

ASIF ŠABANOVIĆ

Curriculum Vitae

SABANCI UNIVERSITY
Faculty of Engineering and Natural Sciences
Orhanli-Tuzla, 34956 Istanbul, Turkey

Tel.:+90.216.484 9502
Fax.:+90.216.4839550
Email: asif@sabanciuniv.edu

Date of Birth: 30 August 1946

Citizenship: Bosnia and Herzegovinn

Current academic titles: **Full professor at Sabanci University, Mechatronics Program**
Full professor at University of Sarajevo, Faculty of EE
Member of Academy of Sciences and Art of Bosnia and Herzegovina

Areas of Speciliazation Mechatronic, Robotics, Motion Control, Control Systems, Control Drives, Power Electronics,

EDUCATION

1975 -1979 Ph.D. Electronics and Automatic Control , University of Sarajevo, Bosnia and Herzegovina
1973 -1975 M.S. Electronics and Automatic Control , University of Sarajevo, Bosnia and Herzegovina
1965 -1970 B.S. Electronics and Automatic Control , University of Sarajevo, Bosnia and Herzegovina

ACADEMIC POSITIONS

1999-Present SABANCI UNIVERSITY Faculty of Engineering and Natural Science, Mechatronics Program, **Full Professor**
1985- 2011 UNIVERSITY OF SARAJEVO, Department of Electrical Engineering (1996-2011) – adjunct professor, **Full Professor**
2008-2009 KEIO UNIVERSITY, Faculty of Science and Technology
Research Fellow in GCOE Program, on Sabbatical leave from Sabanci University
1995-1999 ISTANBUL TECHNICAL UNIVERSITY, Electrical Engineering Department, (Part time), **Full Professor**
1994-1995 KOCAELI UNIVERSITY, Electrical Engineering Department, (Part time), **Full Professor**
1992-1993 YAMAGUCHI UNIVERSITY Faculty of Engineering, **Full Professor**
1991-1992 KEIO UNIVERSITY, Faculty of Science and Technology
Hitachi Chair Professor
1987 UNIVERSITY OF TOKYO, Institute of Industrial Science
Research Fellow
1983-1985 CALIFORNIA INSTITUTE OF TECHNOLOGY –CalTech, Department of Electrical Engineering
Visiting Professor
1974 USSR-ACADEMY OF SCIENCE, Institute of Control Sciences (IAT).
Visiting Researcher

NON-ACADEMIC POSITIONS

1994-1999 Scientific Adviser in CAD/CAM Robotics Department, TUBITAK
1995-1999 Head of Engineering Division, B.H. Engineering and Consulting Co
1993-1994 Head of CAD/CAM Robotics Department, TUBITAK, MAM
1989-1991 Scientific Advisor, ENERGOINVEST – The Institute for Control and Computer Science
1975-1983 Chief engineer, ENERGOINVEST – The Institute for Control and Computer Science

RESEARCH EXPERIENCE

1999-present	SABANCI UNIVERSITY, Establishment of the undergraduate and graduate education program and R&D activities in Mechatronics
1995-2000	ISTANBUL TECHNICAL UNIVERSITY, R&D in Control Systems, Robotics and Power Converters Control Systems
1993-2000	TUBITAK, Establishment of R&D activities in Power Electronics and Development of the 6 d.o.f. robotic system
1992-1993	YAMAGUCHI UNIVERSITY, Establishment of Industrial Control Systems Lab in cooperation with Prof. K. Wada.
1991-1992 and 2008-2009	KEIO UNIVERSITY, Research in Control of Robotic Systems and Power Converters in Prof. Ohnishi Lab
1983-1985	CALIFORNIA INSTITUTE OF TECHNOLOGY, CalTech, Research in Power Electronics in Prof. Middlebrook and Prof Cuk Laboratory

TEACHING EXPERIENCE

1999- Present	SABANCI UNIVERSITY Courses: Power Electronics, Motion Control Systems , Electrical Drives, Introduction to Modeling and Control , Control System Design, Nonlinear Control, Sliding Mode Control, Advanced Motion Control , Mechatronics Design
2008 -2009	KEIO UNIVERSITY Courses: Advances in in Motion Control
1995-1999	ISTANBUL TECHNICAL UNIVERSITY Courses: Control of Power Converters and Electrical Drives, Motion Control Systems
1993-1994	KOCAELI UNIVERSITY Courses: Control of Power Converters and Electrical Machines
1992-1993	YAMAGUCHI UNIVERSITY Courses: Motion Control Systems , Control of Robotic Manipulators
1991-1992	KEIO UNIVERSITY Variable Structure Systems in Motion Control
1983-1985	CALIFORNIA INSTITUTE OF TECHNOLOGY Courses: Variable Structure Systems Application in Power Electronics
1971-1991	UNIVERSITY OF SARAJEVO Courses: Theory of Electrical Circuits, Analog and Hybrid Computers , Power Electronics, Control of Electrical Drives, Energy Conversion Systems , Robotic Control Systems
1996-2011	UNIVERSITY OF SARAJEVO Courses: Robotics (adjunct professor)

THESIS ADVISOR

9 PhD and 29 MSc

AWARDS

1991	Silver Award of the University of Sarajevo for Professional Achievements
1985	Outstanding Paper Award, from IEEE Industrial Electronics Society for the paper "Sliding Mode Control of DC to DC converters"
1980	The State Award " July the 27th ", for the contribution in the Power Electronics development, Sarajevo, (the highest award of the Republic Bosnia and Herzegovina)

MEMBERSHIP IN PROFESSIONAL SOCIETIES

1986 - present	IEEE - The Institute of Electrical and Electronics Engineers
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PUBLICATION LIST

424 publications (5 books, 2 edited books, 10 chapters in the books, 393 articles and conference papers out of which 128 are referred in Web Of Science database).

II Chronological List of Publications (~~2013~~ 2014 – 1974)

2014

- 425 Eşref Emre Özsoy, Edin Golubovic, Asif Šabanović, Seta Boğosyan, Metin Gökaşan
Modeling and control of doubly fed induction generator with a disturbance observer: A stator voltage oriented approach
In the *Turkish Journal of Electrical Engineering & Computer Sciences*, Vol. ? No ? pp.....-...
Available online 23 January 2014 DOI: 10.3906/elk-1312-104 In Press
- 424 Toshiaki Tsuji, Asif Asif Sabanovic, Kiyoshi Ohishi and Makoto Iwasaki ,
Introduction to the Special Section on New Emerging Technologies in Motion Control Systems—Part I,
In the IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, VOL. 61, NO. 7, JULY 2014
- 423 Toshiaki Tsuji, Asif Asif Sabanovic, Kiyoshi Ohishi and Makoto Iwasaki ,
Introduction to the Special Section on New Emerging Technologies in Motion Control Systems—Part I,
In the IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, VOL. 61, NO. 2, FEBRUARY 2014,
- 422 Tarik Uzunovic, Edin Golubovic and Asif Sabanovic; **"Piezo LEGS Driving Principle Based on Coordinate Transformation"**
In the *Mechatronics, IEEE/ASME Transactions on* (Volume:PP , Issue: 99), Page(s):1 - 11, ISSN :1083-4435, DOI:10.1109/TMECH.2014.2351272
- 421 Kuzu, Ahmet, Baran, Eray, Bogosyan, Seta, Gokasan, Metin, Sabanovic, Asif: **"Wavelet Packet Transform Based Compression for Bilateral Teleoperation"**
SAGE Journals, Proceedings of the iMeche, Part I: Journal of Systems and Control Engineering In press
- 420 Emre Ozsoy, Asif Sabanovic, Edin Golubovic, Metin Gokasan, Seta Bogosyan, **"A Novel Rotor Current Controller Scheme for Grid Connected Doubly Fed Induction Generators"**
Proceedings of 16th International Power Electronics and Motion Control Conference, PEMC 2014, September 21-24, Antalya, Turkey, pp 482-487
- 419 *Merve Acer and Asif Sabanovic: " Tasarlanan D`uzlemsel Paralel Esnek Ba ğlantılı Mekanizmanın Kayan Kipli Kontrol ""*
In the Proceedings of 2014 Otomatik Kontrol Ulusal Toplantısı, Kocaeli, 11-13 September 2014, pp 96-101
- 418 *Zhenishbek Zhakypov, Edin Golubovic, Ahmet Özcan Nergiz, Asif Sabanovic: " Galvanometrik Sistemin Lazerle Yüksek Hassasiyette İşaretleme için Yapay Sinir Ağı Tabanlı Modellenmesi "*
In the Proceedings of 2014 Otomatik Kontrol Ulusal Toplantısı, Kocaeli, 11-13 September 2014 , pp 706-711
- 417 Eray A. Baran, Zhenishbek Zhakypov, Erdal Kayacan, Asif Sabanovic: **"Uzaktan Lazer Cerrahi İçin Kısıtlı Sistem Tabanlı Efendi Köle Denetleyicisi"**
In the Proceedings of 2014 Otomatik Kontrol Ulusal Toplantısı, Kocaeli, 11-13 September 2014 , pp 675-680
- 416 *Edin Golubovic, Tarik Uzunovic, Zhenishbek Zhakypov, Doğançan Kebude, Asif Sabanovic: "Piezo LEGS Motorun Hassas Konumlama Uygulamaları için Modellenmesi ve Denetlemesi"*
In the Proceedings of 2014 Otomatik Kontrol Ulusal Toplantısı, Kocaeli, 11-13 September 2014, pp 824-829

- 415 *Burak Soner, Edin Golubovic, Tarik Uzunovic, Asif Šabanović: "Çift Beslemeli İndüksiyon Jeneratörü Rotor Tarafı Akım Döngüsü için Kontrolcü Tasarımı ve TMS320F28335 Üzerinde Uygulaması"*
In the Proceedings of 2014 Otomatik Kontrol Ulusal Toplantısı, Kocaeli, 11-13 September 2014 , pp 83-88
- 414 Uzunovic, T., Baran, E. A., Golubovic, E., Sabanovic, A. "**Three-Dimensional Contour Tracking Control of a Parallel Manipulator: Comparison of Two Control Techniques**",
Proceedings of the 23rd IEEE International Symposium on Industrial Electronics, Istanbul, Turkey, June 1-4, 2014, Pages: 1262-1267, IEEE Catalog Number: CFP14ISI-USB, ISBN: 978-1-4799-2398-
- 413 Zhakypov, Z., Uzunovic, T., Nergiz, A. O., Baran, E. A., Golubovic, E., Sabanovic, A. "**Desktop Microfactory for High Precision Assembly and Machining**",
Proceedings of the 23rd IEEE International Symposium on Industrial Electronics, Istanbul, Turkey, June 1-4, 2014, Pages: 1192-1197, IEEE Catalog Number: CFP14ISI-USB, ISBN: 978-1-4799-2398
- 412 Doğançan Kebude, Hidetaka Morimitsu, Seiichiro Katsura and Asif Sabanovic, "**Multilateral Control-Based Motion Copying System for Haptic Training,**"
Proceedings of the 23rd IEEE International Symposium on Industrial Electronics, Istanbul, Turkey, June 1-4, 2014, Pages: 2246-2251, IEEE Catalog Number: CFP14ISI-USB, ISBN: 978-1-4799-2398
- 411 Uzunovic, T., Golubovic, E., Sabanovic, A. "**FPGA Based Control of a Walking Piezo Motor**",
Proceedings of the 13th International Workshop on Advanced Motion Control, Yokohama, Japan, March 14-16, 2014, Pages: 138-143, IEEE Catalog Number: CFP14403-USB, ISBN: 978-1-4799-2324-3.

2013

- 410 A.T. Naskali, E.D. Kunt, E.D. & A. Šabanović
"**Bi-level modularity concept within a robotic assembly module of a microfactory setting** "
in the **The International Journal of Advanced Manufacturing Technology** (2013) 66
ISSN 0268-3768, DOI 10.1007/s00170-012-4404-9, pp 1255–1269
- 409 Eray A. Baran, Tarik E. Kurt and Asif Sabanovic, **Lightweight Design and Encoderless Control of a Miniature Direct Drive Linear Delta Robot,**
In the Proceedings of The 8th International Conference on Electrical and Electronics Engineering, ELECO 2013, November 28-30,2013. in Bursa, Turkey.
- 408 Tarik Uzunovic, Edin Golubovic, Eray A. Baran and Asif Sabanovic: **Configuration Space Control of Parallel Delta Robot with a Neural Network Based Inverse Kinematics**
In the Proceedings of The 8th International Conference on Electrical and Electronics Engineering, ELECO 2013, November 28-30,2013. in Bursa, Turkey.
- 407 Golubovic Edin, Ozsoy Emre, Gokasan Metin and Sabanovic Asif: **Design and analysis of robust rotor current controller for doubly fed induction generator**
In the Proceedings of the 39th Annual Conference of the IEEE Industrial Electronics Society, November 10-13, Vienna, Austria, pp5258-5263
- 406 Golubovic Edin, Zhakypov Zhanishbek, Uzunovic Tarik and Sabanovic Asif **Piezoelectric motor driver: design and evaluation**
In the Proceedings of the 39th Annual Conference of the IEEE Industrial Electronics Society, November 10-13, Vienna, Austria, 3962-3967
- 405 Baran Eray A. , Ayit Orhan, Santiago Victor B, Lopez-Dorigo Sergio and Sabanovic Asif:**A self optimizing autofocusing scheme for microscope integrated visual inspection systems**

- In the Proceedings of the 39th Annual Conference of the IEEE Industrial Electronics Society, November 10-13, Vienna, Austria, 4041-4046
- 404 Kuzu, Ahmet , Baran Eray A. , Bogosyan Seta, Gokasan Metin, Sabanovic Asif: **WPT based compression for bilateral control**
In the Proceedings of the 39th Annual Conference of the IEEE Industrial Electronics Society, November 10-13, Vienna, Austria, 5684-5689
- 403 Kuzu, Ahmet , Baran Eray A. , Bogosyan Seta, Gokasan Metin, Sabanovic Asif: **Performance comparison of compression techniques used in bilateral control**
In the Proceedings of the 39th Annual Conference of the IEEE Industrial Electronics Society, November 10-13, Vienna, Austria, 5672-5677
- 402 Zhenishbek Zhakypov, Edin Golubovic and Asif Sabanovic: **Galvanometric Optical Laser Beam Steering System for Microfactory Application**
In the Proceedings of the 39th Annual Conference of the IEEE Industrial Electronics Society, November 10-13, Vienna, Austria, 4136-4141
- 401 Zhenishbek Zhakypov, Edin Golubovic, Tarik Uzunovic and Asif Sabanovic: **Nanometric Positioning of a Piezo Walker**
In the Proceedings of the 39th Annual Conference of the IEEE Industrial Electronics Society, November 10-13, Vienna, Austria, 4226-4232
- 400 *Onur Albert Aslan, Alper Nizamoğlu, Edin Golubovic, Tarik Uzunovic, Asif Sabanovic* Nano Hassasiyette Konumlama: Piezoelektrik Eyleyiciler ile Delta Robot Tasarımı,
In the 15. Otomatik Kontrol Ulusal Toplantısı Bildirire Kitabı, TOK2013, 26-28 Eylül 2013, Malatya, Turkey, pp 913-918
- 399 Edin Golubovic, Emre Ozsoy, Ali Tursucular and Asif Sabanovic: **Robust Rotor Current Controller Design for Stand-Alone Doubly Fed Induction Generator Applications,**
In the Proceedings of 17th International Conference on Electrical Drives and Power Electronics – EDPE 2013, October 2–4, 2013, Dubrovnik, Croatia, pp.155-160
- 398 Edin Golubovic, Tarik Uzunovic, Zhenishbek Zhakypov and Asif Sabanovic: **Linear Piezoelectric Walker Motor: Comparison of Two Control Techniques**
In the Proceedings of 17th International Conference on Electrical Drives and Power Electronics – EDPE 2013, October 2–4, 2013, Dubrovnik, Croatia, pp.112-117
- 397 Emre Ozsoy, Edin Golubovic, Asif Sabanovic and Metin Gokasan: **A Stator Voltage Oriented Double Fed Induction Generator Control Method with a Disturbance Observer,**
In the Proceedings of The International Conference on "Computer as a tool"i, EuroCon 2013 • 1-4 July 2013 • Zagreb, Croatia, pp: 910-917
- 396 Ahmet Ozcan Nergiz, Ahmet Teoman Naskali, Zhenishbek Zhakypov, Edin Golubovic and Asif Sabanovic: **Implementation of a Novel Complex Mechatronics Software Framework on Laser Micromachining Workstation**
In the Proceedings of The International Conference on "Computer as a tool"i, EuroCon 2013 • 1-4 July 2013 • Zagreb, Croatia, pp: 910-917
- 395 Z. Zyakupov, E. Golubovic, T. Uzunovic and A. Sabanovic, **High Precision Control of a Walking Piezoelectric Motor in Bending Mode,**
In the Proceedings of 2013 9th Asian Control Conference (ASCC), ASCC 2013, June 23-26, 2013, Istanbul, Turkey
- 394 M. Acer and A. Sabanovic, **Micro Position Control of a Designed 3-PRR Compliant Mechanism Using Experimental Models,**
In the Proceedings of 2013 9th Asian Control Conference (ASCC), ASCC 2013, June 23-26, 2013, Istanbul, Turkey
- 393 E. Baran, E. Golubovic, T. Kurt and A. Sabanovic, **Constant Velocity Control of a Miniature Pantograph with Image Based Trajectory Generation,**
In the Proceedings of 2013 9th Asian Control Conference (ASCC), ASCC 2013, June 23-26,

2013, Istanbul, Turkey

- 392 E. Golubovic, T. Uzunovic, Z. Zhakypov and A. Šabanović, "**Adaptive Control of Piezoelectric Walker Actuator,**" in the Proceedings of the 2013 IEEE International Conference on Mechatronics (ICM), pp. 132-137, Vicenza, Italy, March 27-April 01, 2013
- 391 Merve Acer , Asif Šabanović , "**Micro Position Control of a 3-RRR Compliant Mechanism,**" in the Proceedings of 2013 IEEE International Conference on Industrial Technology, ICIT 2013; Cape Town, 2/25/2013 - 1/27/2013
- 390 Eray A. Baran, Edin Golubovic, Asif Šabanović, "**Functional Observers for Motion Control Systems,**" *Automatika – Vol. 54, No,2*, Zagreb, 2013; pp 231-241
- 389 Merve Acer Asif Šabanović, "**Sliding-Mode Control of a Flexure Based Mechanism Using Piezoelectric Actuators**" *Automatika – Vol. 54, No 1*, Zagreb, .2013; pp. 114-125
- 388 Edin Golubovic, Eray A. Baran and Asif Šabanović, "**Contouring Controller for Precise Motion Control Systems,**" *Automatika – Vol. 54, No,1*, Zagreb, 2013; pp. 19-27

2012

- 387 Zhenishbek Zhakypov, Edin Golubovic, Tarık E. Kurt, Asif Šabanović, "**Yürüyen Piezoelektrik Motorların Sürülmesi,**" In the Proc. of Otomatik Kontrol Türk Milli Komitesi 2012 Ulusal Toplantısı, Niğde, October 11-13, 2012, Türkiye
- 386 Edin Golubovic, Ali Turşucular, Tarık E. Kurt and Asif Šabanović, "**Elektrik Makineleri, Güç Elektroniği ve Denetleme İçin Eğitsel Düzenek Tasarımı ve Üretimi,**" In the Proc. of Otomatik Kontrol Türk Milli Komitesi 2012 Ulusal Toplantısı, Niğde, October 11-13, 2012, Türkiye
- 385 Islam S. M. Khalil* , Asif Šabanović † and Sarthak Misra, "**An Energy-Based State Observer for Dynamical Subsystems with Inaccessible State Variables,**" In the Proc. of 2012 IEEE/RSJ International Conference on Intelligent Robots and Systems October 7-12, 2012. Vilamoura, Algarve, Portugal
- 384 Kunt, E.D.; Naskali, A.T.; Šabanović, A., "**Miniaturized modular manipulator design for high precision assembly and manipulation tasks**" in the Proceedings of the 12th IEEE Workshop on Advanced Motion Control, March 25-27, 2012, Sarajevo, BiH, pp 1-6, DOI: 10.1109/AMC.2012.6197027
- 383 Eray A. Baran, Asif Šabanović "**Predictive Input Delay Compensation for Motion Control Systems**" in the Proceedings of the 12th IEEE Workshop on Advanced Motion Control, March 25-27, 2012, Sarajevo, BiH, pp 1-6, DOI: 10.1109/AMC.2012.6197035
- 382 Edin Golubović, Islam S.M. Khalil Ahmet Ö. Nergiz, Eray A. Baran, Asif Šabanović "**Design and Control of Laser Micromachining Workstation**" in the Proceedings of the 12th IEEE Workshop on Advanced Motion Control, March 25-27, 2012, Sarajevo, BiH, pp 1-6, DOI: 10.1109/AMC.2012.6197037
- 381 Merve Acer Asif Šabanović "**Sliding-Mode Control of a Flexure Based Mechanism Using Piezoelectric Actuators**" in the Proceedings of the 12th IEEE Workshop on Advanced Motion Control, March 25-27, 2012, Sarajevo, BiH, pp 1-6, DOI: 10.1109/AMC.2012.6197141

- 380 Bilen Hakan; Hocaoglu Muhammet A.; Ünel Mustafa; Asif Šabanović
“Developing robust vision modules for microsystems applications”,
Machine Vision and Applications, Volume: 23 Issue: 1, 2012, Pages: 25-42, DOI:
 10.1007/s00138-010-0267-y
- 379 Shoukry Islam; Kunt Emrah Deniz; Šabanović Asif
“Action-reaction based parameters identification and states estimation of flexible systems”
Turkish Journal of Electrical Engineering and Computer Sciences, Volume: 20, Issue: 1,
 2012, Pages:47-56, DOI: 10.3906/elk-1007-586
- 378 Naskali, Ahmet Teoman; Kunt, Emrah Deniz; Šabanović, Asif; Eren, Gonen
”Development of system supervision and control software for a micromanipulation system“
 In the Proceedings of the 2012 Second International Conference on Digital Information and
 Communication Technology and it's Applications (DICTAP), pp 120-124, DOI:
 10.1109/DICTAP.2012.6215367

2011

- 377 Duruhan Ozcelik, Tugba Leblebici, Serhat Dikyar, Mustafa Unel and Asif Sabanovic, An
 Observer Based Approach to Force Reflecting
 Bilateral Teleoperation,
 In the Proceedings of the 5th International Conference on Automation, Robotics and
 Applications, Dec 6-8, 2011, Wellington, New Zealand
- 376 Gülnihal Çevik*, Mahmut F. Akşit, Asif Šabanović, **Piezoelectric Wind Power
 Harnessing – An Overview**
 In the Proceedings of the SET2011, 10th International Conference on Sustainable Energy
 Technologies, İstanbul, TÜRKİYE, 4-7 Sep. 2011
- 375 A. Šabanović, N. Šabanović and E. Golubović
“VSS in Power Electronics and Motion Control”
 It The Proc. of Elektrik-Elektronik Bilgisayar Sempozyumu (FEEB 2011), 5-7 October
 2011, Elazığ, Turkey,
- 374 Šabanović and N. Šabanović-Behlilović
”Variable Structure Techniques”
 in *Handbook on Industrial Electronics (Second Edition, Eds. Bogdan Wilamowski and J.
 David Irwin*, CRP Press, 2011, ISBN 978-1-4398-0289-2
- 373 E. D. Kunt, A. T. Naskali, I. S. M. Kkalil, A. Šabanović, and E. Yuksel
”Design and development of workstation for microparts manipulation and assembly”
Turkish Journal of Electrical Engineering & Computer Sciences., VOL.19, NO.6 , 2011, pp
 973-992, DOI: **10.3906/elk-1005-566**
- 372 Asif Šabanović and Kouhei Ohnishi,
Motion Control Systems,
 John Wiley and IEEE Press, Singapore, 2011, ISBN 978-0-470-82573-0
- 371 Elitaş., M., Khan., S., Nergiz., A. and Šabanović, A.
“Task Based Bilateral Control for Microsystems Application”,
Automatika , Zagreb Vol 52, No. 2, **Apr-Jue 2011** pp 107-117,
- 370 Leblebici, T, Çallı, B., Ünel, M. Šabanović, A. Bogosyan, S. and Gökaşan, M.
”Delay compensation in bilateral teleoperation using sliding mode observer”,
Turkish Journal of Electrical Engineering & Computer Sciences. Vol 19, No. 6, 2011, pp
 851-859, DOI: **10.3906/elk-1007-625**
- 369 Erbatur, K , Seven, U, Taşkıran, E, Koca, Ö, Yılmaz, M, Ünel, M, Kızıldaş, G. and
 Šabanović, A. and Onat, Ahmet
”Design and control of the humanoid robot SURALP”,

- 368 Kahalil, Islam and Kunt, Emrah Deniz and Šabanović, Asif,
“Action-rection based parameters identification and state estimation of flexible systems”,
Turkish Journal of Electrical Engineering & Computer Sciences Vol.19 , No. 5 , 2011,
TUBITAK
- 367 Šabanović, A.,
“Variable Structure Systems with Sliding Modes in Motion Control – A Survey”,
IEEE Transactions on Industrial Informatics, Vol. 7, No.2, May 2011, pp212-223,
DOI:[10.1109/TII.2011.2123907](https://doi.org/10.1109/TII.2011.2123907)
- 366 Merve Acer, Asif Šabanović
”Comparison of Circular Flexure Hinge Compliance Modeling Methods”
in the Proceedings of the 2011 IEEE International Conference on Mechatronics, ICM2011,
held in Istanbul, Turkey from 13-15 April 2011, pp271-276, DOI:
[10.1109/ICMECH.2011.5971294](https://doi.org/10.1109/ICMECH.2011.5971294)
- 365 Cenk Oguz Saglam, Eray A. Baran, Ahmet O. Nergiz and Asif Šabanović
”Model Following Control with Discrete Time SMC for Time-Delayed Bilateral Control Systems”
in the Proceedings of the 2011 IEEE International Conference on Mechatronics, ICM2011,
held in Istanbul, Turkey from 13-15 April 2011.pp 997-1002, DOI:
[10.1109/ICMECH.2011.5971262](https://doi.org/10.1109/ICMECH.2011.5971262)
- 364 Koç, O., Naskali, A.T.,Kunt, E.D., and Šabanović, A.,
“A Field Programmable Gate Array Based Modular Motion Control Platform”
in the Proceedings of 2011 IEEE International Conference on Mechatronics, ICM2011, held
in Istanbul, Turkey from 13-15 April 2011, pp 797-802, DOI:
[10.1109/ICMECH.2011.5971223](https://doi.org/10.1109/ICMECH.2011.5971223) .
- 363 Ahmet Kuzu, Seta Bogosyan, Metin Gokaşan, Asif Šabanović
“Control and Measurement Delay Compensation in Bilateral Position Control”,
in the Proceedings of 2011 IEEE ICM, held in Istanbul, Turkey from 13-15 April 2011, pp
534-539, DOI: [10.1109/ICMECH.2011.5971344](https://doi.org/10.1109/ICMECH.2011.5971344) .
- 362 Islam S. M. Khalil, B. Çelebi, G. Çevik, E. Globovic, M. Berkem and Asif Šabanović
“Optimal Motion Control and Vibration Suppression of Flexible Systems with Inaccessible Outputs “
in the Proceedings of the 2011 IEEE International Conference on Mechatronics, ICM2011,
held in Istanbul, Turkey from 13-15 April 2011, pp 534-539, DOI:
[10.1109/ICMECH.2011.5971344](https://doi.org/10.1109/ICMECH.2011.5971344)
- 361 Islam S. M. Khalil, Ahmet. O. Nergiz and Asif Šabanović
“A Novel State Observer For Dynamical Systemswith Inaccessible Outputs”
in the Proceedings of the 2011 IEEE International Conference on Mechatronics, ICM 2000,
held in Istanbul, Turkey from 13-15 April 2011, pp 206-211, DOI:
[10.1109/ICMECH.2011.5971282](https://doi.org/10.1109/ICMECH.2011.5971282) .
- 360 Islam S. M. Khalil, E. Globovic and Asif Šabanović
“High Precision Motion Control of Parallel Robots with Imperfections and Manufacturing Tolerances”
in the Proceedings of 2011 IEEE International Conference on Mechatronics (ICM), held in
Istanbul, Turkey from 13-15 April 2011, pp 39-44., DOI: [10.1109/ICMECH.2011.5971332](https://doi.org/10.1109/ICMECH.2011.5971332)
- 359 Islam S. M. Khalil and Asif Šabanović,
“Sensorless torque/force control”,
in *Advances in Motor Torque Control.*, Edited by Mukhtar Ahmad, ISBN 978-953-307-686-
7, Publisher: InTech, Published: September 22, 2011,pp 49-68, DOI: [10.5772/862](https://doi.org/10.5772/862)

- 2010 358 Besir Çelebi, Gulnihal Çevik, Berkem Mehmet, Islam S. M. Khalil and Asif Šabanović ,
“Motion Control and Vibration Suppression of Flexible Lumped Systems via Sensorless LQR Control”,
Automatika, Zagreb, Vol 51, No.4, 2010, pp 313-324, 2011 (SCI)
- 357 Gulnihal Çevik, Besir Çelebi, Berkem Mehmet, Islam S. M. Khalil and Asif Šabanović,
“Motion Control and Vibration Suppression of Flexible Lumped Systems via Sensorless LQR”,
 in the Proceedings of 15th IEEE International Conference on Emerging Technologies and Factory Automation, ETFA 2010, September 13-16, 2010, Bilbao, Spain. IEEE 2010, ISBN 978-1-4244-6848-5, pp 1-7
- 356 Islam S. M. Khalil, Edin Golubović, Asif Šabanović:
”High precision motion control of parallel robots with imperfections and manufacturing tolerances”,
 in the Proceedings of 15th IEEE International Conference on Emerging Technologies and Factory Automation, ETFA 2010, September 13-16, 2010, Bilbao, Spain. IEEE 2010, ISBN 978-1-4244-6848-5, pp 1-7
- 355 Merve Acer, Asif Šabanović,
“Compliant mechanism design - a case study”,
 LAP Lambert Academic Publishing, Saarbrücken, Germany, 2010, ISBN978-3838328591
- 354 Islam S. Khalil, Asif Šabanović
“Action-Reaction Based Motion and Vibration Control of Multi-degree-of Freedom Flexible Systems”
 in the Proceedings of the 11th IEEE International Workshop on Advanced Motion Control, March 21-24, 2010, Nagaoka, Japan, pp 577-582, DOI: 10.1109/AMC.2010.5464068
- 353 K. Jezernik, M. Rodič and A. Šabanović
“Speed Sensorless Variable Structure Torque Control of Induction Motor”
Automatika Vol. 51, No1.: pp.33-40, Zagreb, 2010
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“Sliding Modes Applications in Power Electronics and Electrical Drives”
 in *Variable Structure Systems: Towards 21st Century*, Lecture Notes in Control 274, pp 223-251, Eds. X. Yu and J.-X Xu, Springer-Verlag, 2002, ISBN 3-540-42965-4 (chapter in the book)
- 9 Šabanović, A., Šabanović, N and Goktug , G.,
“VSS Control of Timing-Belt Servosystem”,
 in *Advances in Variable Structure Systems*, ETF Sarajevo, 2002, ISBN 9958-629-04-5, pp.363-374,
- 8 Gunay, M, Šabanović, A. and Šabanović, N,
“Mimization of Instantenous Total Harmonic Distorsion of Current for Three Phase Switching Power Converters”,
 in *Advances in Variable Structure Systems*, ETF Sarajevo, 2002, ISBN 9958-629-04-5, pp.275-282

1996

- 7 Erbatur, K., Kaynak, O., Šabanović, A. and Rudas, I.,
“Fuzzy adaptive sliding mode control of a direct drive robot”,
Robotic and Autonomous Systems 19 (1996), Elsevier Science B.V., pp. 215-227

1995

- 6 Kaynak, O. and Šabanović, A. ,
“Diffusion of New Technologies Through Appropriate Education and Training”,
 in the book *Science and Technology: Russia and the World*, Vol. 2, Moscow 1995 (in Russian)
- 5 Kaynak, O., and Šabanović, A.,
”Diffusion of New Technologies through Appropriate Education and Training”,
NATO Advanced Research Workshop on Barriers to International Technology Transfer, London, England, Sept. 17-20, 1995, in the NATO Advanvced Science Institutes Series, Sub-Series 4, Vol. 11, pp. 99-107

1993

- 4 Šabanović, A.
“Variable Structure Controllers in Motion Control Systems”,
Motion Control for Intelligent Automation (Selected Papers from IFAC Workshop, Perugia, Italy, 27-30 October 1992), Pergamon Press, April 1993

1990

- 3 Mile Ostojić and Asif Šabanović,
“Robot Motion Control Based on Compensation of Manipulator Dynamics”,
 in the book *Recent Advances in Motion Control*, Ed. G. Buja, H. Fujita, K. Ohnishi, The Nikkon Kogyo Shinbun Co., Tokyo, 1990, Japan, ISBN 4-526-02854-1 C3054, pp.57-65

1983

- 2 A. Šabanović, D.B. Izosimov F. Bilalović and O. Mušić,,
“Sliding mode in controlled motor drives”,
Control in Power Electronics and Electrical Drives, (Proceedings of the Third IFAC Symposium, Lausanne, September 1983), pp.139-144. Pergamon Press Ed. By. R. Zwicky
- 1 F. Bilalović, A. Šabanović, O. Mušić and D.B. Izosimov,
“Current inverter in the sliding mode for induction motor control”
Control in Power Electronics and Electrical Drives (Proceedings of the Third IFAC Symposium Lausanne, September 1983), pp.133-138, Pergamon Press, By. R. Zwicky

IV. Academic Work With Students

IV.1 PhD Students - Theses

2014

- 13 Abdurrahman Eray Baran
 “Development of a Control Framework for Hybrid Renewable Energy System in Microgrid”,
 Sabanci University, Faculty of Engineering and Natural Sciences, Mechatronics program, 2014
- 12 Emre Eşref Ozsoy
 “Design and Application of a Robust Double Fed Induction Generator Controller for Variable Speed Wind Turbine”
 Istanbul Technic University, FEN bilimleri Enstitüsü, 2014
 Thesis Co-advisor
- 11 Edin Golubovic
 “Development of a Control Framework for Hybrid Renewable Energy System in Microgrid”,
 Sabanci University, Faculty of Engineering and Natural Sciences, Mechatronics program, 2014

2012

- 10 Ahmet Teoman Naskalı
 “Software Framework for High Precision Motion Control Applications”,
 Sabanci University, Faculty of Engineering and Natural Sciences, Mechatronics program, 2012
- 9 Merve Acer
 “Micro Motion stages with Flexure Hinges - Design and control”,
 Sabanci University, Faculty of Engineering and Natural Sciences, Mechatronics program, 2012
- 8 Emrah Deniz Kunt
 “Microfactory concept with bilevel modularity”
 Sabanci University, Faculty of Engineering and Natural Sciences, Mechatronics program, 2012

2011

- 7 Islam Shoukry Mohammed Khalil
 “Energy Based Formalism for State Estimation and Motion Control”,
 Sabanci University, Faculty of Engineering and Natural Sciences, Mechatronics program, 2011

2009

- 6 Shahzad Khan
 “Micromanipulation – A Force Feedback Approach”,
 Sabanci University, Faculty of Engineering and Natural Sciences, Mechatronics program, 2009

2008

- 5 Selim Yannier
 “Analog Controller Based on Sliding Mode Control for Piezoelectric Actuators”,
 Sabanci University, Faculty of Engineering and Natural Sciences, Mechatronics program, 2008

2007

- 4 Nijaz Hadžimejlić
 “Klizni režimi u sistemima upravljanja kretanja sa posebnim osvrtom na primjenu u električnom automobilu”
 Faculty of Electrical Engineering, University of Sarajevo., 2007

1991

- 3 Mile Ostojić,
 “Jedan rekurzivni algoritam za upravljanje kretanja nelinearnih sistema”
 Faculty of Electrical Engineering, University of Sarajevo., 1991

1988

- 2 Faruk Bilalović
 “Organizovanje kliznih režima u sistemima automatskog upravljanja obrtnih električnih

1987

mašina”

Faculty of Electrical Engineering, University of Sarajevo,, 1988

1

Milan Vujović,

“Algoritam upravljanja mašine jednosmjerne struje na bazi sistema sa promjenljivom strukturom”

Faculty of Electrical Engineering, University of Sarajevo, 1987

IV.2 Master Students - Theses

2013

- 33 Zhenishbek Zhakypov
“Software Framework for High Precision Motion Control Applications”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
program, 2013
- 32 Tarik Edip Kurt
“**Micro Motion stages with Flexure Hinges - Design and control**”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
program, 2013

2012

- 31 Victor Benit Santiago
“**Redesing, Reemplacement and implementation of a Vision System for
a Micro Assembly Workstation**”
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, (Exchange student from University of Barcelona, Spain), 2012
- 30 Sergio Kopex-Dorgia Guerra
“**Experimental Study and Redesign of a Vision Based Control System
for Micro Assembly Workstation**”
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, (Exchange student from University of Barcelona, Spain), 2012

2011

- 29 Edin Golubović
“**Design and Realization of Laser Micromachining System**”
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2011
- 28 Ülker Gönenç
“**Design and Implementation of a Control Systems for Use of Gavanometric
Scanners in Laser Micromachining Applications**”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2011

2010

- 27 Osman Koç
“**A field programmable gate array based motion control platform**”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2010
- 26 Abrurrahman Eray Baran
“**Disturbance observer based bilateral control systems**”
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2010

2009

- 25 Islam Shoukry Mohammed Khalil
“**Sensorless Wave Based Control**”
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2009

2008

- 24 Baran Barış
“Anti-Lock Brake System (ABS) via Sliding Mode Control”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2008

2007

- 23 Asanterabi Kighoma Malima
“Motion planning and assembly for microassembly workstation”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2007
- 22 Ahmet Özcan Nergiz
**“Bilaterally controlled micromanipulation by pushing in 1-D with nano-
newton scale force feedback”**,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2007
- 21 Emrah Denic Kunt
“Design and Realization of Microassembly Workstation”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2007
- 20 Ahmet Altınışık
“Bilateral Control Operational Enhancements”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2007
- 19 Eray Doğan
**“Design and Implementation of Vision Systems for Microassembly
Workstation”**,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2007, (Thesis Co-advisor)
- 18 Merve Acer
“Design and modeling of a mechanism”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2007
- 17 Erhan Demirok,
**“Grid-connected variable speed generator applications with doubly-fed
induction machine”**
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program 2007

2006

- 16 Ozer Ulucay
“Control and Design of Stewart Platform”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program 2006
- 15 Meltem Elitaş
“Function Based Control for Motion Control Systems”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2006

2005

- 14 Çağdaş Denizel Onal,
“Bilateral Control - A Sliding Mode Control Approach”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2005
- 13 Burak Yılmaz
“A Sliding Mode Approach to Visual Motion Estimation”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2005
- 12 Nusrettin Güleç
**“Modelling and control of the coordinated motion of a group of autonomous
mobile robots”**,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2005, (Thesis Co-advisor)

2004

- 11 Bahadır Kılıç
“Sensorless Control of Induction Machine”
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2004
- 10 Yildiray Yıldız
“Neuro-Sliding Mode Controllers for Systems with Uncertainties”
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2004
- 9 Kazim Çakır
“In Wheel Motor Design for Electric Vehicles”
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2004
- 8 Khalid Abidi,
“Sliding Mode Control for High Precision Motion Control Systems”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2004

2003

- 7 Özkan Bebek
“A Study on Automatic Gait Parameter Tuning For Biped Robot”,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2003

2002

- 6 Onur C. Sözbilir,
“A Proposed Architecture for Remote Mechatronics Laboratory”
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2002
- 5 Murat Günay
**“Minimization of Instantaneous Total Harmonic Distortion of Current in
Three-phase Switching Converters”**,
Sabancı University, Faculty of Engineering and Natural Sciences, Mechatronics
Program, 2002

- 4 Selim Yannier
“Realization of Reactive Control for Multipurpose Mobile Agents”,
MS, Mechatronics Program, March. 2001-July 2002, (Thesis Co-advisor)

1987

- 3 Nijaz Hadžimejlić
“**Sinteza sistema upravljanja elektromehaničkog servomotora na bazi upravljanje asinhronne mašine**”,
Elektrotehnički fakultet u Sarajevu, 1987

1981

- 2 Milan Vujović
“**Sinteza sistema za regulaciju opterećenja obrtnih mašina**”
Elektrotehnički fakultet u Sarajevu, 1981

1979

- 1 Faruk Bilalović
“**Sinteza jednog tipa sistema sa promjenjivom strukturom za upravljanje kavezne asinhronne mašine**”,
Elektrotehnički fakultet u Sarajevu, 1979

IV.3 Current Students

IV.3.1 PhD Students

1. AHMET OZCAN NERGIZ, PhD, Mechatronics Program, Sept. 2008- (in Progress)
2. ABDURRAHMAN ERAY BARAN, PhD, Mechatronics Program, Sept. 2008- (in Progress)
3. EDIN GOLUBOVIĆ, PhD, Mechatronics Program, Sept. 2011- (in Progress)
4. TATIK UZUNOVIĆ, PhD, Mechatronics Program, Sept. 2012- (in Progress)
5. AKHRAR RASOOL, PhD, Mechatronics Program, Sept. 2012- (in Progress)

IV.3.2 Master Students

- 1.
- 2.

V. Reserch Activities - Projects and Reports

V.1 Research Areas

PROFESSIONAL POSITIONS

- Sabancı University** 1999-today **Full professor**
Mechatronics Program,
Faculty of Engineering and Natural Sciences,
- TUBITAK - MRC,** 1993-1995 - **Head** of the CAD/CAM Robotics Department
Turkey 1995-1998 - **Scientific Advisor** to Institute of Informatics (Part time)
- BH Engineering** **Head** of Engineering Department.
1995-1999
- Energoinvest - IRCA** **Scientific Advisor** in Energoinvest-IRCA in the fields of **Power Electronics** and
Sciences control systems in charge of the coordination of the new large system development and
1990-1991 HVDC back-to-back station control.
- 1986-1989 **Director** of Control Systems Division in IRCA. This division has six departments oriented towards: **power electronics, motion control systems**, distributed control systems, microprocessor application in power system protection, instrumentation. During this period development has been oriented towards of the microprocessor based control system.
- 1975-1983 **Founder and Head** of the Power Electronics and Motion Control Systems Department. During this period Energoinvest for the first time entered Power Electronics activity. Under our scientific and organizational guidance the Production and Engineering Department in the field of Power Electronics has been established and necessary product development and training of engineers and workers has been organized.
- 1978-1991 **Head** of the **ENERGOINVEST's Advisory Committee** for Power Electronics and Electrical Drives. This Committee has been advising the Board of Directors regarding scientific and technological developments in the fields.

RESEARCH AREAS

- Mechatronics and Robotics Systems*** Involvement in **robotic systems R&D** activities started in 1986 and was oriented to:
- development of the industrial manipulators (Energoinvest);
 - development of the high precision robotic manipulator control systems (Keio);
 - development of the direct drive robotic manipulators (Yamaguchi U., University of Maribor)
 - completion of MAMROB in Tubitak
 - investigation of flexible joint and flexible arm systems
 - Microparts assembly
 - Bilateral Control
 - Control of Redundant systems
 - Control of systems with delay
 - Microfactory

This work resulted a few very interesting robotic manipulator control system algorithms which have been tested and proven to have good performance despite very simple structure.

Based on these new algorithms the control of direct drive robot has been fully developed and tested at Yamaguchi University, Japan, University of Maribor, Slovenia, Bogazici University, Turkey and TUBITAK-MAM, Turkey and Sabancı University. Algorithm developed for the robotic manipulator control system design in work space has proven to have very interesting behavior with very simple trajectory specification. The algorithm is very promising for application in nonlinear systems like active power filters, hydraulic servo-systems etc. In this field very interesting results have been achieved in establishing application of new neural network systems with sliding mode as a learning algorithm. Sliding mode based disturbance rejection algorithms are proven to work very well in electrical drive systems.

Very interesting results have been achieved in discrete-time sliding modes which is the base for easier application sliding mode based systems. Application of these systems to manipulators with flexible joints and flexible links is under investigation.

Theory of Control Systems

R&D activities in control systems are mostly oriented to nonlinear control systems especially Variable Structure Systems with Sliding Modes. This orientation has been selected since sliding modes especially suit systems with switching converters.

Study of the sliding mode application to switching converters resulted in new design methods and new algorithms. In this field work in high power system PWM algorithms looks promising.

Development of new discrete-time sliding mode algorithms was triggered by the research in motion control systems and robotics. That resulted in the new algorithms that are applicable for linear as well to nonlinear systems.

Study of the merge of so called soft computing technologies (Fuzzy systems and Neural Nets) with robust control systems like VSS is still new but very useful algorithms have been developed and used for nonlinear systems control. The neural net controller with sliding mode learning algorithm was proved to have very fast and accurate learning capabilities so the off-line learning of the NN controller can be fully avoided.

Electrical Drives

The R&D work related to the Variable Structure Systems (VSS) and their application to the Power Electronics and Motion Control started in 1974 and it covers almost all aspects and types of electrical machines:

- dc drives
- ac drives (induction and synchronous)
- switching reluctance drives
- high performance servodrives for robotic application
- drives for electrical vehicle

This work produced original results on induction machines control that were patented (1977-1979) in SFR Yugoslavia,; Great Britain No 18347/78; Switzerland No 869/78 – 4; Sweden No 780 4591-1; USA No 903.208; W. Germany No P28.19.-789.9; France No 13399; Italy No 23067A/78.

We have been first to publish results on application of sliding mode to electrical machines control. Since then our work is a most advanced one. It has been applied in different complicated servos in military products as well as industrial drives.

During stay in Japan (Keio and Yamaguchi University) and later in cooperation with Toyo Denki Seizo, Yokohama (1993-now) and University of Maribor, Slovenia, this work has been developed to the unified approach to control of different types of electrical machines. Recently in cooperation with Toyo Denki Seizo and Tubitak – Marmara Research Centre – Turkey, a new algorithms for induction motor

identification has been developed as a basic building block for sensorless drive.

Algorithms developed in this field are very advanced in comparison with existing results. Basic feature is the ability to use the same algorithms for different types of machines.

Power Electronics

R&D work in Power Electronics field started in 1975 and covers more or less all interesting areas including:

Design of power converters:

- dc-dc converters of low power and medium power;
- industrial rectifiers for galvanization, electrolysis;
- inverters for HF heating systems;
- converters for avionic application;
- preliminary design of back-to-back HVDC link;

Electrical Drives:

- converters for dc machines;
- converters for ac (induction and synchronous machines);
- converters for switching reluctance machine;
- converters for servodrives in robotic applications;

Switching Converters Control:

- Variable Structure Systems based algorithms for dc-dc converters control;
- Variable Structure Systems based algorithms for three phase converters control (rectifiers and inverters);
- Variable Structure Systems based algorithms for three phase power filters and compensators;

Work in Variable Structure Systems based algorithms dc-to-dc converters performed during stay at **CalTech**, Pasadena, resulted in original algorithms and paper published at IECON'85 has been awarded as the **best conference paper**.

Work on sliding modes application to the converters control, performed during stay in **Japan (Keio and Yamaguchi University)** and later in cooperation with **Toyo Denki Seizo, Yokohama** (1993-now) has resulted in an **unified control algorithm** (patent pending) for all PWM three-phase switching converters. This algorithm has proved to have better performance than any other algorithm now in use. It has been demonstrated that **TDF** with this algorithm is about **50% smaller** than regular sinusoidal PWM. This algorithm is very simple and it could be integrated as a VLSI circuit, since it needs relatively low computational power.

The application of sliding mode to power converters control was proposed by us many years ago and now it is under investigation in many laboratories around the world. The application to low and medium power converters is more or less developed and application to high power systems gives very interesting results, but still needs research.

V.2 - SELECTED PROJECTS

Robotics and Mechatronics (1986-today)

- Development of six degrees of freedom robot manipulator ;
- Development of direct drive robot system
- Development of a electric vehicle based on AC motor application;
- Development of AGV for industrial application.
- Research in Microparts assembly and development of a Microassembly workstation able to handle parts of 10 micromeer size
- Work on flexure based high precision positioners
- Work on control of redundant multibody systems
- Work on laser micromachining and development of a workstation able to machine parts with 10 micron features

- Work on microfactory and development of a modular microassembly complex comprising of two parallel microrobots, pantograph positioner, vision system and a conveyor.
- Work on PZT control
- Work on microparts assembly with force feedback
- Work on the development of a software framework for mechatronics systems control
- Work on bilateral systems without and with time delay
- Development of a fully automated workstation for radioactive pharmaceutical preparations
- Laser assisted micromachining workstation
- Miniaturized delta robot
- Software framework for mechatronics real-time control design

***Power Electronics
and
Motion Control
Systems
(1976-today)***

In this field, from 1976 until today, work on development and implementation of a wide spectrum of different systems including, but not limited to:

Power Electronics

- development of DC to DC converters;
- development of UPS system;
- development of the HF heating systems;
- development of the supply and control system for electron beam welding;
- development of family of AC/DC converters;
- HVDC back to back converter control;
- development of CAD software for Power Electronics Systems;
- development of electromagnetic voltage stabilizer;
- study of new methods for reactive power compensation;
- development of the system for control of AC machines;

Motion Control Systems

- development of system for control of wound rotor asynchronous machine;
- development of system for control of speed and torque of DC machines;
- development of the actuators for Flight by Wire systems;
- development of the industrial robot control;
- development of traction system for the tram car based on induction motor;
- development of electro-mechanical servo motor with induction motor;
- bilateral control systems
- motion systems with delay

***Process control
system
(1970-1976)
(1995-today)***

As design engineer took part in development of a modular process control systems based on the theory of sliding modes control. Later work has been oriented towards control system design for large scale systems (refineries, thermo-plants etc.).

Recently involved in large scale PLC and SCADA system implementation on Water Treatment Plants and Water Distribution Systems (advisor in project related to control of water supply for Istanbul).

V.1.1. Project realized at Sabanci University (from 1999- 2012)

Project Code:	110M425, – Control of Multibody Systems with Network Delay
Starting Year	2012
Duration in months	24
Role:	director
Percentage of Time	%10,
Total Budget	106.000USD
Partners:	University TUBITAK

Funded by grant
Funding Type: internationall
National/International ongoing
Status This project is intended to investigate concepts of control of multibody systems with
Description: network delay.
Control algorithms, Prototype

Deliverables

Project Code: 111M358, TEACF-11_00868 – Microfactory

Starting Year 2011
Duration in months 24
Role: director
Percentage of Time %10,
Total Budget 146.000USD

Partners: none
Funded by TUBITAK

Funding Type: grant
National/International national
Status ongoing
Description: This project is intended to investigate concepts of microfactory which includes
manufacturing and assembly cells.
Control algorithm

Deliverables Prototype

Project Code: TECF09-00637, Laser Supported Micromachining Workstation

Starting Year 2009
Duration in months 24
Role: director
Percentage of Time %10,
Total Budget 288.000TL

Partners: none
Funded by TÜBİTAK

Funding Type: grant
National/International national
Status completed
Description: The main subject of the project is design of a laboratory set-up for laser assisted
micromachining

Deliverables Prototype, reports and published papers

Project Code: 106M533, Bilateral Control Systems with Time Delay Compensation

Starting Year 2008
Duration in months 24
Role: researcher (project was originally awarded to me but due to my sabbatical leave M. Ünel
took the director role)

Percentage of Time %10,
Total Budget 78.000USD
Partners: University of Alaska, Fairbanks

Funded by TÜBİTAK-NSF

Funding Type: grant
National/International international
Status completed
Description: This is an NSF-TÜBİTAK project dealing with hot issue of the bilateral control in the
presence of communication delay. The basic solution is extension of our previous work in
SMC

Deliverables Publications
Reports and published papers

**Project Code: SAC-07-0054-1, SAC-07-0054-2 Computer Controlled Tc99m Pharmaceuticals
Preparation System**

Starting Year 2007
Duration in months 36
Role: director
Percentage of Time %20,
Total Budget 620.000TL approx. 400.000USD
Partners: MolImage, MONROL
Funded by MolImage and Sanayi Bakanlığı (SanTez Project)
Funding Type: contract
National/International Status national completed
Description: A robotic system which prepares doses of farmaceuticals is designed
Deliverables Prototype of fully operational system

Project Code: TACF06-00406, Design, Construction and Control of a Biped Humanoid Walking Robot

Starting Year 2006
Duration in months 36
Role: researcher
Percentage of Time %10,
Total Budget 361.000TL approx. 180.000USD
Partners: none
Funded by TUBITAK – 1001 Project code: 106E040
Funding Type: grant
National/International Status national completed
Description: A 29 degrees-of-freedom full body human sized humanoid robot is designed and constructed. Bipedal walk on uneven terrain and visually assisted force control in environmental interaction are studied
Deliverables Prototype of fully operational system and publications

Project Code: EACF05-00337, Small Hydro plant

Starting Year 2006
Duration in months 24
Role: researcher
Percentage of Time %10,
Total Budget 168.000TL approx. 180.000USD
Partners: GYTE
Funded by TUBITAK
Funding Type: grant
National/International Status national completed
Description: Power stage design and automation for a small sized hydro turbine
Deliverables Test-ring and publications

Project Code: IACF06-00417: Integrated Visual Servoing and Force Approach to Micro-Object Manipulation

Starting Year 2006
Duration in months 24
Role: researcher
Percentage of Time %10,
Total Budget 75.000USD
Partners: none
Funded by Sabancı University Internal Grant
Funding Type: grant
National/International Status national completed
Description: This project describes a novel approach to micro-object manipulation by developing robust and provably correct generic algorithms based on feedback provided from various imaging sensors (e.g. optical microscopes equipped with CCD cameras, AFM, SEM etc.), which will

greatly enhance our ability to monitor and interpret microscopic images and contribute to applications ranging from biotechnology to MEMS Power stage design and automation for a small sized hydro turbine

Deliverables

Publications

Project Code: AECF02-00268, **Microsystems Assembly Workstation**

Starting Year 2004

Duration in months 24

Role: director

Percentage of Time %20,

Total Budget 790.000 USD

Partners: CMU-USA, GYTE

Funded by GYTE/DPT

Funding Type: contract;

National/International National

Status completed

Description: Develop advanced inspection and handling systems and methods for mini/micro products and components. The objective is to develop advanced technologies for handling, inspection and quality control of electromechanical, optoelectrical micro components. The system may be used for inspection and quality control of micro components, intelligent 3D manipulation/positioning system. The operation is based on sensors and machine vision, novel self-aligning/positioning/assembly methods, environmental influences on handling of micro-parts, and measurement of distribution of surface forces and is using information already available in the electrical servomotor measurementAdvanced Mini/Micro Systems Workstation (AMSW) for Handling, Assembly and Testing

Deliverables

Workstation prototype

Project Code: AECF04-00999, **SMC in Motion Control Systems**

Starting Year 2004

Duration in months 36

Role: director

Percentage of Time %10,

Total Budget 23.000 USD (in Turkey)+47.000USD(in Slovenia)

Partners: University of Maribor - Slovenia

Funded by TÜBİTAK

Funding Type: grant;

National/International international

Status completed

Description: Project intended to support cooperation between SÜ and Robotics Institute of University of Maribor in developing SMC based algorithms in electrical drives and motion control systems. The project supports visits of our researchers to Slovenia and Slovenian researchers to SÜnts

Deliverables

Reports and published papers

Project Code: AECF02-00094, **(Timing-belt servosystem)**

Starting Year 2002

Duration in months 10

Role: director

Percentage of Time %10,

Total Budget 28.000USD

Partners: none

Funded by FESTO Germany

Funding Type: contract

National/International international

Status completed

Description: This project was intended to develop the vibration control algorithm to be applied to the toothed-belt linear servo systems powered by electrical servomotors. The system now in use by FESTO exhibits oscillations and very low tolerance to the load mass and belt elasticity changes. Developed system provides for the elimination of the vibration for wide range of the change of the belt's length and variation of the load mass. The solution asks for limited

measurement on the load side of the linear stage and is using information already available in the electrical servomotor measurement
Control algorithm

Deliverables

Project Code:	AECF02-00128, (ISKI SCADA System)
Starting Year	2000
Duration in months	24
Role:	director
Percentage of Time	%10,
Total Budget	136.000USD
Partners:	none
Funded by	ISKI
Funding Type:	contract
National/International	national
Status	completed
Description:	Project aims to unify the structure of the SCADA systems for ISKI water treatment plants and pup stations and prepare preliminary system design and tender documentation for selected water treatment plants, pump stations and overall ISKI water supply system
Deliverables	Preliminary design and tender documentation for selected plants and overall system

V.1.2. Selected Project realized in period (1970-1999)

1997 - 1999	<p>“Control system for new process of sea water desalination “ project funded by Kalsin Group, Turkey Istanbul, Turkey. Design of the high power dc source and control system for new type of sea water desalination plant. Position: Advisor to the project team</p>
1996 - 1999	<p>“Automation and SCADA system for Water Treatment Plants” project funded by ISKI (Istanbul Water Authority), Istanbul, Turkey The study of the PLC and SCADA system for water treatment plants and pumping stations has been a major aspect of this project as a part of the constancy work for Istanbul Water Authority. Position: Head of the project team</p>
1993 - 1997	<p>“Sliding Mode Control of PWM Switching Converters” - project funded by Toyo Denki Seizo KK. Tokyo, Japan in cooperation with Keio University, Japan This project started during our stay in Japan and is founded since. The aim is to develop original PWM Sliding Mode Control of Switching Converters. This goal has been attained and developed algorithm is tested and implemented in serial production. Now project is extended to sliding mode based observers development for sensorless AC drives. Position: Advisor to the project team</p>
1995-1996	<p>“Electric Vehicle” Project founded by FAZ Electric, Izmir, Turkey . The conversion of a SKODA PICK-UP vehicle to an IM based electrically driven one was a target of this project. The conversion has been completed and test vehicle putted into experimental use. The project was completed in cooperation with University of Maribor, Slovenia. Position: Advisor to the project team</p>
1993-1996	<p>“Industrial Robotic Systems” project founded by TUBITAK, Turkey. Six d.o.f. industrial robot with mechanical structure and robotic controller have been developed and produced in TUBITAK-MAM. Position: Advisor to the project team</p>
1993-1996	<p>“VSS in AGV Control Systems”, project founded by TUBITAK ,Turkey Different structures for the AGV control have been studied. The experimental system was developed and tested. Good autonomy and path tracking characteristics have been obtained. Position: Advisor to the project team</p>
1993	<p>“Die Casting Machine Control” - project funded by Ube Industries, Ube, Japan The goal was development of the of the control system for Die Casting Machine. Because of the compressed air drive highly nonlinear characteristics and wide parameter change is</p>

- complicating the task. Computer simulation has proven the stability and the basic characteristics of the developed system.
- Position: Advisor**
- 1985-1987 **“CAD in Power Electronics”**
 The project had been established to develop a PC based computer software for the Analysis and Design of Switching Power Converter. The special attention has been given to the design capabilities of the program and the merging real time measurement with computational predictions in order to facilitate fast prototyping.
 Project was financially supported from the USA-YU Foundation.
*Participants: California Institute of Technology (USA),
 Energoinvest - IRCA*
- Position: Head of the Project from the Bosnian side**
- 1975-1979 **“VSS in Electrical Drives Control”**
 Development of the system for control of mechanical coordinates and torque of electric machines. This was a first world-wide project of the application of VSS theory to induction machine control. It resulted in 40kW industrial prototype and scientific results that have been patented in many countries. This project has triggered research in the Sliding Mode application to power converters and electrical drives.
 This project was ENERGOINVEST’s beginning in the field of Power Electronics and Motor Drives.
*Participants: Institute for Control Problems - Academy of Sciences U.S.S.R.
 Energoinvest - IRCA*
- Position: Head of Project Development team from Energoinvest side.
 Prof. Vadim. I. Utkin was the Head of the team from the USSR side.**
- 1970 -1974 **“Process control system SUPS”**
 Development of a modular process control systems based on the theory of sliding modes control. The system has 58 different modules for: measurement (pressure, level, temperature, flow etc.), controllers, servo motors etc. intended for large scale process control systems.
*Participants: Institute for Control Problems - Academy of Sciences U.S.S.R.
 Energoinvest - IRCA*
- Position: Design Engineer**
- 1986-1991 **“Sliding Mode Control of Power Converters and Electric Machines”**. Research funded by Republican Scientific Foundation and Industry Consortium, Sarajevo.
 This project has sought the unified approach to switching converters and electrical machines control systems in the framework of VSS theory.
- Position: Head of the project team**
- 1985-1991 **“Variable Structure Systems Application in The Control of Robotics Manipulators’**. Research funded by Republican Scientific Foundation and Industry Consortium, Sarajevo.
 Development of the 6 d.o.f. robotic manipulator including mechanical subsystem, the drives and the robot controller. System has been developed and tested with industrial testing in the forging factory.
- Position: Advisor to the project team**
- 1985-1991 **“Industrial Robotics”** - development of the family of industrial robots. Research funded by Republican Scientific Foundation and Industry Consortium, Sarajevo.
 Development of the robotic system suitable for application in forging industry and in HF metal heating systems.
- Position: Advisor the project team**
- 1986-1990 **“Topologies, Analysis, Design and Control of PWM Switching Converters”**. Research funded by Republican Scientific Foundation and Industry Consortium, Sarajevo.
 Under this project an unified theoretical background for the switching converters analysis has been sought. The result has been a new modeling techniques of three phase switching converters which is very useful in the control system design.
- Position: Advisor to the project team**
- 1986-1990 **“HVDC Back to Back Interconnection - A Control System Design”**. Research funded by Republican Scientific Foundation and Industry Consortium, Sarajevo.
 The analysis and simulation of the HVDC link and the control system design has been done under this project. This was a part of a larger project studying the possibility to connect Yugoslav system to the Eastern Europe electric system through HVDC connection.
- Position: Head of the project team**

- 1985-1987 **“CAD in Power Electronics”**, development of the program for the control system design in Power Electronics. Research funded by Republican Scientific Foundation and Energoinvest, Sarajevo.
Development of the software tools that will help design and analysis of the power electronic systems. The package comprised of automatic equation generator for the electronic systems with switching elements, based on Bond graph techniques; the dynamical simulation of the large systems with discontinuous change of the parameters; the graphing tools etc.
Position: Head of the project team
- 1981-1983 **“Control of the Electric Power Consumption in Industrial Systems”**. Research funded by Republican Scientific Foundation and Industry Consortium, Sarajevo.
Large project oriented towards economical utilization of the electrical energy in industrial systems. The methods of power consumption reduction in electric drives, active filters and reactive power compensation were developed.
Position: Head of the project team
- 1981-1983 **“A study of New Methods For Reactive Power Compensation”**. Research funded by Republican Scientific Foundation and Energoinvest, Sarajevo.
System of reactive power compensation based on special auto-transformers with pre-magnetization of the core have been introduced.
Position: Advisor to the project team
- 1980-1983 **“Electromechanical Servo motor for Process Control Applications”**. An experimental research funded by Energoinvest and Republican Scientific Foundation Sarajevo.
Development of the set of servo-motors for process control application with linear and angular movement based on the controlled induction machine drive. The production of these motors has been organized in Energoinvest.
Position: Head of the project team
- 1978-1979 **“An Induction Machine Application For the Tram-Car-Traction”**. An experimental research funded by Energoinvest and Republican Scientific Foundation Sarajevo.
Development and field testing of the tram-car drive based on induction machine. The experiments were successfully completed for a car powered by four 32kW motors supplied from 750DCV supply.
Position: Head of the project team
- 1977 **“Open-Pit-Mine Transport System Automation”**, a study under contract with Energoinvest - TTU, Tuzla and with support of Republican Scientific Foundation RZNIR, Sarajevo.
The development of the large open pit coal mine control system.
Position: member of the project team
- 1974-1976 **“Squirrel cage induction motor speed control”**.
Study under contract with Republican Scientific Foundation Sarajevo.
Project under which the prototypes for industrial production of the IM control system have been developed.
Position: Head of the project team

V.1.3. Selected development works

- 1994-1996 **“Industrial robot MAM-15”**, Tubitak -MAM
Development of the control algorithm and robotic controller for 6 d.o.f. robot.
- 1992-1993 **“Control of Die Casting Machine”**, Yamaguchi University, Ube.
Simulation of the control algorithm for Die Casting Machines.
- 1992-1993 **“Three d.o.f. Direct Drive Robotic Manipulator”**, Yamaguchi University, Ube,
Development of the laboratory prototype of 3 d.o.f. robot and control system.
- 1992-1993 **“Automatic Guided Vehicle”**, Yamaguchi University, Ube.
Development of the AFV control system for industrial application.
- 1991-1992 **“Sliding Modes Application in Motion Control Systems”**, Keio University, Yokohama.
Testing of different types of motion controllers for DD robotic manipulators.
- 1989-1991 **“Microprocessor Controller for Industrial Robots”**, Energoinvest - IRCA, Sarajevo
.
Development of a robotic controller for 6 d.o.f. robot.
- 1989-1991 **“AC Servos for Robotics Applications”**, Energoinvest - IRCA, Sarajevo .
The PM synchronous machines actuators for robotic applications.

- 1991 **“Supply and Control System for Electronic Beam Welding”**, Energoinvest - IRCA, Sarajevo.
The Controlled high voltage power supply and microprocessor control system of an industrial installation for electronic beam welding has been developed.
- 1985-1991 **“Medium and High Frequency Heating Systems”**,
Development of converters and control systems for industrial melting and heating installations has been developed.
- 1985-1987 **“Electromagnetic Voltage Stabilizers”**, Energoinvest - IRCA, Sarajevo.
Development of a family of the AC voltage stabilizers for industrial applications.
- 1982-1984 **“Electromechanical Actuators for Fly By Wire Systems”**, Energoinvest - IRCA, Sarajevo.
Development of the electromagnetic servo-actuator for application in fly-by-wire system. System has been designed and tested in flight conditions.
- 1987-1991 **“AC to DC Power Supplies for Avionics Applications”**, Energoinvest - IRCA, Sarajevo.
Development of power supplies for different electronic system at military airplanes.
- 1982-1987 **“Family of Electromechanical Actuators for Avionics Applications”** Energoinvest - IRCA, Sarajevo.
Development of a set of electromechanical actuators powered by induction motor controllable drive for process control system application.
- 1984-1985 **“400Hz Inverter for Avionic Applications”**, Energoinvest - IRCA, Sarajevo.
Development of the DC to AC converter for military plane application.
- 1981-1983 **“Industrial Power Supplies”**, Energoinvest - IRCA, Sarajevo.
Development of a family of DC to DC and AC to DC converters for industrial applications.
- 1980-1982 **“Industrial UPS Systems”**, Energoinvest - IRCA, Sarajevo.
Development of a family of UPS for industrial applications.
- 1977-1979 **“System for Control of Speed and Torque of Wound Rotor Asynchronous Machine”**, Energoinvest - IRCA, Sarajevo.
Development of a family of sub synchronous cascade systems has been developed for industrial applications.
- 1976-1979 **“DC Machines Control Systems”**, Energoinvest - IRCA, Sarajevo.
Development of a family of controlled bridge rectifiers for power range 1-500KW has been developed to supply controlled DC drives. The structure of the controller is a cascade one.
- 1974-1978 **“VSS for Induction Machines Control”** Energoinvest - IRCA, Sarajevo.
Development of the system for control of AC machines. The system Consists of the family of McMurray type inverters for power range 10-150KW, the control unit and control panel..
- 1971-1973 **“Integrator and memory unit MIA-100”**, Energoinvest - IRCA, Sarajevo.
Development of an analog circuitry that could provide given mathematical operations.
- 1971-1973 **“Universal mathematical unit UMB 100”** (multiplier, divider, square root)
Energoinvest - IRCA Sarajevo.
Development of an analog circuitry that could provide listed mathematical operations.
- 1971-1973 **“Square root calculator KOR-100”**, Energoinvest - IRCA Sarajevo.
Development of an analog circuitry that could provide listed mathematical operations.
- 1971-1973 **“Algebraic unit ALG-100”**, Energoinvest - IRCA, Sarajevo.
Development of an analog circuitry that could provide algebraic operations.
- G - Patents** **“Variable structure control system for the control of induction motor”** (Patent act) 1977. The patent act describes a control algorithms for the control of squirrel cage induction motor, its implementation and description of operation of each block in the control structure. SFR Yugoslavia; Great Britain; Switzerland; USA; Germany; France; Italy

V.2 Selected Technical Reports

- 1994 "The Principles of Operation and Control of Switching Power Converters", TUBITAK-MAM, Turkey, March 1994
 "Variable Structure Controllers in Motion Control Systems", TUBITAK-MAM, Turkey, March, 1994
 "Inverse kinematics and Trajectory Generation Methods for Robotic Manipulators", TUBITAK-MAM, Turkey, March, 1994
 "Microprocessor and PC Solutions for Current Control of Three-Phase Switching Inverters - Hardware and Software" , TUBITAK-MAM, Turkey, December 1994
 "MAMROB/ER15, Preliminary Report", TUBITAK-MAM, Turkey, December, 1994
- 1995 "Sliding Mode Control of MAMROB Manipulator", No: 12-19, TUBITAK-MAM, Turkey, March 1995.
 "Inverse kinematics and Trajectory Generation Methods for Robotic Manipulators", No.12-21, TUBITAK-MAM, Turkey, March, 1995
- 1996 "NN and Fuzzy Control Techniques for Motion Control Applications" No..12-30, TUBITAK-MAM, Turkey, March, 1996
 "Adaptive VSS Techniques for Industrial Robots", No. 12-29, TUBITAK-MAM, Turkey, March, 1996
 "VSS Controller Development and Application for Robotics Systems", No. 12-28, TUBITAK-MAM, Turkey, March, 1996
 "Neuro-Controllers for Robot Manipulators and Neuro-Sliding Mode Control", No.12-32, TUBITAK-MAM, Turkey, June 1996
 "Automation of Buyukcekmece Water treatment Plant Structure and Technical Specification", Rep. No. 9609, B.H. Engineering and Consulting Co., September 1996
- 1997 - "AECF02-00128, (ISKI SCADA System)"
 2004 Tehnička dokumentacija za SCADA sistem pitke i otpadnih voda u Istanbulu obuhvata 5 postrojenja za pripremu 2 miliona kubnih metara pitke vode dnevno, 96 pumpnih stanica i vodovoda i 5 postrojenja za prečišćavanje otpadnih voda.
- 2002 Final report for Project: "AECF02-00094, (Timing-belt servosystem)", submitted to FESTO, Esslingen, Germany,
- 2007 Final report for Project: "AECF04-00999, SMC in Motion Control Systems", submitted to TUBITAK, Ankara
- 2008 Final report for Project: " AECF02-00268, Microsystems Assembly Workstation", submitted to DPT, Ankara
- 2008 Final report for Project: "IACF06-00417: Integrated Visual Servoing and Force Approach to Micro-Object Manipulation", submitted to SABANCI UNIVERSITY, Ankara
- 2008 Final report for Project: "EACF05-00337, Small Hydro plant", submitted to TUBITAK, Ankara
- 2009 Final report for Project: "TACF06-00406, Design, Construction and Control of a Biped Humanoid Walking Robot", submitted to TUBITAK, Ankara
- 2010 Final report for Project: "SAC-07-0054-1, SAC-07-0054-2 Computer Controlled Te99m Pharmaceuticals Preparation System", submitted to San. Bak., Ankara
- 2010 Final report for Project: "106M533, Bilateral Control Systems with Time Delay Compensation", submitted to TUBITAK, Ankara
- 2011 Final report for Project: "TECF09-00637, Laser Supported Micromachining Workstation", submitted to TUBITAK, Ankara
- 2012 First report for Project: "111M358, TEACF-11_00868 – Microfactory", submitted to TUBITAK, Ankara

VI. Selected Seminars

- 1992** 1 **"Sliding Mode Control Systems"**, ciklus od 10 predavanja u okviru programa "HitachiChairship" za polaznike postdiplomskog studija na Faculty of Sciences, Japan.
- 2 **"Advanced Motion control"** Predavanje u Hitachi Corporate Research Center, Japan
- 3 **"Sliding Modes in Power Converters Control"**, seminar (3 predavanja) za inženjere u Toyo Denki Seizo, KK, Tokyo, Japan
- 1993** 4 **"How to apply SMC"**, semnar u Ube Industries, Ube, Maj 1993, Japan
- 1994** 5 **"Controll of Switching Converters"** seminar na KyushuUniversity, EE Department, June 1993
- 6 **"Sliding modes application in Power electronics and Motion Control"** IECON'94, Sept 4, 1994, Bologna, Italy
- 1995** 7 **"Sliding Mode Control Systems"**, ciklus predavanja od 5 u TUBITAK-Marmara Research Center za saradnike u CAD/CAM Robotics Department, 1995, Turska
- 1999** 81 TUTORIJAL **"Sliding Mode in Power Electronics and Motor Drives"**, (Šabanović, A. i Utkin, V.I) ISIE'99 International Symposium on Industrial Electronics, Bled, 1999, Slovenia
- 2000** 9 **"Mechatronics – A Way to Go"**, ETF Sarajevo, Mart, 2000, BiH
- 2003** 10 TUTORIJAL **"Sliding Mode Control Systems and its Applications"**, (Šabanović, A. i Utkin, V.I) 29th Annual Conference of the IEEE Industrial Electronics Society, IECON 2003, Roanoke, November 02-09, 2003, USA
- 11 **"SMC in Power Electronics"** University Technology Malaysia, Kuala Lumpur, Maj 2003, Malezija
- 12 **"SMC in Mechatronics Systems"**, na Universitetu u Mariboru, FERI, Septembar 2003, Slovenija
- 2004** 13 **"Robust Motion Control – SMC Point of View"** the 11th International Power Electronics and Motion Control Conference, EPE_PEMC 2004, Riga, September 2-5, 2004, Litvanija
- 14 AMC 2004 the 8th IEEE International Workshop on Advanced Motion Control AMC'04- Kawasaki, March 25 - 28, 2004, Japan
- 2006** 15 **"Vision Assisted Microassembly"**, TUBITAK, May 24, 2006, Turska
- 2007** 16 **"Challenges in Motion Contol"** 9th WSEAS International Conference on AUTOMATIC CONTROL, MODELLING and SIMULATION (ACMOS '07), Istanbul, May 27-28, 2007, Turska
- 2008** 17 TUTORIAL – **"SMC and its Applications"**, 17th IFAC World Congress, Seoul, Korea, July 06 2008, Koreja
- 2008-9** 18 **"Advances in Motion Contro"** ciklus od 12 predavanja za saradnike na projektu Global Centers of Excellences, Keio University, Japan, Department of Systems Design, Japan

VII. Citizenship

VII.1 Organization of Conferences

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|-------------|---|--|
| 1981 | 1 | Member of the Organizing Committee of the IV Jugoslovenskog savjetovanja Energetska Elektronika, Sarajevo, Bosna i Hercegovina, June, 1981. |
| 1990 | 2 | Chairman of the First IEEE International Workshop on Variable Structure Systems and their Applications VSS'90, Sarajevo, Bosna i Hercegovina, March 27,28 1990. |
| 1992 | 3 | Organizer and Chairperson of the Special Session "VSS & Its Applications I_III" IMACS/SICE International Symposium on Robotics, Mechatronics and Manufacturing, Kobe, Japan, September 16-20, 1992. |
| | 4 | Organizer and Chairperson of the Special Session "Motion Control and Actuators" 1992 IEEE/RJS International Conference on Intelligent Robot Systems, Raleigh, USA, July 7-10, 1992. |
| 2002 | 5 | Chairman of the First IEEE International Workshop on Variable Structure Systems and their Applications VSS'2002, Sarajevo, Bosna i Hercegovina, March 27,28 2002. |
| 2006 | 6 | General Chair of the AMC 2006 9th IEEE International Workshop on Advanced Motion Control (AMC). 27-29 March 2006, Istanbul, Turkey. |
| 2012 | 7 | General Co-Chair of the AMC 2012the 12th IEEE International Workshop on Advanced Motion Control (AMC 2012). Sarajevo, Bosna i Hercegovina, March 25-27, 2012. |

VII.2 Membership in Organizing Committees

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|-------------|----|--|
| 1988 | 8 | Member of the Organizing Committee: the Conferences "Power Electronics" held in Sarajevo (1981), Ljubljana (1984), Subotica (1986), Belgrade (1988) |
| 1992 | 9 | Member of the Organizing Committee: the IEEE International Workshop on Variable Structure and Lyapunov Control of Uncertain Dynamical Systems, Sheffield, UK., September 7-9, 1992. |
| 1994 | 10 | Member of the Organizing Committee: the IEEE Workshop on Sliding Modes and Lyapunov Design, Benevento, Italy, December 2-4, 1994 |
| 1996 | 11 | Member of the Organizing Committee: the IEEE Workshop on Sliding Modes and Lyapunov Design, Tokyo, Japan, December 2-4, 1996 |
| 1998 | 12 | Member of the Organizing Committee: the EDPE'98 Intl. Conf. On Electric Drives and Power Electronics, Dubrovnik, Croatia, October 14-17, 1998 |
| 1999 | 13 | Member of the Organizing Committee: the ISIE'99 International Symposium on Industrial Electronics, Bled, Slovenia 1999 |
| 2000 | 14 | Member of the Organizing Committee: the IECON 2000 26th Annual Conference of the IEEE Industrial Electronics Society : 2000 IEEE International Conference on Industrial Electronics, Control and Instrumentation : 21st Century technologies and industrial opportunities : 22-28 October, 2000, Nagoya, Aichi, Japan |
| 2001 | 15 | Member of the Organizing Committee: the IECON 2001, the 27th Annual Conference of the IEEE Industrial Electronics Society, Hyatt Regency Tech Center, Denver, Colorado, USA Nov 29 (Thu) to Dec 2 (Sun) 2001 |
| 2002 | 16 | Member of the Organizing Committee: the AMC 2002 7th International Workshop on |

- Advanced Motion Control AMC'02 Maribor, Slovenia July 3 - 5 , 2002
- 2003** 17 **Member of the Organizing Committee :** the ICIT 2003 ICIT'03 International Conference on Industrial Technology ICIT'03 Maribor, Slovenia December 10 - 12, 2003
- 2004** 18 **Member of the Organizing Committee :** the AMC 2004 the 8th IEEE International Workshop on Advanced Motion Control AMC'04- Kawasaki , Japan March 25 - 28, 2004
- 19 **Member of the Organizing Committee :** the EPE-PEMC 2004 11th International Power Electronics and Motion Control Conference 2004, Riga, Latvia.
- 2005** 20 **Member of the Organizing Committee :** the EDPE 2005 the 4th joint Slovak-Croatian conference International Conference on Electric Drives and Power Electronics 26 – 28 September 2005, Dubrovnik, Croatia
- 2006** 21 **Member of the Organizing Committee :** the ICM 2006 4th IEEE International Conference on Mechatronics July 3-5, 2006, Budapest, Hungary
- 22 **Member of the Organizing Committee :** the EPE-PEMC 2006 12th International Power Electronics and Motion Control Conference EPE-PEMC 2006 Portoroz, Slovenia, August 30 - September 1, 2006
- 2007** 23 **Member of the Organizing Committee :** the TOK 2007 Otomatik Kontrol Ulusal Toplantısı 5 - 7 September **2007**, Sabancı Üniversitesi, Istanbul
- 24 **Member of the Organizing Committee :** ISIE 2007. 2007 IEEE International Symposium on Industrial Electronics. June 4-7,2007. Centro Cultural and Centro Social Caixanova - Vigo, Spain
- 2008** 25 **Member of the Organizing Committee :** the AMC 2008 The 10th IEEE International Workshop on Advanced Motion Control (AMC 2008). Trento, Italy, March 26-28, 2008.
- 26 **Member of the Organizing Committee :** the EPE-PEMC 2008 14th International Power Electronics and Motion Control Conference EPE-PEMC 2008, Ohrid, 6-8 September, Macedonia
- 27 **Member of the Organizing Committee :** the TOK 2008 Otomatik Kontrol Ulusal Toplantısı 13-15 Kasım 2008 , İTÜ, Istanbul, Turkey
- 2009** 28 **Member of the Organizing Committee :** the ICM 2009 5th IEEE International Conference on Mechatronics, Málaga, Spain, on April 14-17, 2009
- 29 **Member of the Organizing Committee :** the ICIT 2009 IEEE International Conference on Industrial Technology (ICIT'09). Monash University – Gippsland, Australia, February 10-13, 2009
- 30 **Member of the Organizing Committee :** the EDPE 2009 the 4th joint Slovak-Croatian conference Electrical Drives and Power Electronics, Dubrovnik, October 12-14, 2009, Croatia
- 31 **Member of the Organizing Committee :** the 35th Annual Conference of the IEEE Industrial Electronics Society (IECON-2009). Porto, Portugal, 3-6 November 2009
- 32 **Member of the Organizing Committee :** the **TOK 2009**, Otomatik Kontrol Ulusal Toplantısı, 13-16 Ekim 2009, Yıldız Teknik Üniversitesi, İstanbul i
- 2010** 33 **Member of the Organizing Committee :** the 36th Annual Conference of the IEEE Industrial Electronics Society (IECON-2010). Glendale, AZ, USA, 7-10 November 2010.

- 34 **Member of the Organizing Committee** : the ICIT 2010 7th International Conference on Industrial Tribology. First Announcement. December 2-4, 2010, Viña del Mar, Chile
- 35 **Member of the Organizing Committee** : the AMC 2010 The 11th IEEE International Workshop on Advanced Motion Control, Nagaoka University of Technology, Nagaoka-city, Niigata, Japan, on March 21–24, 2010.
- 36 **Member of the Organizing Committee** : the EPE-PEMC 2010 13th International Power Electronics and Motion Control Conference EPE-PEMC 2010, Poznan, 1-3 September, Poland
- 37 **Member of the Organizing Committee** : the TOK 2010 Otomatik Kontrol Ulusal Toplantısı, Sep 21, 2010 - Sep 23, 2010, GYTE, Kocaeli, Turkey
- 2011 38 **Member of the Organizing Committee** : ICM 2011 IEEE International Conference on Mechatronics, ICM 2011, April 13-15, 2011 in Istanbul, Turkey.
- 39 **Member of the Organizing Committee** : the HSI 2011 4th International Conference on Human System Interaction (HSI 2011), Keio University, May 19-21, Yokohama, Japan
- 40 **Member of the Organizing Committee** : theVSS 2010 - The 11th International Workshop on Variable Structure Systems, Mexico City from June 26th till June 28th, 2010.
- 41 **Member of the Organizing Committee** : the ICELIE 2011 The 5th IEEE International Conference on E-Learning in Industrial Electronics (ICELIE 2011) Crown Conference Centre, Melbourne Australia from 7-10 November 2011.
- 42 **Member of the Organizing Committee** : the IECON 2011 37th Annual Conference of the IEEE Industrial Electronics Society, Crown Conference Centre, Melbourne Australia from 7-10 November 2011.
- 43 **Member of the Organizing Committee** : the EDPE 2011. 5th joint Slovak-Croatian conference. Electrical Drives and Power Electronics, High Tatras, Slovakia, on 28 - 30 September 2011
- 2012 44 **Member of the Organizing Committee** : the 38th Annual Conference of the IEEE Industrial Electronics Society (IECON-2012). Montreal, Canada, 25-28 October 2012.
- 45 **Member of the Organizing Committee** : the ICIT 2012 International Conference on Information Technology. Madrid, Spain March 28-29, 2012
- 46 **Member of the Organizing Committee** : the ICELIE 2012 6th IEEE International Conference on E-Learning in Industrial Electronics (ICELIE 2012) Montreal Canada from 25 to 28 October
- 47 **Member of the Organizing Committee**: of the VSS 2012 The 12th International Workshop on Variable Structure Systems VSS 2012| Indian Institute of Technology Bombay, India January 12-14, 2012
- 2013 48

VII.3 Membership in Editorial Boards

- 1994- 1 **Member of the Publishing Concil**, Automatika – Journal of Control, measurement, electronics, computing and communications, KoREMA, Zagreb, ISSN (Online) 1843-3380, ISSN (Print) 0005-1444

2008- 2 **Member of the Editorial Board** of The International Journal of Mechatronics (IJMMS), ISSN (Online) 1753-1047, ISSN (Print) 1753-1039, Inderscience Publisher, Canada

VII.4 Membership in Technical Committees

2008 - 3 **Member IEEE IES**, Technical Committee on Education in Engineering and Industrial Technologies

2008 - 4 **Member IEEE IES**, Technical Committee on Sensors and Actuators

2006- 2 **Member IEEE CSS**, the Technical Committee on Variable Structure and Sliding Mode Control (TCVSSMC)

1991 5 **Member IEEE IES, CSS, IAS**, – Status Senior member

1985 -
1991 6 **Head of the Concel for Power Electronics ENERGOINVEST, Sarajevo**

VII.5 Reviews

IEEE Transactions on Industrial Electronics
IEEE Transactions on Mechatronics
IEEE Transactions on Power Electronics
IEEE Transactions on Industrial Information Technology
IEEE Transactions on Industrial Applications
IEEE Control System Magazine
International Journal of Control
Journal of Physics
Asian Journal of Control
Automatica
Automatika

VII.6 Patents

1997 **Patent "Control System of Asynchronous Machine"**

- Great Britain No 18347/78
- Switzerland No 869/78-4
- Sweden No 780 4591-1
- USA No 903.208
- W. Germany No P28.19.-789.9
- France No 13399;
- Italy No 23067A/78