Curriculum Vitae

Particulars

Full name	KOVÁCS, László
Place of birth	Budapest
Date of birth	04/03/1975
Home address	Kisforrás u. 2., 2000 Szentendre, Hungary
Workplace	Department of Applied Mechanics, Budapest University of Technology and Econommics, (former Technical University of Budapest, TUB, founded in 1782)
Work address	H-1521 Budapest, P.O. Box 91, Hungary
Phone / Fax	+36 1 463 3678 / +36 1 463 3471
E-Mail	kovacs@mm.bme.hu
Homepage	http://www.mm.bme.hu/~kovacs
Nationality	Hungarian
Marital status	Married to Zsuzsanna Eszter Albrecht (Architect)
Daughters:	Eszter Kovács (2002) and Rita Kovács (2004)

Degree

2007 October	PhD in Mechanical Engineering (degree no.: 1720-PhD) Dissertation title: Dynamics of Digital Force Control of Robots Supervisor: Prof. Gábor Stépán, Head of department, Dept. Applied Mechanics

Education

2000 – 2006	Pattantyús Ábrahám Géza School of PhD Studies, Faculty of Mechanical Engineering, Budapest University of Technology and Economics
1997 – 2000	Technical University of Budapest, Faculty of Mechanical Engineering, Fields of study: Applied Mechanics, Chemical and Food Industry Engineering MSc in Applied Mechanics (degree no.: 57/2000)
1995 – 1997	Technical University of Budapest, Faculty of Mechanical Engineering, BSc in Chemical and Food Industry Engineering (degree no.: 82/1997)

Positions

2012 Jul. –	Research associate, HAS-BME Research Group on Dynamics of Machines and Vehicles (Research Group of HAS at Budapest University of Technology and Economics)
2011 – 2012	Postdoctoral Fellow, Centre for Intelligent Machines, Department of Mechanical Engineering, McGill University, Montreal, Quebec, Canada
2004 – 2010	Research associate, HAS-BME Research Group on Dynamics of Machines and Vehicles (Research Group of HAS at Budapest University of Technology and Economics)

Teaching activities

2013 –	Tutorials in Vibrations (BSc), Supervisor of 1 Bsc Thesis, Co-Supervisor of 1 PhD Thesis

2012 –	Mechanisms (MSc, in English/Hungarian), Tutorial in Dynamics (BSc), Supervisor of 1 MSc Thesis (2012-2013)
2011 –	Supervisor of 1 PhD Thesis
2007 – 2010	Supervisor of 1 MSc Thesis (2010), 2 BSc Theses (2008, 2010) and 4 Scientific Student Competition papers in the fields of force control, and dynamics modeling and control of multibody systems; Supervisor of exchange students in 2 Integrated Engineering Projects (2008, 2009)
2006	Tutorial in Strength of Materials (BSc)
2004 – 2010	Tutorial in Dynamics (BSc)
2004 – 2010	Tutorial in Vibrations (BSc)

Work experience and research appointments abroad

2013 Jan. – Feb.	Visiting Researcher, Centre for Intelligent Machines, Department of Mechanical Engineering, McGill University, Montreal, Quebec, Canada, Field of research: Dynamics and performance characterization of Multi-DoF Haptic Devices
2010 June – July	Research scholar at University of Texas at Dallas, Richardson, Texas, USA (5 weeks), Analysis of systems with varying time delays, Supervisor: Prof. Janos Turi, Research fund of the Joint Research Project under the Agreement between the Hungarian Academy of Sciences (MTA-NSF/103) and the National Science Foundation (NSF 0705247)
2010 Apr. – Oct.	Research associate in the frame of the Hungarian-Singaporean joint research project COSMOSYS (OMFB-00183/2010) at Department of Applied Mechanics, Faculty of Mechanical Engineering, Budapest University of Technology and Economics Project title: Cognitive Stroke Movement Therapy Systems through Integration of Wearable Haptic Interfaces Field of research: motion control of co-operative robots used in physiotherapy of stroke patients, force control of the distal (hand) module
2007 – 2010	Research associate and assistant project manager in the frame of the ACROBOTER (IST-2006-045530) EU-FP6 project at Department of Applied Mechanics, Faculty of Mechanical Engineering, Budapest University of Technology and Economics. Project title: Autonomous Collaborative Robot to Swing and Work in Everyday Environments Field of research: dynamics modeling and control of underactuated and redundant service robots
2005 May – July	Visiting researcher at McGill University, Montreal QC, Canada 9 weeks, Dynamics and control of physical interactions in mechanical systems, Supervisor: Prof. Jozsef Kovecses, Research Fund of the Bilateral Hungarian-Canadian Science and Technology Program (OMFB-00514/2005)
2004 June – Aug.	Visiting researcher at McGill University, Montreal QC, Canada 8 weeks, Dynamics and control of physical interactions in mechanical systems, Supervisor: Prof. Jozsef Kovecses, Research Fund of the Bilateral Hungarian-Canadian Science and Technology Program (TéT-BILAT CAN-1/03)
2004 Jan. – Aug.	Research associate in the frame of the ALLADIN (IST-2002-507424) EU-FP6 project at Department of Manufacturing Engineering, Faculty of Mechanical

	Engineering, Budapest University of Technology and Economics. Project title: Natural Language Based Decision Support in Neuro-rehabilitation Field of research: development of a mechatronic platform for the assessment of stroke patients using force/torque measurements in isometric conditions
2002	Research associate in the frame of the REHAROB (IST-1999-13109) EU-FP5 project at Department of Manufacturing Engineering, Faculty of Mechanical Engineering, Budapest University of Technology and Economics. Project title: Supporting Rehabilitation of Disabled Using Industrial Robots for Upper Limb Motion Therapy Field of research: Teaching-in force control of industrial robots
1999	Teaching assistant at Department of Applied Mechanics, Faculty of Mechanical Engineering, Budapest University of Technology and Economics.

Languages

Hungarian	Mother tongue
English	Fluent in speaking, reading, and writing
Russian	Beginner level

Research interest

Underactuated and redundant robots
Dynamics modeling and control of constrained dynamical systems
Control of mechanical systems
Service robotics
Haptics
Dynamics and stability of digital force control of robots

Contributions to scholarly communities

2013	Session chair at the National Scientific Student Competition, Sessions of Technical Sciences (in Hungarian: tagozati zsűrielnök, Országos Tudományos Diákköri Konferencia (OTDK), Műszaki Tudományi Szekció)
2012 –	Member of the Honorary Editorial Board of the Journal of Advances in Vibration Engineering (http://www.tvi-in.com/)
2010 –	Observer in the IFToMM Technical Committee on Robotics and Mechatronics
2010	Secretary of the IUTAM Symposium on Dynamics Modeling and Interaction Control in Virtual and Real Environments, 7-11 June, 2010, Budapest, Hungary
2006 –	Secretary of IFToMM Technical Committee for Vibrations (former Technical Committee of Nonlinear Oscillations)
2003 –	Observer and member of the IFToMM Technical Committee for Vibrations (former Technical Committee of Nonlinear Oscillations)

Awards

1999	1st prize of the Scientific Student Competition (BME, Faculty of Mechanical Engineering) and the award of the Pro Progressio Fundation Paper title: Stability of force control Supervisor: Prof. Gábor Stépán, Head of department, Dept. of Applied Mechanics

Publications

Edited Books

Stépán G., **Kovács L.L.** and Tóth A. (eds.), Proceedings of the IUTAM Symposium on Dynamics Modeling and Interaction Control in Virtual and Real Environments, 7-11 June, 2010, Budapest, Hungary, IUTAM Bookseries, vol. 30, (ISBN 978-94-007-1642-1).

Journal papers

Kovács L.L. and Bencsik L., Stability case study of the ACROBOTER underactuated service robot, Theoretical & Applied Mechanics Letters, vol. 2, no. 4, 2012 (7 pages, paper ID: 043004)

Zelei A., **Kovács L.L.** and Stépán G., Computed torque control of an under-actuated service robot platform modeled by natural coordinates, Communications in Nonlinear Science and Numerical Simulation, vol. 16, number 5, 2011, pp. 2205-2217.

Insperger T., **Kovács L.L.**, Galambos P. and Stépán G., Increasing the accuracy of digital force control process using the act-and-wait concept, IEEE/ASME Transactions on Mechatronics, vol. 15, number 2, 2010, pp. 291-298.

Kovács L.L., Kövecses J. and Stépán, G., Analysis of effects of differential gain on dynamic stability of digital force control, International Journal of Non-Linear Mechanics, Elsevier, 2008, vol. 43, 514-520.

Kövecses J., **Kovács L.L.** and Stépán G., Dynamics modeling and stability of robotic systems with discrete-time force control, Archive of Applied Mechanics, 2007, vol. 77, pp. 293-299.

Kövecses J., **Kovács L.L.** and Stépán G., Dynamic Stability of Machine-Tissue Contacts in Force-Feedback Systems , Journal of Biomechanics, vol. 39, supplement 1, pp. S211-S212, 2006, Abstracts of the 5th World Congress of Biomechanics, 29 July 2006 - 04 August 2006.

Tóth A., Arz G., **Kovács L.L.**, Stépán G. and Fazekas G., Industrial robots applied in neurorehabilitation: Arm and shoulder exercising by robot, Journal of Computational and Applied Mechanics, Miskolc University Press, Miskolc, Hungary, 2006, vol. 7, pp. 85-101.

Kovács L.L. and Stépán G., A digitális PD erőszabályozás stabilitása, Gép – A Gépipari Tudományos Egyesület Folyóirata, Gép, 2004, vol. 15, pp. 96-103 (in Hungarian).

Kovács L.L. and Stépán G., Dynamics of Digital Force Control Applied in Rehabilitation Robotics, Meccanica, Kluwer Academic Publishers, 2003, vol. 38, pp. 213-226.

Book chapters

Insperger T., **Kovács L.L.**, Galambos P. and Stépán G., Act-and-wait control concept for a force control process with delayed feedback, Ulbrich H. and Ginzinger L. (eds.), Motion and Vibration Control, Springer, Garching, 2009, pp. 133-142.

Kovács L.L., Insperger T., Galambos P. and Stépán G., Experiments on the stability of digital force control of robots , Awrejcewicz J. (ed.), Modeling, Simulation and Control of Nonlinear Engineering Dynamical Systems – State-of-the-Art, Perspectives and Applications, Springer, 2009, pp. 191-199.

Kovács L. L., Dynamics of Digital Force Control of Robots, 2006, PhD dissertation.

Stépán G., **Kovács L.L.** and Kövecses J., Bifurcations caused by sampling effects in robotic force control, Ulbrich H. and Gunthner W. (eds.), Vibration Control of Nonlinear Mechanisms and Structures, Springer, Dordrecht, 2005, vol. 130, pp. 331-342.

Kovács L. L., Tóth A., Stépán G., Arz G. and Magyar G., Industrial Robot in a Medical Application – Back to Walk-through Programming, Pham D. T., Dimov, S. S. and O'Hagan V. (eds.), Advances in Manufacturing Technology – XV, Professional Engineering Publishing Ltd., London, 2001, pp. 479-484.

Patents

Stépán G., **Kovács L.L.**, Wohlfart R., Jurák M., Bachrathy D. and Tóth A., Suspended Payload Platform Thrusted by Fluid Mass Flow Generators, international application number and filing date: PCT/HU2010/000084, 27.07.2010, publication number and date: WO/2011/012915, 03.02.2011, URL: http://patentscope.wipo.int/search/en/WO2011012915

Seminars

The Role of Mechanical Properties on the Behaviour and Performance of Multi-DoF Haptic Devices, Department of Mechanical Engineering, Kumoh Institute of Technology, Gumi, South-Korea, April 19, 2013.

ACROBOTER: A Ceiling Based Service Robot Platform, Robotics Laboratory, Department of Mechanical Engineering, Laval University, Ste-Foy, Quebec, Canada, February 14, 2011.

Conference papers

Shayan-Amin S., **Kovács L.L.** and Kövecses J., Virtual Contact Dynamics Behaviour in Haptic Interfacing, in Proceedings of the ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2013), August 4-7, 2013, Portland, OR, USA, DETC2013-13411 (7 pages, accepted)

Zelei A; Bencsik L., **Kovács L.L.**, Stépán G., Impact models for walking and running systems – angular moment conservation versus varying geometric constraints (*accepted*, paper ID: 301, 2 pages)

Kovács L.L., Shayan-Amin S., Kövecses J., Performance Optimization of Haptic Multibody Systems, ECCOMAS Multibody Dynamics 2013, Conference, July 1-4, 2013, Zagreb, Croatia (*accepted*, paper ID: 285, 2 pages)

Shayan-Amin S., **Kovács L.L.**, Kövecses J., The Role of Mechanical Properties on the Behaviour and Performance of Multi-DoF Haptic Devices, in Proceedings of the IEEE World Haptics Conference 2013, The 5th Joint Eurohaptics Conference and IEEE Haptics Symposium, April 14-18, 2013, Daejeon, Korea (6 pages, paper ID: 202)

Shayan-Amin S., **Kovács L.L.** and Kövecses J., Dynamic Behaviour and Stability Analysis of Multibody Haptic Systems, in Proceedings of the ASME 2012 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2012), August 12-15, 2012, Chicago, IL, USA, DETC2012-71495 (7 pages)

Zelei A., Bencsik L., **Kovács L.L.**, Stépán G., Redundancy Resolution of the Underactuated Manipulator ACROBOTER, in Proceedings of The 19th CISM-IFToMM RoManSy Symposium (ROMANSY2012), June 12-15, 2012, UPMC-Sorbone University, Paris. (8 pages, paper ID: 17)

Zelei A., Bencsik L., Stépán G. and **Kovács L.L.**, Dynamics and Actuation of the Acroboter Platform, in Proceedings of The 2nd Joint International Conference on Multibody System Dynamics (IMSD 2012), May 29 - June 1, 2012, Stuttgart, Germany (2 pages)

Kovács L.L., Bencsik L., Kövecses J., Dynamic Analysis of Under-actuated Mechanical Systems for Design Optimization and Control Performance, in Proceedings of The 2nd Joint International

Conference on Multibody System Dynamics (IMSD 2012), May 29 - June 1, 2012, Stuttgart, Germany (2 pages).

Bencsik L. and **Kovács L.L.**, Stability Case Study of an Underactuated Service Robot, In Proceedings of the 11th Conference on Dynamical Systems Theory and Applications (DSTA 2011), Lodz, Poland, Dec 5-9, pp. 89-94.

Bencsik L. és **Kovács L.L.**, Alulaktuált robotok kiszámított nyomaték szabályozása szervó-kényszerek alkalmazásával, XI. Magyar Mechanikai Konferencia (MaMeK 2011), Miskolc, Augusztus 29-31, ISBN 978-963-661-975-6, 6 pages (in Hungarian).

Kovács L.L., Kövecses J., Zelei A., Bencsik L. and Stépán G., Servo-Constraint Based Computer Torque Control of Underactuated Mechanical Systems, ASME 2011 8th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC), Washington, USA, August 28-31, DETC2011-48533, 6 pages.

Kövecses J. and **Kovács L.L.**, Foot impact in different modes of running: mechanisms and energy transfer, Procedia IUTAM (2011 Symposium on Human Body Dynamics), vol. 2, June 2011, pp. 101–108.

Kovács L.L., Zelei A., Bencsik L. and Stépán G., Conceptual Design and Dynamics Modeling Aspects of ACROBOTER, in Procedings of the IUTAM Symposium on Dynamics Modeling and Interaction Control in Virtual and Real Environments, 7-11 June, 2010, Budapest, Hungary, IUTAM Bookseries, vol. 30, pp. 3-10.

Stépán G., **Kovács L.L.** and Tóth A., High-flying service robot: a ceiling based approach, in Book of Abstracts of the 19th International Workshop on Robotics in Alpe-Adria-Danube Region, Budapest, June 23-25, 2010. (1 page)

Kovács L. L., Zelei A., Bencsik L., Turi J. and Stépán G., Motion Control of an Under-Actuated Service Robot Using Natural Coordinates, in *Proceedings of the 18th CISM-IFToMM Symposium on Robot Design, Dynamics, and Control (RoManSy2010)*, Udine, Italy, *July 5-8, 2010, pp.* 331-338.

Zelei A., **Kovács L.L.**, Bencsik L. and Stépán G., Computed Torque Control of Under-actuated Dynamical Systems Modeled by Natural Coordinates, in *Proceedings of the 7th International Conference on Mechanical Engineering (Gépészet 2010)*, Budapest, Hungary, May 25-26, 2010, pp. 312-319 (CD-ROM, 048_zelei.pdf)

Zelei A., **Kovács L.L.** and Stépán G., Trajectory Generation of an Underactuated and redundant Service Robot Platform Equipped with Ducted Fan Actuators, in *Proceedings of the 10th Conference on Dynamical Systems Theory and Applications (DSTA 2009)*, Lodz, Poland, Dec 7-10, 2009, pp. 789-796.

Stépán G., Tóth A., **Kovács L.L.**, Bolmsjö G., Nikoleris G., Surdilovic D., Conrad A., Gasteratos A., Kyriakoulis N., Chrysostomou D., Kouskouridas R., Canou J., Smith T., Harwin W.S., Loureiro R.C.V., Lopez R. and Moreno M., ACROBOTER: A Ceiling Based Crawling, Hoisting and Swinging Service Robot Platform, *Beyond Gray Droids: Domestic Robot Design for the 21st Century, Workshop at Human Computer Interaction*, Sep 1, 2009, Cambridge, UK (4 pages, URL: http://www.cl.cam.ac.uk/conference/drd09).

Zelei A., **Kovács L.L.** and Stépán G., Computed Torque Control Method For Under-Actuated Manipulator, in *Proceedings of the ASME 2009 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2009)*, San Diego, USA, Aug 30 – Sep 2, 2009, pp. 1-6, paper no. DETC2009-86409.

Insperger T., **Kovács L.L.**, Galambos P. and Stépán G., Act-and-wait concept for digital force control of robots, in *Proceedings of The 17th CISM-IFToMM Symposium on Robot Design, Dynamics and Control (Romansy 2008)*, Tokyo, Japan, June 5-9, 2008, pp. 535-542.

Kovács L.L., Galambos P., Juhász A. and Stépán G., Experiments on the stability of digital force control of robots, in *Proceedings of the 9th Conference on Dynamical Systems Theory and Applications (DSTA 2007)*, Lodz, Poland, Dec 17-20, 2007, vol. 2, pp. 751-758.

Kovács L.L., Stépán G. and Kövecses J., Stability and optimization aspects of slightly damped oscillatory systems with digital force control, in *Proceedings of the 12th IFToMM World Congress*, Besancon, France, June 16-21, 2007, (CD-ROM, paper A808.pdf) 6 pages.

Kovács L.L., Kövecses J. and Stépán G., Dynamic Behavior of Robots with Digital Force Control, in *Proceedings of the 8th Conference on Dynamical Systems Theory and Applications (DSTA 2005)*, Lodz, Poland, Dec 12-15, 2005, vol. 1, pp. 335-342.

Kovács L.L., Stépán G. and Kövecses J., A case study on the stability of digital force control of robotic manipulators, in *Proceedings of the 20th Canadian Congress of Applied Mechanics (CANCAM 2005)*, McGill University, Montréal, Québec, Canada, May 30 - June 2, 2005, pp. 427-428.

Kovács L.L., Stépán G. and Kövecses J., Discrete-time Stability and Vibrations of Systems with Unidirectional Force Control, in *Proceedings of the 2005 CCToMM Symposium on Mechanisms, Machines, and Mechatronics*, Longueuil (St-Hubert), Québec, Canada, May 26-27, 2005, CCToMM05-P17 (CDROM), 6 pages.

Kovács L.L., Insperger T. and Stépán G., Teaching-in Force Control of Industrial Robots Used in Medical Applications , in *Proceedings of The 15th CISM-IFToMM Symposium on Robot Design, Dynamics and Control (Romansy 2004)*, Montreal, Canada, June 14-18, 2004, Rom04-46 (CDROM), 10 pages.

Kovács L.L. and Stépán, G., Deadtime Effect on Indirect Force Control of Industrial Robots, in *Proceedings of the Fourth International Conference on Mechanical Engineering (Gépészet 2004)*, Budapest, Hungary, May 27-28, 2004, vol. 1, pp. 377-381.

Kovács L.L., Stépán G. and Insperger T., Outer-loop force control of industrial robots, in *Proceedings of 11th World Congress in Mechanism and Machine Science (IFToMM 2004)*, China Machine Press, Tianjin, China, Apr 1-4, 2004, vol. 4, pp. 1746-1750.

Kovács L.L., Stépán G. and Gáspár T., Ipari Robotok Külső Köri Erőszabályozása, A IX. Magyar Mechanikai Konferencia Összefoglalói (IX. MAMEK), Miskolci Egyetem, Miskolc, Augusztus 27-29, 2003, p. 214 (in Hungarian).

Kovács L.L. and Stépán G., Digital force control in rehabilitation robotics, in *Proceedigns of 14th CISM-FToMM Symposium on Theory and Practice of Robots and Manipulators (Romansy 2002)*, Udine, Italy, July 1-4, 2002, pp. 181-188.

Kovács L.L. and Stépán G., Stability of Indirect Force Control Applied in Rehabilitation Robotics, in *Booklet of the Brainstorming Seminars at the Budapest University of Technology and Economics*, Budapest, Hungary, May 16, 2002 (2 pages).

Kovács L.L., Stépán G., Jurák M. and Tóth A., Indirect Force Control Applied in Rehabilitation Robotics, in *Proceedings of the Third International Conference on Mechanical Engineering (Gépészet 2002)*, Budapest, Hungary, 2002, vol. 2, 853-857.

Kovács L.L., Stépán G, Tóth A., Magyar G, Programming of Industrial Robots by Demonstration Using Force/Torque Measurements, in Proceedings of the 10th International Workshop on Robotics in Alpe-Adria-Danube Region (RAAD 2001), Wien, Austria, May 16-19, 2001 (6 pages).

Kovács L. L. and Stépán G., Force based walk-through programming of industrial robots, in *Book of Abstracts of Finno-Ugric International Conference of Mechanics (FUDOM 2001)*, Savoyai Palace Ráckeve, Hungary, May 27-June 2, 2001 (1 page).

Stépán G. and **Kovács L.L.**: Dynamics of Structures Subjected to Digital Force Control, in *Book of Abstracts of The 20th International Congress on Theoretical and Applied Mechanics*, Chicago, Illinois, Aug 27 - Sep 2, 2000.