

Kandó Kálmán Faculty of Electrical Engineering

Institute of Instrumentation and Automation

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1 Introduction

Institute of Instrumentation and Automation can be found in Tavaszmező plant of Budapest Tech.

Institute has 26 teachers 24 full time and 2 part time persons.

Among them there are two PhD and four PhD aspirants.

Number of administrative and technical staff is 14. Among them there is 1 PhD aspirant.

Institute keeps contact with 96 industrial enterprises and companies.

2 Educational Profile

Five specified modules are educated, those are:

- **Electronical Testing.** The goal of the module is to train such kind of engineers who can handle measurement and instrumentation problems emerging in Industrial environment.

They have wide knowledge in the field of operate, service and development of digital systems.

Module subjects:

Intelligent Measuring Systems I, II,

Instrumentation Circuits,

Instrument Technics,

Electronic Testing,
Metrology,
Electronic Test Laboratory I, II,
Project.

- **Supervising Informatics and Electronic Surveillance Systems.** The goal of the module is to train such kind of engineers who can develop, handle and operate property protection systems.

In the frame of module students have the opportunity to take fire protection exam and weapon exam.

Module subjects:

Surveillance Informatics and Security Alarm Systems I, II,
Building Automation,
Video Surveillance Systems,
Electronic Surveillance Instruments and Systems,
Electronic Surveillance Laboratory,
Integrated Surveillance Laboratory,
Project.

- **Medical Devices and Systems.** The goal of the module is to train such kind of engineers who are able to handle all the devices and systems can be found in medical and hospital systems.

They can operate, service and install those instruments.

Module subjects:

Medical Engineering I II,
Clinical Engineering,
Metrology of Quality Management,
Contemporary Measurements of Biological Signals,
Digital Radiography,
Medical Engineering Laboratory I, II,
Project.

- **Automatic Production Systems.** The goal of module is to train such kind of engineers who know the structures, applicable technologies and their informatics as well as the control devices.

They have wide knowledge in the field of electronics, pneumatics, hydraulics, embedded systems and control engineering as well as scheduling theory.

Module subjects:

Manufacturing systems I, II,
Embedded systems,
Sensors and actuators,
Computer networks,
Quality management and corporate systems,
Manufacturing systems laboratory I, II,
Project.

- **Computer-aided Process Control.** The goal of the module is to produce such kind of engineers who have knowledge related to so-called classical control problems.

They know physical background of processes, their control solutions as well as control devices.

Module subjects:

Process Control I, II,
Measurement and Instrumentation of Process Variables,
Programmable Logic Controllers and Systems,
Real-Time Systems,
Automation of Buildings and Public Utilities,
Process Control Laboratory I, II,
Project.

Apart from the module educations institute takes part in basic education of Budapest Tech. Those subjects are:

- **Information Technology I** for Kandó Faculty and Rejtő Faculty in Tavaszmező street and Óbuda,
- **Programming I, II** for Kandó Faculty in Tavaszmező street and Óbuda,
- **Measurement I, II** for Kandó Faculty in Tavaszmező street,
- **Automatics** for Kandó Faculty in Tavaszmező street,
- **Electronics and Digital Circuits** together with Institute of Technologies and Microelectronics and Institute of Telecommunication for Kandó Faculty in Tavaszmező street.

3 Research and Scientific Activity

In the frame of institute the following research topics are running:

- **Industrial Application of Fuzzy Logic.** Result of this adaptive thread stress control. Project leader: György Schuster PhD.
- **Control Question of Production Systems.** Additional automation of production lines. Project leader: György Schuster PhD, Partner Continental Temic Hungary.
- **Application of Operation Research Methods in Trajectory Planning.** Feasibility survey of automation possibility in production lines. Project leader: György Schuster PhD, Partner Continental Temic Hungary.
- **Embedded Systems Application in Production Lines.** Project leader: Tamás Sándor. Result MK60I station control and scheduling. Partner: Continental Temic Hungary.
- **Application of Boundary Scan Method.** Project leader: Dr. József Kohut.
- **Design of Integrated Circuits (ASIC).** Design of special sensors, analogues and digital circuits. Project leader: Timót Hídvégi PhD, Gábor Marton.
- **Implementation and Application Neural Networks.** Project leader: Timót Hídvégi PhD, Tamás Zeffer.

Institute takes part in four innovation projects. Those are:

- **Automated Unit Handling of Lid Welding Machine on MK60 Production Line**

The goal of the project is planning of the automated serve of MK60 low frequency lid welding machine. Project contains:

- 1 technological survey,
- 2 testing material flow and possible altering suggestions,
- 3 plans of automatic serve.

Project connects to **Control Question of Production Systems** and **Embedded Systems Application in Production Lines** research fields.

Project leader: György Schuster PhD associate professor.

- **Feasibility Survey of Automated Unit Handling for MK25 Low Frequency Lid Welding and Leaking Tester Station**

The goal of the project is to prepare a feasibility review on the automation of material handling connecting laser engraver, cooling conveyor, low frequency

lid welding machine and leak tester at the MK25 production line in Continental Temic Hungary Ltd. plant. Project contains:

- 1 technological survey,
- 2 layout suggestion considering technological facilities,
- 3 suggestion taking into consideration production culture and given devices of company,
- 4 simulation of suggested material handling and its mathematical model.

Project leader: György Schuster PhD.

● **Application and Usage of CTN Open-Source ICON Software Engine**

The goal of the project is in the title mentioned ICON software system application research. Partner is Vamato Ltd. Project contains:

- 5 application validation,
- 6 accessory software development,
- 7 application and software testing.

Project leader: Tamás Sándor.

● **Establishing Hardware and Software of Test Work Station on Products of Comfort Electronics (SITZ)**

The goal of the project is to implement a test station in the given technological production at the given location. Planning test procedure and planning the hardware and software of the mentioned station. Project contains:

- 8 planning of test steps,
- 9 specification of the above mentioned test steps,
- 10 preparing system plan of test hardware,
- 11 supporting manufacturer of test device,
- 12 planning and engineering of device software,
- 13 implementing of prepared device.

Project leader: Dr. József Kohut.

Most important publication in the institute in past five years:

Schuster György: Kispontosságú fuzzy pozícionáló rendszer, Kandó Konferencia 2002. november 10-11.

György Schuster: Fuzzy Approach of Backward Identification of Quasi-Linear and Quasi-Time-Invariant Systems, in Proceedings of 11th International Workshop

Institute of Instrumentation and Automation

on Robotics in Alpe-Adria-Danube Region, RAAD 2002, Balatonfüred, Hungary, June 30-July 2, 2002, pp. 43-50, ISBN 963 7154 09 4

György Schuster: Adaptive Fuzzy Control of Thread testing Furnace, in Proceedings of IEEE International Conference on Computational Cybernetics, ICC 2003, Siófok, Hungary, August 29-31, 2003, pp. 299-304, ISBN 963 7154 17 5

György Schuster, Tamás Sándor: A Method and Layout of Serial-Parallel Scheduling Problem, in Proceedings of Jubilee Conference of Budapest Tech, Budapest, Hungary, September 4, 2004, pp. 185-192, ISBN 963 7154 31 0

Zsolt Markella, András Kocsis, Tamás Vízkelety: Computer Modelling of Face Reconstruction Systems, Kandó Conference, January 12-13, 2006

Dr. József Kohut: Application of Wals-Functions in Description of Digital Networks, Kandó Conference, January 12-13, 2006

Péter Kucséra: Introduction of Mobile Robotics, Kandó Conference, January 12-13, 2006

Dr. Schuster György, Sándor Tamás, Delikát András, Kiss Dániel Kristóf: Ütemezési kérdések beágyazott rendszerek esetén, Kandó Conference, January 12-13, 2006

Dr. Schuster György, Sándor Tamás, Delikát András, Kiss Dániel Kristóf: Informatikai hálózatok időszerű kérdései gyártórendszerekben, Kandó Conference, January 12-13, 2006

György Schuster, Tamás Sándor: Application of Networks in Automotive Production, in Proceedings of 15th International Workshop on Robotics in Alpe-Adria-Danube Region, RAAD 2006, Balatonfüred, Hungary, June 15-17, 2006, pp. 136-141, ISBN 963 7154 48 5

György Schuster: Improved Method of Adaptive Fuzzy Control of a Thread Testing Furnace, in Proceedings of 4th IEEE International Conference on Computational Cybernetics, ICC 2006, Tallinn, Estonia, August 20-22, 2006, pp. 125-129, ISBN 1-4244-0071-6, IEEE Catalog Number: 06EX1270

Péter Kucséra: Sensors for Mobile Robot Systems (to be printed)

József Kohut: Künstliche Intelligenz der Messgeräte Wissenschaftliche Beiträge, Technische Fachhochschule Wildau, Deutschland, 2001. July, pp. 100...102

József Kohut: Minőségbiztosítás az elektronikában – Fejlesztési eredmények a Leonardo-programban, Szakképzési szemle XVII. Évf. (2001) 2 szám, pp. 181...184

József Kohut: Digitálisan programozható analóg áramkörök, Előadás a Hungelektro 2002 kiállítás konferenciáján (2002)

József Kohut: Analóg és digitális áramkörök peremfigyeléses vizsgálata, Előadás a Hungelektro 2002 kiállítás konferenciáján (2002)

József Kohut: Analóg áramkörök peremfigyeléses vizsgálata, Cikksorozat az ElektroNet 2002/1-4. számaiban

József Kohut: Digitálisan programozható analóg áramkörök, Előadás a BMF KVK konferenciáján, cikk a konferencia CD-kiadványában (2003)

József Kohut: Analóg és digitális áramkörök peremfigyeléses vizsgálata, Előadás a BMF KVK konferenciáján, cikk a konferencia CD-kiadványában (2003)

József Kohut: Artificial (Computer) Intelligence in Measuring Instruments, Presentation on 20th Joint Science Conference: Science for Practice, Osijek, Croatia, May 5-6, 2003

József Kohut: A digitális és analóg integrált áramkörök peremfigyeléses vizsgálata, Előadás a Wilhelshaveni Műszaki Főiskola hallgatói részére (2004. április)

József Kohut: Új módszer a többkimenetű logikai áramkörök működésének jellemzésére és hibáinak diagnosztizálására, Előadás a Regionális konferencia 2004, tudományos főirányok az EU-ban konferencián (Székesfehérvár, 2004. november 8.)

József Kohut: A Proposal for the Characterization and Diagnosis of Multiple-Input/Multiple-Output (MIMO) Digital Circuits, Presentation on European Board Test Workshop 2005, Tallinn, Estonia, May 25-26, 2005

T. Hidvégi, P. Keresztes, P. Szolgay: The CASTLE Emulated Digital Array Processor, Activity Report, Europractice, IC Service, 2005

Tamás Zeffér, Timót Hidvégi: A Programmable Digital Cellular Neural Network Processing On- and Off-Chip Sensory Information, The 10th IEEE International Workshop on Cellular Neural Networks and their Applications, August 28-30, 2006, Istanbul, Turkey

Tamás Zeffér, Timót Hidvégi: The Configurable Digital Neural Network with Emulated Digital Cellular Neural Network Cores, in Proceedings of IEEE 3rd International Conference on Mechatronics, ICM 2006, Budapest, Hungary, July 3-5, 2006, pp. 312-315, ISBN 1-4244-9712-6, IEEE Catalog Number: 06EX1432

Tamás Zeffér, Timót Hidvégi: The Configurable Digital Cellular Neural – Hopfield Network, in Proceedings of 10th IEEE International Conference on Intelligent Engineering Systems, INES 2006, London, UK, June 26-28, 2006, pp. 160-164, ISBN 1-4244-9708-8, IEEE Catalog Number: 06EX1430

Utassy Sándor: Behatolásjelző rendszerek tápellátási kérdései. (Detektor Plusz, cikk, 2006/10. szám, Budapest)

Utassy Sándor, Bárkányi Pál: IP alapú kommunikáció az elektronikus vagyonvédelmi rendszerekben. (Bólyai szemle, cikk, 2006/2. szám, Budapest)

Utassy Sándor, Rónai Gyula: A tűzjelző rendszerek tervezésének néhány kérdése. (Detektor Plusz, cikk, 2006/1-2. szám, Budapest)

Sándor Utassy, Dr. Elek Horváth: The Evolution of the Integrated Security Systems, 23rd Kandó Conference 2006, Budapest

Sándor Utassy, Gyula Rónai: Distributed Fire Alarm Systems and Panels. 23rd Kandó Conference 2006, Budapest

Utassy Sándor: Tervezési szempontok. – A biztosítások feltételei. (Detektor Plusz, cikk, 2005/12. szám, Budapest)

Sándor Utassy: An Approach of the Risk Analysis of Integrated Security Systems. 22nd Internationale Konferenz 'Science in Practice', Schweinfurt 2005, Fachhochschule Würzburg-Schweinfurt, University of Applied Sciences, May 18-20, 2005

Utassy Sándor, Szalay János, Dr. Zsigmond Gyula: Üzemen kívül helyezett katonai objektumok környezetbiztonsági kockázatainak csökkentése integrált épületfelügyeleti rendszerek kialakításával. (Havaria-esetek és kezelésük 2005. konferencia, ZMNE, előadás, 2005. március 22.)

Utassy Sándor: Komplex villamos rendszerek biztonságtechnikai kérdései. (ZMNE, PhD konferencia, előadás, 2004. 11. 15.)

Utassy Sándor: Integrált felügyeleti rendszerek - Intelligens épületek. (ZMNE, PhD konferencia, előadás, 2004. 11. 15.)

Utassy Sándor: Felügyeleti informatika – Integrált épületfelügyeleti rendszerek. III. (Tudományos megközelítés) (Áram és Technológia, cikk, 2004. III. évf. 10. szám, Budapest)

Utassy Sándor: Felügyeleti informatika – Az IP alapú kommunikáció. IV. (Képtömörítési eljárások) (Áram és Technológia, cikk, 2004. III. évf. 3. szám, Budapest)