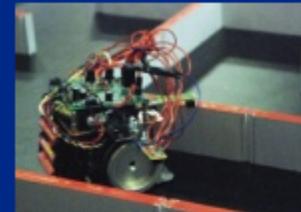
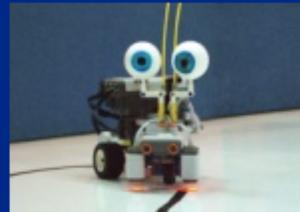
Slovak University of
Technology Bratislava
Slovakia

Rules

Linefollower

The task is to construct an autonomous robot that will complete the racing track and negotiate all its pitfalls. The robot must track a black line on the white surface. It contains several obstacles - for example a tunnel to pass through and a brick to be avoided.

[Details...](#)



Micromouse

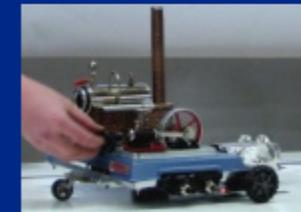
The task is to construct a robot that can autonomously solve a maze and achieve the goal in the shortest time. When the robot tracks the right hand wall it will solve the maze, but not in the shortest possible time.

[Details...](#)

MiniSumo

The task is to build an autonomous mobile robot which is capable of pushing its opponent out of the ring. The first robot that touches the outside of the ring loses the round. The first robot to win two rounds, wins the match. Robots are weight and size limited.

[Details...](#)



Freestyle

In this category, competitors are encouraged to demonstrate their robotics creations which do not fit into other categories. Each contestant has 5 minutes to demonstrate his or her robot's capabilities. The winner is appointed according to the strength of the audience applause and the jury judgment.

[Details...](#)

Common rules

And for each category also the common rules apply. They deals mainly with the safety issues and materials.

[Details...](#)

International Conference

CYBERNETICS AND INFORMATICS

Hotel Magura, ŽDIAR, Slovak Republic



February 10 - 14, 2008

organized by

Slovak Society for Cybernetics and Informatics (SSKI)

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and

Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava

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Cybernetics and Informatics 2010



International Conference

CYBERNETICS AND INFORMATICS '10
Hotel Barbora, VYŠNÁ BOCA, Slovak Republic
February 10 - 13, 2010

organized by

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28.09.2009

10TH INTERNATIONAL CONFERENCE

VIRTUAL UNIVERSITY

BRATISLAVA, SLOVAK REPUBLIC

DECEMBER 10TH-11TH, 2009



10th International Conf. Virtual University

10.-11.12.2009 Bratislava, <http://virtuni.eas.sk>



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attention!

student stays

# student	# month	scholarship rate in EUR	travel rate in EUR
2	5	240	800

1-2Q 2010

PHD student stays

# PHD student	# month	scholarship rate in EUR	travel rate in EUR
4	1	470	800

2x3Q 2010
2x1Q 2011

teacher / researcher stays

# person	# day
6	5
5	7
2	10
2	14

3x4Q 2009, 3x4Q 2010

3x1Q 2010, 2x3Q 2010

2x1Q 2011

2x3Q 2010