

Prof. RNDr. Sergej Čelikovský, CSc.

Degrees

- 1984 MSc. from Faculty of Numerical Mathematics and Cybernetics of the Moscow State University, Department of Optimal Control.
- 1985 RNDr. degree (Rerum Naturalium Doctoris) from the Mathematical and Physical Faculty of Charles University in Prague.
- 1989 CSc. degree (Candidate of Sciences - corresponds to Ph.D degree) from the Institute of Information Theory and Automation of the Czechoslovak Academy of Sciences.
- 2008 Associate Professor at Technical Cybernetics, Czech Technical University in Prague.
- 2011 Full Professor at Technical Cybernetics, Czech Technical University in Prague.

Expertise

Nonlinear systems, chaotic systems control and synchronization, numerical methods, stability and stabilization, observers and filtering, analysis and control of underactuated systems with applications to walking robots.

Main dates

1989-2003 Research fellow and later **Senior research fellow** in the Department of Control Theory of Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic.

1994 3 months taking position of research associate at the Faculty of Mathematics, University of Twente, Enschede, NL.

1998 Half year taking position of research associate at the Department of Mechanical and Automation Engineering of the Chinese University of Hong Kong.

1998-2000 On the leave in CINVESTAV-IPN, Unidad Guadalajara, Mexico as Level 3A visiting professor.

From 2001 Associate member of the Centre for Chaos and Synchronization at the City University of Hong Kong.

From 2003 Chief research fellow in the Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic.

2003-2008 Research fellow and, later on, assistant professor at Department of Control Engineering, Faculty of Electrical Engineering, Czech Technical University in Prague.

From 2004 Head of Department of Control Theory Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic.

2008-2011 Associate Professor in Technical Cybernetics at Czech Technical University in Prague.

From 2008 Member of the Scientific Board of the Institute of Physical Biology, University of South Bohemia.

From 2011 Full Professor in Technical Cybernetics at Czech Technical University in Prague.

Scientific societies and editorial boards

- From 1996: Member of the Institute of Electrical and Electronics Engineers, Inc. (IEEE).
- From 1997: Member of the IFAC TC on Nonlinear Systems.
- 1997-2002: Vice-chair of the IFAC TC on Nonlinear Systems.
- From 2002: Senior Member of the Institute of Electrical and Electronics Engineers, Inc. (IEEE).
- 2002-2008: Member of IFAC TC on Robust Control.

- From 2002: Secretary of the Czech NMO of IFAC.
- From 2004: Chairman of Action Group “Chaos Control and Synchronization” of IEEE TC on Computer Aided Control Systems Design.
- 2004-2006: Associate Editor of **Dynamics of Continuous, Discrete and Impulsive Systems**.
- 2006-2009: Associate Editor of **IEEE Transaction on Automatic Control**.
- 2004: Member of Editorial Board of **Kybernetika**.
- 2010: Guest Associate Editor of **International Journal of Bifurcation and Chaos**.

International program committees at the international conferences and symposia

- 1998 IPC member of the IFAC Conference on Systems Structure and Control, Nantes, France, July, 1998.
- 2001 IPC member of the IFAC Nonlinear Control Symposium NOLCOS 2001, St. Petersburg, Russia.
- 2001 IPC member of the 1st IFAC Symposium on Systems and Structure Control, SSSC 2001, Prague, Czech Republic
- 2007 Subarea Chair of the IPC of the IFAC Nonlinear Control Symposium NOLCOS 2007, Pretoria, South Africa.
- 2009 IPC member of the IFAC Conference on Chaos Control 2009, London, GB.
- 2010 IPC member of the 3rd International Conference on Dynamics, Vibration and Control (ICDVC-2010), Hangzhou, China.
- 2010 IPC member of the 5th Asia-Pacific Workshop on Chaos Control and Synchronization, Kunming, China.
- 2010 Subarea Chair of the IPC of the IFAC Nonlinear Control Symposium NOLCOS 2010, Bologna, Italy.
- 2011 IPC member of the Physcon 2011 Conference, University of Leon, Spain.

Selected grants and projects

1997-2000 Leader of the research team supported by Grant Agency of the Academy of Sciences of Czech Republic through the grant No. 2075702 “Nonlinear Systems: Novel Topics in Control and Detection”.

1998-1999 Coordinator of the Czech part of common French-Czech Project “Control and observation of nonlinear systems”, sponsored within Programme ”Barrande 98”.

1999-2001 Leader of the research team in the Institute of Information Theory and Automation working on the grant project No. 102/99/1368 “Numerical algorithms for the design of control and filtration” jointly with the Czech Technical University, supported by the Grant Agency of the Czech Republic during 1999-2001. **Evaluated by the GA ČR as “excellent”.**

2002-2004 Leader of the research team in the Institute of Information Theory and Automation working on the grant project No. 102/02/0709 “Modern numerical methods for systems, signals and control”. jointly with the Czech Technical University, supported by the Grant Agency of the Czech Republic during 2002-2004. **Evaluated by the GA ČR as “excellent”.**

2005-2007 Leader of the research team in the Institute of Information Theory and Automation working on the grant project No. 102/05/0011 “Structure and Universality in Complex Control Systems” jointly with the Czech Technical University supported by the Grant Agency of the Czech Republic. **Evaluated by the GA ČR as “excellent”.**

2006-2007 Leader of the research team in the Institute of Information Theory and Automation, Academy of Sciences of Czech Republic, of common French-Czech Project “Analysis and Control of Underactuated Mechanical Systems”, sponsored within Programme ”Barrande 2006”.

2009-2010 Leader of the research team in the Institute of Information Theory and Automation, Academy of Sciences of Czech Republic, of common French-Czech Project “Stabilisation de systemes mechaniques

articles et application a la Robotique a pattes”, sponsored within Programme ”Barrande 2009”.

2008-2010 Leader of the research team in the Institute of Information Theory and Automation working on the grant project No. 102/08/0186 “Algorithms for Complex Systems Analysis and Control Design ” jointly with the Czech Technical University supported by the Grant Agency of the Czech Republic.

Educational activities

- 1999-2000 CINVESTAV Guadalajara, Mexico, “Modern Nonlinear Control”, 60 hours per year.
- 1999-2000 CINVESTAV Guadalajara, Mexico, “Advanced Nonlinear Control”, 60 hours per year.
- 2003-2009 Faculty of Electrical Engineering, Czech Technical University in Prague, “Nonlinear Systems”, master level course in Czech, 26 hours per year.
- 2004-2005 Faculty of Electrical Engineering, Czech Technical University in Prague, “Nonlinear Systems”, master level course in English, 26 hours per year.
- 2005-2006 Faculty of Electrical Engineering, Czech Technical University in Prague, “Nonlinear Systems”, PhD level course in Czech, 26 hours per year.
- 2009-2010 Faculty of Electrical Engineering, Czech Technical University in Prague, “Nonlinear Systems”, PhD level course in Czech, 26 hours per year.
- 2002-2010 Supervisor of 4 successfully defended PhD students.
- 2001-2006 Member of Study Branch Board for PhD study branches “Control Technology and Robotics”.
- 2006-2009 Member of Study Branch Board for PhD study branches “Control Technology and Robotics”.
- Currently advisor of 2 PhD students.
- From 2009 Member of Study Branch Boards for PhD study branches “Control Technology and Robotics”, “Measurement Technology” and “Control and Operation of Air Traffic”.

Selected publications

Summary:

Co-author of one book and two book chapters, co-editor of the book, over 40 papers in international journals, over 80 papers in international conference proceeding, over 800 SCI citations (auto-citations excluded).

- 1996 *Vaněček Antonín, Čelikovský Sergej*: Control Systems: From Linear Analysis to Synthesis of Chaos, **Prentice Hall**, London 1996.
- 1996 *Čelikovský Sergej, Nijmeijer H.*: Equivalence of nonlinear systems to triangular form: The singular case, **Systems and Control Letters** 27 (1996), pp. 135-144.
- 1997 *Čelikovský Sergej, Nijmeijer H.*: On the relation between local controllability and stabilizability for a class of nonlinear systems, **IEEE Transactions on Automatic Control**, 42 (1997), pp. 90-94.
- 1997 *Liu X. P., Čelikovský Sergej*: Feedback control of affine nonlinear singular control systems, **International Journal of Control**, 68 (1997), pp. 753-774.
- 1999 *Čelikovský Sergej, Aranda-Bricaire E.*: Constructive nonsmooth stabilization of triangular systems, **Systems and Control Letters** 36 (1999), pp. 21-37.
- 2000 *Čelikovský Sergej*: Local stabilization and controllability of a class of nontriangular nonlinear systems, **IEEE Transactions on Automatic Control**, 45 (2000), pp. 1909-1913.
- 2002 *S. Čelikovský and G. Chen*: On a generalized Lorenz canonical form of chaotic systems, **International Journal of Bifurcation and Chaos**, 12 (2002), 1789-1812.

- 2002 *J. Lu, G. Chen, D. Cheng and S. Čelikovský*: Bridge the gap between the Lorenz and the Chen system, **International Journal of Bifurcation and Chaos**, 12 (2002), 2917-2926.
- 2004 *S. L.E. Ramos, Čelikovský and V. Kučera*: Generalized output regulation problem for a class of nonlinear systems with nonautonomous exosystem, **IEEE Transactions on Automatic Control**, 49 (2004), 10, 1737-1742.
- 2004 *Ruiz-Leon J., Sapiens A. J., Čelikovský, Torres J. A.*: Decoupling with stability: Application to the real time control of a water storing plant, **Asian Journal of Control**, 6 (2004), 3, 415-420.
- 2005 *S. Čelikovský and G. Chen*: Secure synchronization of a class of chaotic systems from a nonlinear observer approach, **IEEE Transactions on Automatic Control**, vol. 50 (2005), 76-82.
- 2005 *T. Zhou, G. Chen and S. Čelikovský*: Shilnikov chaos in generalized Lorenz canonical form of chaotic systems, **Nonlinear Dynamics**, 39 (2005), 319-334.
- 2005 *G. Chen, J. Zhou and S. Čelikovský*: On LaSalle invariance principle and its application to robust synchronization of general vector Lienard equations, **IEEE Transactions on Automatic Control**, 50 (2005), 6, 869-874.
- 2005 *Čelikovský S., Guanrong C.*: On the generalized Lorenz canonical form, **Chaos Solitons and Fractals**, 26 (2005), 5, 1271-1276.
- 2007 *Papáček Š., Čelikovský Sergej, Štys D., Ruiz León J.*: BILINEAR SYSTEM AS A MODELLING FRAMEWORK FOR ANALYSIS OF MICROALGAL GROWTH, **Kybernetika**, vol.43, 1 (2007), p. 1- 20.
- 2008 *Rehák Branislav, Čelikovský Sergej, Papáček Š.*: Model for Photosynthesis and Photoinhibition: Parameter Identification Based on the Harmonic Irradiation O₂ Response Measurement, **IEEE Transactions on Automatic Control**, 53 (2008), pp. 101-108.
- 2008 *Zelinka I., Chen G., Čelikovský S.*: Chaos Synthesis by Means of Evolutionary Algorithms, **International Journal of Bifurcation and Chaos**, **International Journal of Bifurcation and Chaos**, 18 (2008), pp. 911-942.
- 2008 *B. Rehák and S. Čelikovský*: Numerical method for the solution of the regulator equation with application to nonlinear tracking, **Automatica**, 44 (2008), pp. 1358-1365.
- 2009 *Rehák Branislav, Čelikovský Sergej, Ruiz-León J., Orozco-Mora J.*: A comparison of two Fem-based methods for the solution of the nonlinear output regulation problem, **Kybernetika**, 45 (2009), pp. 427-444.
- 2009 *Suzuki H., Sakamoto N., Čelikovský Sergej*: Hisenkei Syutsuryoku Regyuresyon Mondai niokeru Cyushin Tayoutai no Kinjikaihou, **Society of Instrument and Control Engineers. Transactions**, 45, 9 (2009), pp. 451-458.
- 2009 *Chen G., Čelikovský Sergej, Zhou J.*: On a functional LaSalle principle with application to chaos synchronization, **International Journal of Bifurcation and Chaos**, 19 (2009), pp. 4253-4261.
- 2010 *Anderle Milan, Čelikovský Sergej, Henrion Didier, Zikmund Jiří*: Advanced LMI based analysis and design for Acrobot walking, **International Journal of Control**, 83 (2010), pp. 1641-1652.
- 2010 *Papáček Š., Čelikovský Sergej, Rehák Branislav, Štys D.*: Experimental design for parameter estimation of two time-scale model of photosynthesis and photoinhibition in microalgae, **Mathematics and Computers in Simulation**, 80 (2010), pp. 1302-1309.
- 2010 *Lynnyk Volodymyr, Čelikovský Sergej*: On the anti-synchronization detection for the generalized Lorenz system and its applications to secure encryption, **Kybernetika**, 46 (2010), pp. 1-18.
- 2010 *Čelikovský Sergej, Papáček Štěpán, Cervantes-Herrera A., Ruiz-León J.*: Singular Perturbation Based Solution to Optimal Microalgal Growth Problem and Its Infinite Time Horizon Analysis, **IEEE Transactions on Automatic Control**, 55 (2010), pp. 767-772.
- 2010 *Zelinka I., Chen G., Čelikovský Sergej*: Chaos Synthesis by Evolutionary Algorithms, Evolutionary Algorithms and Chaotic Systems, Eds: Zelinka I., Čelikovský S., Richter H., Chen G., **Springer-Verlag, Heidelberg** 2010.
- 2010 *Čelikovský Sergej, Zelinka I.*: Chaos Theory for Evolutionary Algorithms Researchers, Evolutionary Algorithms and Chaotic Systems, Eds: Zelinka I., Čelikovský S., Richter H., Chen G., **Springer-Verlag, Heidelberg** 2010.