

**DEPARTMENT OF ELECTRICAL DRIVES
AND MECHATRONICS**

<http://www.tuke.sk/fei-kepm>

Tel.: ++421 55 602 2279, Fax: ++421 55 633 0115

Head of Department: doc. Ing. Ján Fetyko, PhD.
E-mail: Jan.Fetyko@tuke.sk



Tu budú 4 fotky

Computer settings of controlled drive
parameters

Laboratory of Industrial Automation

Programming of control
for educational robot control

Practical training in the subject
Electrical Equipment of Vehicles

1 DEPARTMENT'S PROFILE

The Department is responsible for education and research in electrical engineering in fields of power and industrial electronics, electrical machines, drives and controlled drives, in automation of electrical equipment, in electromechanical systems, and in mechatronic systems. The Department offers both types of undergraduate courses (master and bachelor courses) as well as the Ph.D. postgraduate course.

Development of modern industry has given rise to new requirements to profile of graduates from the department what resulted in new, innovative curricula development. That is to say, that department orientation was already earlier aiming towards the industrial mechatronic systems and this has been one branch of department orientation. On the other side, the department staff deals with industrial electrical equipment of all kinds and that was reason that in year 2004 we prepared curricula for two new study branches: in Electrical Engineering and in Mechatronics, the both for the 1st (bachelor) and 2nd (master) degrees and that were approved by Accreditation Committee. The students for that programmes will admit to these programs in the next academic year 2005/06. The study programs in the branch of Mechatronics are oriented (according to the student's choice) towards Mechatronics for vehicles and car industry and to Mechatronics of productions systems.

2 STAFF

Professors:	prof. Ing. Jaroslav Timko, PhD. prof. Ing. Ladislav Zboray, PhD.	
Associate Professors:	doc. Ing. Jaroslav Dudrik, PhD. doc. Ing. Viliam Fedák, PhD. doc. Ing. Jozef Fedor, PhD. doc. Ing. Pavol Fedor, PhD. doc. Ing. Ján Fetyko, PhD. doc. Ing. Michal Kostelný, PhD. doc. Ing. Irena Kováčová, PhD., extraord. prof. doc. Ing. Jozef Ondera, PhD. doc. Ing. Daniela Perduková, PhD. (since April 1, 2004) doc. Ing. Pavel Zásalický, PhD.	
Assistant Professors:	Ing. František Ďurovský, PhD. Ing. Stanislav Fedor Ing. Želmíra Ferková, PhD. Ing. Ján Kaňuch Ing. Jaroslava Žilková, PhD.	
Assistants:	Ing. Stanislav Beláň	
Senior Scientists:	Ing. Emanuel Hutník Ing. Peter Višnyi, PhD. doc. Ing. Juraj Oetter, PhD.	
Technical Staff:	Katarína Gočová Ing. Vasil Graban	František Hajsák (part time) Zuzana Olexová
Ph.D. Students:	Ing. Martin Borbeľ Ing. Peter Girovský	Ing. Martin Olejár Ing. Ondrej Šimko

Ing. Ladislav Nemec
Ing. Tomáš Hrdina

Ing. Martin Repiščák

3 EQUIPMENT

3.1. Teaching and Research Laboratories

- two laboratories for teaching of subjects on electrical engineering basics
- three specialized laboratories for power electronics, one for electronics
- laboratory for CAD and CAE in electrical drives, power electronics and electrical machines (COSMOS, ProEngineer, MATLAB, PSpice, and applied SW) - 10 x PC
- two specialized laboratories for electrical drives and servosystems based on industrial systems
- two specialized laboratories for electrical machines and one for electrical apparatus

3.2. Special Measuring Instruments and Equipment

Control Systems

- Modicon TSX Premium (Schneider Electric) incl. development SW (PL7 Pro V3.1)
- OMRON - Sysmac Mini SK20, OMRON - Sysmac CQM 1
- Allen Bradley Programmable controller SLC 200 incl. development SW RS logic 500, Tech. Terminal AB PanelView 550 and converter AB 1305
- Control system Symadyn
- Automat LOGO, Siemens

Apparatus

- Logic Analyser PHILIPS
- Controlled drives and converters
- DSP controlled AC drive
- DOMINOPUTER - teaching kit

Converters

- Frequency Converter ABB ACS 140, 5,5 kW, RLLK 101 (EVÚ Nová Dubnica)
- DC Converters SIEMENS: SIMOREG 6RA24, 6RA70
- AC Converters SIEMENS: SIMOVERT 6SE21, MicroMaster Junior, SIMOVERT 6SE70 Master drive, 6SE70 Master Drives - Motion Control 2-axes servodrive
- DC thyristor converters SIMOREG 6RA24 a 6RA70 DCMaster (SIEMENS)
- Softstarter (ABB)
- Ward-Leonard drive system

Mechatronics systems

- Educational Robot Tech Quipment MA 2000
- Physical model of production line
- DSP Controlled pendulum
- Model of liquid reservoir
- Model of caster material reservoirs
- Model of flow rate control

4 TEACHING

4.1. Undergraduate Study (Bc.)

Subject	Semester	Lectures/Labs (hours per week)	Name of lecturer
Technical Documentation in El. Engineering	1 st	2/1	Đurovský
Electrical Machines	3 rd	3/3	Kostelný
Power Electronics I.	3 rd	3/3	Dudrík
Microprocessor Techniques	3 rd	2/3	Fedor, P., Perduková
Applied SW in Electrical Engineering	3 rd	1/3	Dudrík, Fedák
Electrical Machines and Apparatus	4 th	3/3	Kostelný, Fedor, J.
Power Electronics II.	4 th	3/3	Dudrík
Automation of Electrical Equipment	4 th	3/3	Fedor, P.
Electrical Drives	4 th	3/3	Timko
Automatic Electrical Drives I.	5 th	3/3	Fetyko
Power Semiconductor Systems I.	5 th	3/3	Ondera
Control Systems in Power Electronics	5 th	2/2	Dudrík, Višnyi
Electrical Equipment for Vehicles	5 th	2/2	Đurovský
Robots and Manipulators	5 th	2/2	Fetyko
Automated Electrical Drives II.	6 th	3/3	Fetyko
Power Semiconductor Systems II.	6 th	3/3	Ondera
Design of Electrical Drives	6 th	2/2	Maxim
Selected Industrial Drives	6 th	2/2	Đurovský
Fundamentals of Mechatronics	6 th	2/3	Fetyko

4.2. Graduate Study (Ing.)

Subject	Semester	Lectures/Labs (hours per week)	Name of lecturer
Technical Documentation in El. Eng.	1 st	2/1	Đurovský
Electrical Machines I.	5 th	3/3	Kostelný
Applied Electronics	5 th	2/3	Kováčová
Micro-controllers	5 th	2/2	Fedor, P., Višnyi
Power Electronics	6 th	3/3	Dudrík
Electrical Apparatus	6 th	3/2	Fedor, J.
Electrical Machines II.	6 th	3/3	Kostelný
Control Systems Software	6 th	2/3	Fedor, P.
Mechatronics Fundamentals	6 th	2/3	Fetyko
Electrical Drives	7 th	3/3	Timko
Automation Technology	7 th	3/3	Fedor, P.
Semestral Project	7 th	0/2	Supervisor
Models of Dynamic Systems	7 th	2/2	Fedák, Fetyko
Control Circuits for Power Electronics	7 th	2/2	Dudrík, Višnyi
Electrical Machines Design	7 th	2/2	Záskalický, Ferková
Electrical Equipment of Vehicles	7 th	2/2	Đurovský

Applied SW in Electrical Engineering	7 th	1/3	Dudrík, Fedák
Controlled Drives	8 th	3/3	Zboray
Electrical Apparatus Construction	8 th	2/3	Fedor, J.
Projection of Electrical Systems	8 th	2/3	Đurovský
Mechatronic Systems	8 th	2/3	Fetyko, Fedák
Logic and Non-linear control	8 th	2/3	Fedor, P.
Power Semiconductor Converters	8 th	2/3	Ondera
Semestral Project	8 th	0/2	supervisor
Special El. Machines and Apparatus	9 th	3/2	Kostelný, Fedor, J.
Semiconductor Converters Applications	9 th	2/3	Ondera
Control and Visualisation Systems of Technological Lines	9 th	2/3	Fedor, P.
Control of Robots and Manipulators	9 th	2/3	Fetyko
Production systems	9 th	2/3	Fetyko, Đurovský
Digital Control of Converters	9 th	2/2	Višnyi
Neuro and Fuzzy Control in Mechatronics	9 th	2/2	Timko, Žilková
Master Thesis (Diploma Work)	10 th	0/8	Thesis supervisor

4.3. Undergraduate and Graduate Study for Foreign Students (In English Language)

Subject	Lectures/Labs (hours per week)	Name of lecturer
Control Theory	2/2	Fedák
Electrical Machines I.	3/3	Záskalický
Electromechanical Systems	2/2	Fedák, Fetyko
Power Electronics	3/3	Dudrík
Electrical Apparatus	3/2	Fedor J.
Electrical Machines II.	3/3	Záskalický
Measurement in El. and Power Engineering	2/3	Záskalický
Mechatronics Fundamentals	2/3	Fetyko
Electrical Drives	3/3	Fedák
Automation of Electrical Equipment	3/3	Fedor P., Perduková
State Control of Electrical Drives	2/3	Zboray
Industrial Systems Identification	2/3	Fedák
Control Circuits for Power Electronics	2/3	Dudrík, Višnyi
Electrical Equipment of Vehicles	2/2	Maxim
System Identification	2/2	Fedák
Applied SW in Electrical Engineering	1/3	Dudrík, Fedák
Controlled Drives	3/3	Zboray
Complex Drive Systems	2/3	Fedák
Power Semiconductor Converters	2/3	Dudrík
Master Thesis Workshop	0/5	supervisor
Power Semiconductor Converters Applications	2/3	Dudrík
Electrical Drives Design	2/3	Maxim

Control of Robots and Manipulators	2/3	Fetyko
Selected Industrial Drives	2/3	Fetyko, Ďurovský
Master Thesis	0/8	Thesis supervisor

4.4. Newly approved study programs

Since the academic year 2005/06 the department will open the following study programmes:

Branch of study: Electrical Engineering

Degree of study	Study programme
I. (Bc.)	Electrical Engineering
II. (Ing.)	Electrical Engineering
III. (PhD.)	Electrical Engineering

Branch of study: Mechatronics

Degree of study	Study programme
I. (Bc.)	Informatic and Control Systems in Mechatronics
II. (Ing.)	Control of Mechatronic Systems

5 RESEARCH PROJECTS

- *Modern Methods of Identification and Control of Industrial Systems*, Scientific grant agency project (S.G.A.) VEGA project No. 1/9033/02 (01.2002-12.2004)
- *Voltage and Current Power Supplies with High Efficiency and Reduced Electromagnetic Interference*. VEGA project No. 1/9025/02 (01/2002-12/2004)
- *Modern Control Methods for Mechatronic Systems*, VEGA project No. 1/9277/02 (01/2002-12/2004)
- *EMC Power Converters*, VEGA project No. 1/0176/2003 (01/2003-12/2005)
- *Development of Mechatronic Systems Modern Components*. Institutional research project of FEI TU Košice, No. 4424 (01/2003 – 12/2005)
- *Sophisticated Processes and Products Supporting Export Efficiency of Electrical Engineering Branch in Slovak Republic*. Project of state research and development program task No 03 (01/2003-12/2004)

6 CO-OPERATION

6.1. Co-operation in Slovakia

The Department co-operates with many industrial enterprises in Slovakia having joint project at modernising of the electrical drive systems, control and mechatronic applications: US STEEL Košice, SIEMENS, ABB, BSH Drives and Pumps Michalovce, Křížik Prešov, Schneider Electric Slovakia, Spell Procont Prešov, Vonsch Podbrezová, TEKO Košice, ENERGO CONTROL Košice, ZŤS VVU Košice, ŽP Podbrezová, Bukóza Hencovce.

6.1.1. Visitors to the Department

- Hájek, V., Bartl, J. (VUT Brno, Czech Republic), 11. Feb., 11 Aug. 2004. Visit from contracting institution of the INETELE project.
- Weiss, H., Schmid, A., Thaler A. (Montanuniversität Leoben Austria), 27-29 July 2004. Visit in framework of the joint INETELE project.
- Bauer, P. (University of Technology of Delft, The Netherlands), 28-29 Aug., 2-3 Dec. 2004. Visit in framework of the joint INETELE project.
- Richter A., Konečná, E., Rydlo P. (Technical University of Liberec), 22-25 Nov. 2004. Cooperation in framework of joint Czech-Slovak Project.
- Lazanakis, A. (Nat. Technical University of Athens, Greece). 11-14 Dec. 2004. Visit in framework of the joint INETELE project.

6.2. International Co-operation

The department maintains intensive contacts with universities co-operating in current joint international projects:

- Montanuniversität of Leoben, Austria
- University of Zagreb, Croatia
- Brno University of Technology, Czech Republic
- Technical University of Liberec, Czech Republic
- Institut National Polytechnique de Lorraine, Nancy, France
- National Technical University of Athens, Greece
- University of Technology and Economy, Budapest, Hungary
- University of Miskolc, Hungary
- Delft University of Technology, The Netherlands
- Politecnico di Torino, Italy
- University of Podgorica, Montenegro, Yugoslavia
- Silesian University of Gliwice, Poland
- University of Maribor, Slovenia

6.2.1. Visits of Staff Members to Foreign Institutions

- Fedák, V.: Amsterdam, The Netherlands, 14-18 Jan. 2004, (3rd Joint Co-ordinating Committee of the eEDUSER project)
- Kováčová, I.: Magna, Austria, 15-17 Jan. 2004, (Co-operation in EMC)
- Ferková, Ž., Kostelný, M., Kaňuch, J., Záskalický P.: Brno, Czech Republic, 19-22 Jan. 2004, (Seminar of Electrical Machines Teachers).
- Dudrik, J.: Delft University of Technology, The Netherlands, 1–12 Feb. 2004, (study stay supported by the INETELE project).
- Kováčová, I.: Magna, Austria, 5-6 Feb. 2004, (Co-operation in EMC)
- Fedák, V.: Riga, Latvia, (ISC EPE-PEMC 2004 Int. Conf., EPE Executive Council + EPE-PEMC Council)
- Fedák, V.: Bordeaux, France, 17-19 March 2004 (European Conference on „Leonardo's Europe“)
- Fedák, V.: Manchester, United Kingdom, 20-22 March 2004, (Final meeting of the TEMPUS project partners)
- Fedor, P., Perduková, D.: Zakopane, Poland, 25-28 May, (Int. Carpathian Control Conf., ICC 2004)

- Fedák, V., Fetyko, J.: Athens, Greece, 30 April-5 May 2004 (3rd Joint Co-ordinating Committee of the INETELE project)
- Ďurovský, F., Kaňuch, J., Hutník E., SIEMENS, Vienna, 4 May 2004, (Excursion with students)
- Ďurovský, F. Žďár nad Sázavou, 12-17 May 2004, (ŽĎAS, Co-operation with SIEMENS Slovakia)
- Timko, J.: Institute of EE, Czech Academy of Science, Prague, 8-12 May 2004, (co-operation)
- Fetyko, J.: Žďár nad Sázavou, Czech Republic, June 2004, (ŽĎAS, Co-operation with SIEMENS Slovakia)
- Kostelný, M.: Gliwice, Poland, 24–26 May, 2004, (Co-operation of authors on a joint module in the INETELE project)
- Kováčová, I.: Magna, Austria, 31 May-2 June 2004, (Co-operation in EMC)
- Fedák, V.: Brno, Czech Republic, 13 June 2004, (INETELE project monitoring by Czech National Agency Leonardo da Vinci)
- Borbeľ, M., Dudrik, J., Fedák, V., Fetyko, J., Girovský, P., Šimko, O.: 21-24 June, 2004, Prague, Czech Republic, (SYMPEP 2004 - Int. Seminar of the Electrical Drives Teachers)
- Fedák, V.: Zaragoza, Spain, 9-12 July 2004 (4th Joint Co-ordinating Committee of the eEDUSER project)
- Kováčová, I.: Fachhochschule Hartz ,Germany, 30 June-2 July 2004, (Workshop)
- Dudrik, J., Fedák, V., Fetyko, J.: Riga, Latvia, 31 Aug.-9 Sept. (Power Electronics and Motion Control Int. Conference, EPE-PEMC 2004)
- Ferková, Ž.: Prague, Czech Republic, 7-10 September 2004, (ICEM Int. Conference)
- Ferková, Ž.: Pec pod Snežkou, Czech Republic, 29 Sept.-1 Oct. 2004, (21st Int. Conference of COMSOS Users)
- Girovský, P., Šimko, O.: Gliwice/Wisla, Poland, 12-19 Oct. 2004 (CEEPUS Summer School and VI International Workshop for Candidates for a Doctor Degree OWD'2004)
- Beláň, S.: Prague, Czech Republic, 3-5 Nov. 2004, (MATLAB Conference)
- Fedák, V.: Brno, Czech Republic, 14-18 Nov. 2004, (participation in the Czech-Polish international conference on Low Voltage Electrical Machines and meeting with the INETELE project co-ordinator)
- Fetyko, J.: Liberec, Czech Republic, 29 Nov.–1 Dec. 2004, (Joint Czech-Slovak project)
- Ferková, Ž., Hutník, E., Šimko, O.: Liberec, Czech Republic, 29 Nov.– 3 Dec. 2004, (Joint Czech-Slovak project)

6.3. Membership in International Organizations, Societies and Committees

- Fedák, V.: EPE EC (Executive Council) full member and EPE General Assembly member (EPE = European Power Electronics and Drives Association - Brussels)
- Fedák, V., Fetyko, J., Timko, J.: EPE-PEMC-C members (Power Electronics and Motion Control Council - Budapest). Fetyko, J. – appointed to be council member on 5 Sept. 2004 in Riga.

Members of Programme and Steering Committees of the International Conferences

- ISC of the EPE-PEMC 2004 (Power Electronics and Motion Control, 4-6 Sept. 2004, Riga): Fedák, V., Timko, J.
- ISC of the OPTIM 2004 (Optimisation of Electrical Equipment, 20-24 May 2004, Poiana Brasov, Romania): Fedák, V.
- ISC EPNC 2004 (Electromagnetic Phenomena In Nonlinear Circuits), June 28 –30, 2004, Poznań, Poland): Fedák, V.
- ISC ICETA 2004 (Emerging Telecommunications Technologies and Applications, 16-18 Sept. 2004, Košice): Fedák, V.
- IEEE ICIT 2004 (Int. Conference on Industrial Technology, 8-10 Dec. 2004, Hammamet, Tunisia): Fedák, V.

6.4. Membership in National Organisations and Societies

- Timko, J. (Vice-chairman); Fedák, V.; Fedor, J.; Zboray, L.; Fedor, P. (app.in June 2004), Fetyko J. (app.in June 2004), Dudrik J. (app.in June 2004) - members of Joint Slovak Board for the Ph.D. Study in Electrical Engineering
- Timko, J. (chairman), Fetyko, J., Kováčová, I., Fedor, P., Fedák, V., Dudrik, J.: members of board for the Ph.D. Study in Heavy-Current Electrical Engineering at FEEI
- Ferková, Ž.: member of Technical Standards Commission on Electrical Machines in SR
- Fedor, J.: Working group member of Accreditation Committee at Ministry of Education of SR
- Fedák, V.; Fedor, J.; Fetyko, J.; Kaňuch, J.; Ondera, J.; Timko, J.; Záskalický, P.; Zboray, L.: members of The SES (Slovak Electrotechnical Society), Branch at FEEI TU Košice
- Ondera, J.: Slovak Electrotechnical Society, Committee member
- Fedák, V.: Council of the Secondary Technical School for EE, Košice (delegate of the FEEI)

6.5. Contracts, International Projects

- The Department is a co-ordinating institution the Leonardo da Vinci project Interactive and Unified E-Based Education and Training in Electrical Engineering - INETELE, (No CZ/02/B/F/PP/ 134009). The objective of the project is to facilitate understanding and enhancement the studying in field of electrical engineering by teaching materials in electronic form with animated figures and interactive simulations. Target groups consist of students (secondary and university level), unemployed, disabled and all those who needs to refresh the knowledge from EE.

Project partners: Montanuniversität Leoben (A), Brno University of Technology (CZ), Institut National Polytechnique de Lorraine, Nancy (F), Budapest University of Economics and Technology (H), Silesian Technical University, Gliwice (PL), Delft University of Technology (NL), Slovak Chamber of Commerce and Industry (SK), Chamber of Commerce (CZ), Simulation Research (NL), Mercury-Smékal, Košice (SK). Duration of the project: 2002-2005. Contracting Institution: Brno TU, project co-ordinator: Fedák, V.

- In 2004 with Dept. of El. Engineering and Electromechanical Systems of the Technical university of Liberec, Czech Republic we had a joint project of cooperation

between the partners' departments that was organized in framework of intergovernmental agreement between Czech Republic and Slovakia.

Guarantee: doc. Fetyko

The working plan in 2004: joint visits at the departments supported by the lecture on topical research. Based on these, a plan of co-operation for collaboration in the next years is under preparation.

The staff members were also involved in the following international projects:

- TEMPUS JEP CD-16127-2001: Standardisation of Curriculum for Electrical Machines Using Multimedia (Fedák, partners: universities in Podgorica, Bath, Politecnico di Torino, Manchester).
- Leonardo da Vinci: SK/02/B/P/PP/142256: Efficient E-Learning Network Services Establishment for Education without Borders (Fedák – project sub-coordinator, 10 partners from The Netherlands, Germany, Spain, Finland, Greece, Slovakia).
- CEEPUS PL-0119-01/02: Multimedia as Auxiliary Tool in Teaching and Learning of Electrical Engineering (subco-ordinator: Fedák, V.)
Partners: universities in Maribor, Budapest, Pilsen, Bratislava, Gliwice).

The following project preproposals in from the Department in framework of the Leonardo da Vinci II programme were successfully accepted in 2004 (with deadline for full proposal 11 Feb. 2005):

- E-based Interactive Education in Electrical Engineering - Network of Users (IENES) – (Co-ordinator. V. Fedák). 11 prospective partners from: Czech Republic, Slovakia, Austria, Greece, France, Hungary, Poland, The Netherlands.
- Distance E-learning based Interactive Practical Education (DEBIPE). Partners: universities in Slovakia (Technical University of Kosice as contractor), Austria, Czech republic, France, Germany, Greece, Hungary, Poland, Romania, Slovenia, The Netherlands; research institutes and SMEs in The Netherlands and in Slovakia.

6.6. National Educational Projects

1) Project Code: G/166/03/61300

Project title: New Pedagogical Approaches and ICT Use for Teachers. (I2DV2)

Program: program IDEP (Internet Distance Education Program) of the Open Society Foundation

Period: 9/2003-9/2005

Project co-ordinator: doc. Perduková

Staff memmbers: doc. Perduková, Ing. Harčarufková, K., Ing. Orbanová I.

Tasks: The project goal consists in development of 9 e-learning modules from field of IE for teachers at the secondary schools and universities. Based on the modules, 70 participants have to take part in the distance education pilot courses.

Department task: to develop 8 e-learning modules, perform training and tutoring of the pilot run of the distance education course

7 THESES

7.1. Masters Theses (Ing. Study)

1. Andráš Ľuboš *Fuzzy Model of Asynchronous Motor* (Supervisor: Perduková, D.)
2. Beláň Stanislav *Design of Softstarter for Asynchronous Motor* (Supervisor: Ďurovský F.)
3. Hrdina Tomáš *Control of Cooling Water Technology with Schneider-Modicon Telemecanique Control System* (Supervisor: Perduková, D.)
4. Jenčopaľa Milan *Liquid Tank Physical Model* (Supervisor: Fedor, S.)
5. Krompaský Erik *Control of Liquid Storage Bin Systems* (Supervisor: Fedor, P.)
6. Krivanský Tomáš *Single-Phase Inverter 12/230 V* (Supervisor: Dudrik, J.)
7. Kužma Ladislav *Model of the Two – Phase Synchronous Motor Supplied by a Triac* (Supervisor: Záskalický, P.)
8. Miták Ivan *Design and Realization of Functional Model of Inverse Pendulum with DSP Control* (Supervisor: Fetyko, J.)
9. Nemeč Ladislav *A Neural Network Model of Tin Place Line* (Supervisor: Žilková, J.)
10. Olejár Martin *Regenerative Laboratory DC Source with Bidirectional Power Flow* (Supervisor: Ondera, J.)
11. Pollák Igor *Model of Reluctance Step Motor* (Supervisor: Záskalický, P.)
12. Repišák Martin *Design and Processing of Interactive Multimedia Learning Material for Education in Mechatronics* (Supervisor: Fedák, V.)
13. Rusiňko Martin *Design of the Synchronous Generator* (Supervisor: Ferková, Ž.)
14. Scholtz Valter *Modelling of Switching Processes in Protecting* (Supervisor: Fedor, J.)
15. Smolnický Rastislav *Inteligent Control Systems of Building Control* (Žilková, J.)
16. Stupák Marián *Neural Estimator of the Induction Motor Angular Speed* (Supervisor: Žilková, J.)
17. Šepeľa Ján *High Frequency Soft Switching Current-Mode Controlled DC-DC Converter* (Supervisor: Dudrik, J.)
18. Vaškovičová Andrea *Direct Torque Control of an Induction Motor* (Supervisor: Zboray, L.)
19. Zajac Miloš *Educational Stand of Internal Combustion Motor Control Unit* (Supervisor: Ďurovský, F.)

Note: All theses are in Slovak.

7.2. Masters Theses (Ing. Study) of Foreign Students

In January a group of 8 students from Kuwait has graduated from the department (2nd degree – master study), the branch of study: Electrical Drives. Two among them were the excellent students: Mekhlef M. Aldaihani And Ayedh M. A. M. Almutairi. Here are their theses:

1. MEKHLEF M. ALDAIHANI: *Design of a Controlled Hoist Drive with Elastic Connection*. (Supervisor: Fedák, V.)
2. AYEDH M. A. M. ALMUTAIRI: *Computer Analysis of AC Drive System Asynchronous Motor – Voltage Type Frequency Converter*. (Supervisor: Fedák, V.)
3. MOHAMMAD A. M. J. ALHUBAIL: *Design of Thermal Release for Monoblock*

- Starter.* (Supervisor: Fedor, J.)
4. HAMED M. SH. R. ALENEZI: *High-Frequency Switching Power Supply.* (Supervisor: Dudrik, J.)
 5. MUSSAD F. F. S. ALAZMI: *The Calculation of the Currents and Torque of the Switched Reluctance Motor.* (Supervisor: Záskalický, P.)
 6. TURKI A. R. O. ALOTAIBI: *Analysis of Anti-blocking System (ABS) Dynamics.* (Supervisor: Maxim, V.)
 7. SAMI Z. S. Z. A. ALAZEMI: *Behaviour of the Two-Phase Permanent Magnet Synchronous Machine.* (Supervisor: Záskalický, P.)
 8. SALAH KHALAF AL-FAHDLY: *Problems of Operation of High Voltage Transmission Lines in Kuwait.* (Supervisor: Tkáč J, KEE)

7.3. Theses to the PhD. Exam.

1. KAŇUCH, J.: *Electromagnetic compatibility of power semiconductor converters.* Written work to dissertation exam. KEPM FEI TU Košice, 2004 (Supervisor: Kováčová, I.)
2. HIČÁR, M., *Robust Cran Control*, 2004. Written work to dissertation exam. KEPM FEI TU Košice, 2004 (Supervisor: Zboray, L.)

8 OTHER ACTIVITIES

8.1. Symposia, Workshops, Conferences

- *High-Tech Workshop, Herľany 2004.* High-Tech (as the abbreviation of High-Technology) is the engineering workshop aimed to the informal exchange of ideas of teachers, students, graduates and colleagues from practise in the Educational and Training Centre of Technical University of Košice in Herľany (www.gejzir.sk). The 2004 workshop, already 16th in order, is organised annually and its programme includes specialised, sport and social parts with extremely interesting presentations and discussions, and amusing sporting and other disciplines. More information about this activity is to be found in www.tuke.sk/hth.
- Seminar on *Remembrance of doc. Jaroslav Tomko's and his Activities with Industry* (31 January 2004). Program: Review of projects of co-operation of the Department with industrial enterprises. Present state of joint co-operation. Overview of activities in organising international conferences by the department since 1973. Contributions from industry on topic of university (department) – industry co-operation. Requirements from industry on graduate from the department. About 60 participants from the local industry and Slovak universities.
- Seminar on *Fuzzy Logic Systems in Electrical Drives and Mechatronics* (15 April 2004). Program: Introduction into fuzzy systems and fuzzy logic. Fuzzy systems for modelling. Fuzzy systems for control. Realisation of fuzzy systems in praxis. Possibility of application and utilisation of fuzzy systems in praxis.
- Seminar on *Applications of Artificial Neural Networks in Electrical Drives and Mechatronics* (29 April 2004). Program: Introduction into ANN. Applications of ANN at identification of parameters of electrical drives and mechatronic systems. Experiences got from ANNs applications.

- Seminar on *Design of e-Learning Modules in Electrical Engineering* (6 April 2005) – in framework of the Leonardo da Vinci project “INETELE”. Program: Realised parts of interactive e-learning modules - FEDÁK, V.: *Mechatronic Systems* (math. models, block diagrams, interactive graphs); DUDRIK, J.: *Power Semiconductor Devices* (animations, electrical circuits); KOSTELNÝ M.: *Transformers* (magnetic circuits, vector diagrams). Know-how at design of the modules. Static and dynamic modules. Mutual exchange of information.
- Seminar on *Educational Visualization of Different Aspects at design of E-learning Modules* (1 July 2005). Program: e-Learning projects at FEI. Technological platforms. Overview of INETELE modules and their relation of the uLern platform. Realisation of interactive graphs for linear, nonlinear and dynamical systems. Utilisation for the simulation programme CASPOC for interactive simulations. INETELE Guidelines and basic principles at preparation of the modules.
- Seminar on *BSH Drives Michalovce activities*. Introduction and presentation of the company. Enlargement of the development basis in the branch Michalovce. Overview of activities, possibility of employment, joint co-operation. It was devoted for students of higher years at the department.
- Seminar on *SEZ Krompachy activities*. Introduction and presentation of the company. Overview of products, possibility of employment, joint co-operation. Possibilities for supporting the students by the scholarship.
- Presentation of the results in the educational projects: on 14-15 Oct. 2004 there was held international valorisation conference of the Leonardo da Vinci programme titled „Transfer of Innovations in Vocational Education and Preparation in Europe“ that was organised by SAAIC (Slovak Acadamis Association for International Co-operation, www.saaic.sk/transfair) spojená s medzinárodnou výstavou vzdelávacích projektov (number of participants at theconference: 170, number of international project: 38). The department took part in the exhibition by exhibiting results in the exhibition stand reached in the projects ELINA (previous project) and INETELE (the current one). At the competition of the projects, the project INETELE co-ordinating by the department won the 1st prize (exhibitors: Fedák V., Repičšák M.).

8.2. Projects for Industry

- 1) Project title: Solution and Technical Consultancy at Realization of Drives and Control System in the Lengthwise Dividing Line in the U. S. Steel Košice, s.r.o., Cold Mill Branch
 Done for: Siemens, s.r.o., Bratislava
 Project manager: Fetyko, J.
 Co-operating staff: Ďurovský, F., Hutník, E.
- 2) Project title: Design and Realisation of the Tester for Thermal Trip for Current Breakers
 Done for: SEZ Krompachy, a.s.
 Project manager: Fetyko, J.
 Co-operating staff: Dudrík, J., Višnyj, P., Ďurovský, F., Hutník, E., Nemeč, L., Hrdina, T., Kaňuch, J., Hajsák, F.
- 3) Project title: Tinning Line
 Done for: U. S. Steel Košice, s.r.o., Hot Mill Branch
 Project manager: Ďurovský, F.

Co-operating staff: Fetyko, J., Ďurovský, F., Hutník, E., Šimko, O.

- 4) Project title: Training in Converters and Rectifiers of SIEMENS Production
Done for: U.S. Steel Košice, Cold Mill Branch
Project manager: Ďurovský
Co-operating staff: Hutník
- 5) Project title: Switching Equipment for Switching and Synchronisation of the Short-Circuit Current
Done for: SEZ Krompachy, a.s.
Project manager: Fetyko
Co-operating staff: Dudrik, Vyšnyi P.
- 6) Project title: Lecturing of MS Office Course
Done for: Telegrafia, s.r.o.,
Project manager: Perduková
Co-operating staff: Perduková, Fedor S.,
- 7) Project title: Preparation and Lecturing of MS Office Course
Done for: Military Repairing Enterprise. Moldava n./B,
Project manager: Perduková
Co-operating staff: Perduková, Fedák

9) PUBLICATIONS

a) Books

–

b) Journals

1. DUDRIK, J. – FETYKO, J. – VIŠNYI, P. – KAROL', L.: Equipment for Switching and Synchronization of Short Circuit Current. *Journal for Electrotechnics and Power Engineering*, Vol.10, 2004, pp.131-134. (in Slovak).
2. FEDOR, P. – PERDUKOVÁ, D. – FERKOVÁ, Ž.: Fuzzy Model of the Asynchronous Motor Drive. *JEE – Journal of Electrical Engineering*, University Politehnica Romania, Vol.4/2004, No.1, pp.59-63, ISSN 1582-4594.
3. FEDOR, P. – PERDUKOVÁ, D. – MIŠKO, P.: Control System for Injection Moulding Machines. *Elektrotechnika v praxi*, BAEL 2004, Vol. 14, May/June 2004, pp.76-78. ISSN 0862-9730. (in Slovak).
4. FEDOR, P. – PERDUKOVÁ, D.: Design of Control System for Injection Moulding Machines of CASSPOS type. *EE Journal for Electrical and Electropower Engineering*, FEI STU Bratislava, Slovakia, 2004, Vol.10, 2004, pp.125-128. ISSN 1355-2547. (in Slovak).
5. FETYKO, J. – ĎUROVSKÝ, F. – HUTNÍK, E. – TAKÁČ, T. – MARCIN, D. – JÁNOŠÍK, M.: Modernising of Winder Drives in the Hot-Strip Mill of U.S. STEEL Košice. *ATP Journal*, Slovakia, Vol.11, No. 6, 2004, pp.64-65. ISSN 1335-2237. (in Slovak).
6. FERKOVÁ, Ž. - FEDOR, J. – DUPEJ, J.: Influence of Magnetic Field Distribution on Commutation of One-phase Commutator Motor, *Journal "Elektrotechnika v praxi"*, Czech Republic, 2004, pp.44-45. ISSN 0862-9730. (in Slovak).

7. FERKOVÁ, Ž.: Sensorless Control of Switched Reluctance Motor, *AT&P Journal*, Vol. XI, No.2, 2004, pp.71-73. ISSN 1335-2237. (in Slovak).
8. FERKOVÁ, Ž. – KUBÍN, K. – KAROL', J.: Simulation of Dynamic Behaviour of Breaker Mechanism, *EE - Journal for Electrical and Power Engineering*, Slovakia, Vol.10, 2004, pp.128-130. ISSN 1335-2547. (in Slovak).
9. PERDUKOVÁ, D. – FEDOR, P. – TIMKO, J.: Modern Methods of Complex Drives Control. *Acta Technica*, CSAV 49 (2004), pp.31-45. ISSN 0001-7043.
10. ZÁSKALICKÝ, P.: Dynamic Model of Two-phase Permanent Magnet Motor; *Zeszyty naukowe Politechniki Slaskiej*, Seria: Elektryka z.188, Gliwice, Poland, 2004, p p.215-220, ISSN 0072-4688.
11. ZÁSKALICKÝ, P. – ZÁSKALICKÁ, M.: Dynamical Model of Two-Phase Motor with Permanent Magnet; *Advances in Electrical and Electronic Engineering*; Žilina, Slovakia, Vol.2/2003, No 3-4; pp.30-33. ISSN 1336-1376. (printed in January 2004)
12. ŽILKOVÁ, J. – TIMKO, J.: Modelling of Linear Induction Motor in Dynamical Performance. *Acta Electrotechnica et Informatica*, No.1.,Vol.4., 2004, pp.12-15, ISSN 135-8243

9.2 Textbooks

1. KOVÁČ, D. – KOVÁČOVÁ, I. – KÖPONCEI, P.: Technological Processes Automation II, *E – learning textbook*, FEI TU of Košice, 2004, 134 p. (in Slovak).
2. TIMKO, J. – FEDÁK, V. – ŽILKOVÁ J.: Electrical Drives. *E-learning module* (uLern platform, available from www.tuke.sk). FEI TU Košice, 2004. (in Slovak).
3. HARČARUFKOVÁ, K. – PERDUKOVÁ, D.: Fundamentals of Work with computer. Microsoft Windows 2000. *Manual for distance education course. Prepared in framework of the project NOS – OSF*, No G/166/03/61300, titled New Pedagogical Approaches in Education and Utilisation of ICT for Teachers. FEI TU of Košice, 2004, 48 p. ISBN 80-8073-108-X. (in Slovak).
4. HARČARUFKOVÁ, K. – PERDUKOVÁ, D.: Microsoft Excel 2000 – Fundamentals of Work. *Manual for distance education course. Prepared in framework of the project NOS – OSF*, No G/166/03/61300, titled New Pedagogical Approaches in Education and Utilisation of ICT for Teachers. FEI TU of Košice, 2004, 32 p. ISBN 80-8073-104-X. (in Slovak).
5. PERDUKOVÁ, D.: Microsoft Excel 2000 – Advanced Techniques. Manual for distance education course. *Prepared in framework of the project NOS – OSF*, No G/166/03/61300, titled New Pedagogical Approaches in Education and Utilisation of ICT for Teachers. 40 p., FEI TU of Košice, 2004. ISBN 80-8073-105-X. (in Slovak).
6. WILLIAMSON, S. – DJUROVIC, M. – PROFUMO, F. - FEDÁK, V. – EASTHAM, F.: Electrical Machines. Part: Why Electrical Machines. *E-learning material for Electrical Machines In framework of the TEMPUS JEP*, project No. CD-16127-2001: “Standardization of Curriculum for Electrical Machines Using Multimedia”. Published on iternet at www.machines.cg.ac.yu.

9.3 Conferences

1. BAUER, P. – FEDÁK, V.: Educational Visualization of Different Aspects for Power Circuits and Electrical Drives. *11th Power Electronics and Motion Control International Conference, EPE-PEMC 2004*. Riga, Latvia, 2-4 September 2004. ISBN 9984-32-010-3 + CD ROM.
2. BORBEL', M. – ŽILKOVÁ, J. – TIMKO, J.: Inverse Control of DC Drive with External Excitation by Neural Network. *XX. Int. Symposium of Electrical Drives Teachers, SYMEP 2004*, Prague, Czech Republic, 2004, pp.14-18. ISBN 80-248-0619-3 + CD ROM. (in Slovak).
3. BRANDSTETTER, P. – ŠTEPANEC, L. – FEDOR, P. – PERDUKOVÁ, D.: Induction Motor Drive Using Sugeno-Type Fuzzy Logic. *In EPE-PEMC 2004*, Riga, Latvia, 2004, ISBN 9984-32-010-3 + CD ROM.
4. DUDRIK, J.: Visual Education of Power Semiconductor Devices Using E-learning Methods, *XX. Int. Symposium of Electrical Drives Teachers, SYMEP 2004*, Prague, Czech Republic, 2004, pp.51 – 56. ISBN 80-248-0619-3 + CD ROM. (in Slovak).
5. DUDRIK, J.: Soft-Switching DC-DC Power Converters, *XX. Int. Symposium of Electrical Drives Teachers, SYMEP 2004*, Prague, Czech Republic, 2004, pp 57-62. ISBN 80-248-0619-3 + CD ROM. (in Slovak).
6. DUDRIK, J.: Current-Mode Controlled DC Source for Arc Welding, *EPE-PEMC, Riga*, Latvia, 2004, ISBN 9984-32-010-3 + CD ROM.
7. DUDRIK, J.: Education of Power Electronics Devices Using E-Learning, *3rd International Conference on Emerging Telecommunications Technologies and Applications - ICETA- 2004*, Košice, Slovakia, September 2004, pp.427-430. ISBN 80-89066-85-2 + CD ROM.
8. FEDÁK, V.: Interactive Solutions at Design of e-Learning Material for Mechatronics. *XX. Int. Symposium of El. Drives Teachers, SYMEP 2004*. Prague, Czech Republic, 2004. pp.63-70. ISBN 80-248-0619-3 + CD ROM. (in Slovak).
9. FEDÁK, V. – FETYKO, J.: Interactive Solutions Design for E-learning Course on Mechatronics. *ICETA 3rd Int. Conf. on Emerging Telecommunications Technologies and Applications*, Kosice, Slovakia, 16-18 September 2004, pp.435-439. ISBN 80-89066-85-2 + CD ROM.
10. FEDÁK, V. – BAUER, P. – HÁJEK, V. – VAN DUIJSEN, P. – WEISS, H. – DAVAT, B. – MANIAS, S. – NAGY, I. – KORONDI, P. – MIKSIEWICZ, R. – SMÉKAL, P.: Interactive and Unified E-based Education in Electrical Engineering. *ICETA 3rd Int. Conf. on Emerging Telecommunications Technologies and Applications*, Kosice, Slovakia, 16-18 September 2004, pp.431-434. ISBN 80-89066-85-2.
11. FEDÁK, V. – KOSTELNÝ, M. – KAŇUCH, J.: E-Learning Course on Transformers – Animation and Visualisation of Operation. *Joint Czech – Polish Conference on Project GACR 102/03/0813. „Low Voltage Electrical Machines“*, VUT Brno, Czech Republic, 15–16 Nov. 2004. pp.23-32. ISBN 80-214-2632-2 + CD ROM.
12. FERKOVÁ, Ž. - FABRICI, D.: Parameter Identification of an Induction Motor by Genetic Algorithms, *XII. International Symposium on Electric Machinery*, Prague, Czech Republic, 2004. ISBN 80-01-03061
13. FERKOVÁ, Ž. – KUBÍN, K. – KAROL', J.: Utilisation of Cosmos/EMS at Analysis of Circuit Breaker Mechanism, *21st Conference of Cosmos Users, 2004*, Pec pod Sněžkou, Czech Republic, 2004, pp.2/21-2/28. ISBN 80-239-3654-9. (in Slovak).

14. FETYKO, J. – HUTNÍK, E. – J. ČVERČKO, – FEDÁK, V.: Observer Based Tension Control in Hot-Strip Finishing Mill. *11th Power Electronics and Motion Control International Conference, EPE-PEMC 2004*. Riga, Latvia, 2-4 September 2004. ISBN 9984-32-010-3 + CD ROM.
15. GIROVSKÝ P. – TIMKO, J. – ŽILKOVÁ J.: Contribution to Control of Electrical Drives by Artificial Neural Networks. *XX. Int. Symposium of El. Drives Teachers, SYMEP 2004*, Prague, Czech Republic, 2004, pp.81-85. ISBN 80-248-0619-3 + CD ROM. (in Slovak).
16. KAŇUCH, J.: Electromagnetic compatibility of electrical machines. *Proc of 4th Internal conference of PhD. students, ISC'2004 Conference*, FEI TU Košice, 2004. ETC GRAFO, 2004, pp.55-56. ISBN 80-968395-9-4.
17. KOVÁČOVÁ, I. - MADARÁSZ, L. - KOVÁČ, D. - VOJTKO, J.: Neural Network Linearization of Pressure Force Sensor Transfer Characteristic, *Proceeding of IEEE International Conference on Intelligent Engineering Systems – INES 2004*, Cluj-Napoca, Romania, September 2004, pp.79-82, ISBN 973-662-120-0
18. PERDUKOVÁ, D. - FEDOR, P. – TIMKO, J.: Modern Methods of Complex Drives Control. In: *Proc. of Int. Carpathian Control Conf. ICC 2004*. Zakopane, Poland, May 2004, pp.153-158. ISBN 83-89772-00-0.
19. ŠIMKO, O. – FETYKO, J.: Adaptive Control of Robot by a Neuronal Observer. *XX. Int. Symposium of El. Drives Teachers, SYMEP 2004*, Prague, 2004, pp.209-215. ISBN 80-248-0619-3 + CD ROM. (in Slovak).
20. VOJTKO, J. – KOVÁČOVÁ, I. – MADARÁSZ, L. - KOVÁČ, D.: Neural Network for Error Correction of Pressure Force Sensor Based on Elastomagnetic Phenomena, *Proceeding of IEEE. International Conference on Computational Cybernetics - ICC 2004*, Vienna, Austria, September 2004, pp.35-38, ISBN 3-902463-01-5.
21. ZÁSKALICKÝ, P., – ZÁSKALICKÁ, M.: Torque Ripples Calculation of the Two-phase Permanent Magnet Synchronous Motor Supplied by a Triac Converter from Single-phase Voltage; *EPE-PEMC 2004, 11th International Power Electronics and Motion Control Conference*, 2-4 September 2004, Riga, Latvia. pp.196-198, ISBN 9984-32-034-0 + CD ROM.
22. ZÁSKALICKÝ, P.: Dynamic Model of Two-phase Motor with Permanent Magnet Supplied by a Triac Converter; *Medzinárodný odborný seminár SEKEL 2004*, 22-24 Sept. 2004, Písek u Jablunkova, VŠB-TU Ostrava, Czech Republic, 2004, pp.105-100, ISBN 80-248-0619-3.
23. ZÁSKALICKÝ, P. – ZÁSKALICKÁ, M.: Two-phase Synchronous Motor Supplied by a Triacs; *Proceedings of the 7th International Symposium Mechatronics 2004*, 24-26 May 2004, Račkova dolina, STU Bratislava, Slovak Republic, 2004, pp.114-119 ISBN 80-227-2064-X.
24. WEISS, H. – SCHMIDHOFER, A. – SCHMID, A. – HÁJEK, V. – DAVAT, B. – MANIAS, S., NAGY, I. – KORONDI, P. – JÁRDÁN, R. K. – MIKSIEWICZ, R. – FEDÁK, V. – SMÉKAL, P. – BAUER, P. – VAN DUIJSEN, P.: Animated and Interactive e-Learning Concept and Realization. *The IASTED Int. Conf. on Web-Based Education, WBE 2004*. Innsbruck, Austria, 16-18 Feb. 2004. Paper No 416-210_L, ISBN 0-88986-377-6

25. ŽILKOVÁ, J. – TIMKO, J.: Modeling of Technological Line. *Proc. From the 8th Conf. On Intelligent Systems for Praxis*. Seč u Chrudimi, Czech Republic, Oct. 2004, ISBN 80-239-3680-8. + CD ROM (in Slovak).
26. ŽILKOVÁ, J. – TIMKO, J.: Model of Tubule Asynchronous Motor in Matlab-Simulink. *XX. Int. Symposium of El. Drives Teachers, SYMEP 2004*, Prague, Czech Republic, 2004. pp.282-286. ISBN 80-248-0619-3. (in Slovak).

9.4 Others

Unpublished lectures and

- 1 FEDÁK, V.: Presentation of the INETELE project outputs. In framework of *the European Conference "Leonardo's Europe"*. Bordeaux, France, 18-19 March 2004.
- 2 FEDÁK, V.: Interactive and Unified E-Based Education and Training in Electrical Engineering. Presentation and Exhibition of Project Leonardo da Vinci: No CZ/02/B/F/PP/134009 outputs. Exhibited at *Int. conference and Exhibition on "Transfair of Innovations in Vocational Education and Preparation in Europe"*, 14–15 Oct. 2004 Bratislava. The INETELE exhibition stand organised under name of the Technical University of Kosice was evaluated as the best educational project from 38 exhibited projects of participating European countries. Published at the web site: www.saaic.sk/transfair.
- 3 FEDÁK, V.: e-Learning in Electrical Engineering. *Lecture supported by computer presentation at workshop on "e-Learning in the School Praxis"*. Michalovce, 12.11.2004. Approx. 60 teachers from the secondary schools and representatives from Slovak National Agency Leonardo da Vinci programme. Published at the web site: www.spsemi.sk.

Joint Projects with Industry - Reports

- 1 FETYKO, J. – DUDRIK, J. – VIŠNYI, P.: Equipment for switching and synchronization of short circuit current, *Final report of industry project TU03/03 – a joint project with SEZ Krompachy*. KEPM FEI T Košice, 2004. 9 p. (in Slovak)