



PhysCon2013

Program at a glance

Monday (26th August)		Tuesday (27th August)		Wednesday (28th August)		Thursday (29th August)	
"Rafael Nieto" Auditorium at UASLP Rectory Building.							
Opening R. Femat 8:45-9:00hrs							
Keynote 1 J. Kurths <i>On the Stability of Complex Networks and Their Application to Control Power Grids</i> 9:00 a 10:00hrs		Keynote 2 J. Alvarez <i>Controlled Synchronization of Dynamical Systems</i> 9:00 a 10:00hrs		Keynote 3 V. Jurdjevic <i>Hamiltonian Systems and optimal control</i> 9:00 a 10:00hrs		Keynote 4 S. Celikosky <i>Modeling and control of the underactuated mechanical systems</i> 9:00 a 10:00hrs	
"Las Cajas Reales" Conference and Exhibition Hall, UASLP							
Room 1 "Capilla"	Room 2 "Catedral"	Room 1 "Capilla"	Room 2 "Catedral"	Room 1 "Capilla"	Room 2 "Catedral"	Room 1 "Capilla"	Room 2 "Catedral"
Mo-am1: <i>General 1</i> 10:15- 12:30	Mo-am2: <i>Invited 2.I</i> 10:15- 13:30	Tu-am1: <i>Invited 2- II</i> 10:15- 13:00	Tu-am2: <i>Invited 1- II</i> 10:15- 13:30	We-am1: <i>Invited 1- III</i> 10:15- 12:30	We-am2: <i>Invited 6</i> 10:15- 13:00	Th-am1: <i>General 4</i> 10:15- 12:30	Th-am2: <i>General 5</i> 10:15- 12:30
Lunch 13:30 - 15:00						Closing 13:00-13:30hrs	
Mo-pm1: <i>Invited 1.I</i> 15:00- 17:45	Mo-pm2: <i>Invited 3</i> 15:00- 17:45	Tu-pm1: <i>Invited 4</i> 15:00- 19:00	Tu-pm2: <i>Invited 5</i> 15:00- 17:15	We-pm1: <i>General 2</i> 15:00- 17:15	We-pm2: <i>General 3</i> 15:00- 17:15		
IPACS General Assembly 18:30-20:00hrs		Free		Dinner 20:00.22:00hrs			
Welcome reception 20:00-22:00hrs							



PhysCon2013

On the Stability of Complex Networks and Their Application to Control Power Grids

Schedule: Mo-am1, 9:00- 10:00hrs

Auditorium: "Rafael Nieto" Rectory Building UASLP



Speaker: Professor Jurgen Kurths

**Potsdam Institute for Climate Impact Research and
Humboldt University Berlin,
Institute of Physics, Germany and
Institute for Complex systems and Mathematical Biology,
University of Aberdeen, UK,**

Email: Juergen.Kurths@pik-potsdam.de

Abstract:

The human brain, power grids, arrays of coupled lasers and the Amazon rainforest are all characterized by multistability. The likelihood that these systems will remain in the most desirable of their many stable states depends on their stability against significant perturbations, particularly in a state space populated by undesirable states. Here we claim that the traditional linearization-based approach to stability is too local to adequately assess how stable a state is. Instead, we quantify it in terms of basin stability, a new measure related to the volume of the basin of attraction. Basin stability is non-local, nonlinear and easily applicable, even to highdimensional systems. It provides a long-sought-after explanation for the surprisingly regular topologies of neural networks and power grids, which have eluded theoretical description based solely on linear stability. We anticipate that basin stability will provide a powerful tool for complex systems studies, including the assessment of multistable climatic tipping elements. As a first example, new principles for the design of stable power grids under the restriction of smart grids will be given.

References:

- P. Menck, J. Heitzig, N. Marwan, and J. Kurths, *Nature Physics* 9, 89 (2013)
Runge, J., J. Heitzig, V. Petoukhov, and J. Kurths, *Phys. Rev. Lett.* 108, 258701 (2012).
Donges, J., R. Donner, M. Trauth, N. Marwan, H.J. Schellnhuber, and J. Kurths, *PNAS* 108, 20422-20427 (2011).
Arenas, A., Diaz-Guilera, A., Kurths, J., Moreno, Y., and Zhou, C., *Physics Reports* 469, 93-153 (2008).

Short CV:

Jürgen Kurths studied mathematics at the University of Rostock and got his PhD in 1983 at the GDR Academy of Sciences and his Dr. habil. in 1990. He was full Professor at the University of Potsdam from 1994-2008 and has been Professor of Nonlinear Dynamics at the Humboldt University, Berlin and chair of the research domain Transdisciplinary Concepts of the Potsdam Institute for Climate Impact Research since 2008 and a 6th century chair at the Institute for Complex Systems and Mathematical Biology at Kings College of the Aberdeen University (UK) since 2009.

He is a fellow of the American Physical Society and of the Fraunhofer Society (Germany). He has become a member of the Academia Europaea in 2010. He got an Alexander von Humboldt research award from CSIR (India) in 2005 and a Honory Doctorate in 2008 from the Lobachevsky University Nizhny Novgorod., a Honorary Professor of Potsdam University in 2011, a Honorary Doctorate in 2012 from the State University Saratov and has become a Guest Professor at the Southeast University in Nanjing. He was awarded the L.F. Richardson Medal of the European Geosciences Union in 2013.

His main research interests are complex synchronization phenomena, complex networks, time series analysis and their applications in climatology, sustainability research, physiology, systems biology and engineering.

He has supervised more than 60 PhD students from about 20 countries; more than 30 of them have now tenured positions in various countries.

He has published more than 500 papers in peer-reviewed journals and two monographs which are cited more than 19.000 times (H-factor: 58).

He is in the editorial board of more than 10 journals, among them CHAOS, Philosophical Trans. Royal Soc. A, PLoS ONE, European J. Physics ST and Nonlinear Processes in Geophysics and of the Springer Series Complexity.

He coordinated several large projects in EU and DFG and is now speaker of an International Research Training Group on complex networks (DFG and Brazil).



PhysCon2013

Controlled Synchronization of Dynamical Systems

Schedule: Tu-am1, 9:00- 10:00hrs

Auditorium: "Rafael Nieto" Rectory Building UASLP



Speaker: Professor Joaquín Álvarez

**Electronics and Telecommunications Department
Scientific Research and Advanced Studies Center
of Ensenada, México (CICESE)**

Email: jqalvar@cicese.mx

Abstract:

Synchronization refers to correlated or corresponding-in-time behavior of two or more systems. Synchronization is a natural phenomenon, playing a key role to build a proper scenario to preserve a vital equilibrium, from living organisms to celestial systems.

For engineering systems performing collaborative tasks, synchronization is usually forced to make them operate properly or in an optimal way. In this case, synchronization becomes a control objective, which can be accomplished using feedback control techniques, which in turn need a good estimation of the states. Hence, closely related to the controlled synchronization problem is the observer design. Among many applications, controlled synchronization can be used in private communications, multi-robot systems, master/slave teleoperation, electrical networks, transportation systems, etc.

In this talking we present some observer designs and robust control techniques to achieve synchronization of a class of dynamical systems. We illustrate some theoretical results with experiments involving electronic circuits and mechanisms, among others.

Short CV:

Joaquin Alvarez obtained the Engineering-degree in Electronics and Telecommunications from the National Polytechnic Institute (IPN) of Mexico (1975); the M.Sc.-degree in Electrical Engineering from the Advanced Studies and Scientific Research Center (CINVESTAV) of the IPN (1976), and the Engineer-Doctor-degree in Automatic Control from the National Polytechnic Institute of Grenoble, France (1979).

From 1980 to 1987 he held a Professorial position in the Electrical Engineering Department of the CINVESTAV, and a researcher position in the Electrical Research Institute at Cuernavaca, Mexico, from 1986 to 1990. Since 1990 he has been a full professor in the Electronics and Telecommunications Department of the Scientific Research and Advanced Studies Center of Ensenada, Mexico (CICESE). He has been the Head of this Department in 1991-92 and from 2006 to 2009. He has been also part-time Professor in the Superior School of Electrical and Mechanical Engineering of the IPN and the National Center of Research and Technology (CENIDET).

He has published more than 160 papers in journals and scientific conferences, and been the leader of more than 15 scientific and technological projects. He has been also the advisor of 9 doctorate, 36 M.Sc, and 7 engineer students. He is associate editor of some scientific journals, and has been a member of the National System of Scientific Research of Mexico since 1984, where he holds the maximal level (III). Also, he is a member of the Mexican Academy of Sciences, the Mexican Academy of Engineering, the IEEE, and the Mexican Association of Automatic Control, having been the President of this Association from 1984 to 1986. His research interests are in the fields of nonlinear control, discontinuous systems, chaos control and synchronization.



PhysCon2013

Hamiltonian Systems and optimal control

Schedule: We-am1, 9:00- 10:00hrs

Auditorium: "Rafael Nieto" Rectory Building UASLP



Speaker: Professor Velimir Jurdjevic

**Department of Mathematics,
University of Toronto, Ontario Canada
E-mail:** jurdj@math.toronto.edu

Abstract:

This lecture will highlight the contributions of optimal control theory to geometry and mechanics. The basic object of study is the reachable sets of families of vector fields parametrized by control functions. We will show how the extremal properties of the reachable sets lead to the Hamiltonians and how these Hamiltonians alter our understanding of the classical calculus of variations in which the Euler-Lagrange equation is a focal point of the subject.

The second part of the lecture will be focused on systems with symmetries, integrals of motion and integrability. We will show the relevance of symplectic geometry and the associated Hamiltonian formalism on Lie groups G whose Lie algebras \mathfrak{g} admit Cartan decomposition $\mathfrak{g} = \mathfrak{p} + \mathfrak{k}$ subject to Lie bracket relations

$$[\mathfrak{p}, \mathfrak{p}] \subseteq \mathfrak{k}, [\mathfrak{p}, \mathfrak{k}] \subseteq \mathfrak{p}, [\mathfrak{k}, \mathfrak{k}] \subseteq \mathfrak{k}$$

by singling out certain left-invariant optimal control problems whose solutions give new insights into the geometry of the underlying Riemannian symmetric spaces and also clarify certain aspects of the theory of integrable Hamiltonian systems.

Short CV:

1. Degrees:

- 2005-present Professor Emeritus, University of Toronto
- 1971-2005 Professor, Mathematics, University of Toronto
- 1970-71 Post-Doctoral Fellow, Harvard University, Cambridge, Mass.
- 1969 Ph.D. Case Western Reserve University, Cleveland, Ohio.

2. Other Teaching and Research Experience

- Spring 2012 Visiting Member of the Institute Mittag-Leffler, Stockholm, Sweden
- Summer 2010 Visiting Lecturer, Summer School in Geometria, Control Y Aplicaciones Universidad de Los Andes, Colombia
- Spring 2009 Visiting Researcher, Kavli Institute for Theoretical Physics Department of Physics, University of California at Santa Barbara
- Summer 2009 Lecturer, Summer School in Geometry, Mechanics and Control Theory, University of Barcelona, Spain,
- Spring 2003 Visiting Member of the Institute Mittag-Leffler, Stockholm, Sweden
- 1997-1998 Visiting Professor, University of Florence, Italy
- Visiting Professor, Institute des Sciences Appliquées, Rouen, France
- 1993-1994 Visiting Professor, Mathematics, University of Bourgogne April
- Member of the Institute for Advanced Study, Princeton, New Jersey
- Visiting Professor, Mathematics, Steklov Institute of Mathematics, Moscow.

3. Invited Lectures

- 2012 Integrable Hamiltonian Systems on Symmetric Spaces
Conference on Geometric Control theory, Dijon, France.
- 2012 Jacobi's geodesic problem and Lie groups
Geometric Control and sub-Riemannian Geometry, Corona, Italy.
- 2011 Optimal Control in Geometry and Mechanics
Conference on Geometry, Dynamics and Integrable systems, Sintra, Portugal.
- 2010 Optimal Control Problems on Lie groups and Integrable Systems,
Conference on Geometry, Dynamics and Integrable Systems, Sept 7-13, 2010, Belgrade, Serbia
- 2010 Optimal Control on Lie Groups and their homogeneous spaces,
Queens University, Kingston, Ontario
- 2009 Integrable Hamiltonian Systems on Lie groups and Symmetric Spaces,
Canad. Math. Soc. Meeting, Windsor, Ont
- 2009 Integrable Hamiltonian Systems, University of Loughborough, U.K.
- 2007 Optimal Control Problems, Mechanics and Geometry, plenary lecture
Joint Meeting AMS and the Brazilian Math. Soc., Rio de Janeiro, Brazil.
- 2003 S. Kowalewski: The Passion, The Mystery and the Genius -
Mittag - Leffler Institute, Stockholm, Sweden
The Elastic Curves, Tops and the Optimal Control,
Mittag-Leffler Institute, Stockholm, Sweden.

4. Books

1. Geometric Control Theory, Advanced Studies in Mathematics, Vol. 52, Cambridge University Press.
2. Geometric Control and Non-Holonomic Problems in Mechanics, Editor jointly with R. Sharpe, Canad. Math. Soc. Conference Proceedings, 1998.
3. Integrable Hamiltonian Systems on Complex Lie Groups, Memoirs Amer. Math. Soc., Vol 178, No 838, 2005.

5. Select list of publications

1. Integrable Hamiltonian Systems on Lie Groups: Kowalewski type, *Annals of Mathematics* 150, 1999, p. 605-644.
2. On Removing Barriers between Mechanics and Optimal Control: Completely Integrable Systems, *Proceedings of 37 th IEEE Conference on Decision and Control, Tampa, Florida (1998)*, pp. 2244–2250.
3. Complex Hamiltonians and Integrable Systems, *Proceedings of 38th Conference on Decision and Control, Phoenix, Arizona (1999)*.
4. Hamiltonian Point of View of Non-Euclidean Geometry and Elliptic Functions, *Lie Theory and Application in Control Systems*, edited by U. Helmke, K. Hueper and J. Lawson, *System and Control Letters* 43 (2001), 25–41.
5. with F. Monroy-Pérez, Variational Problems on Lie Groups and their Homogeneous spaces: Elastic Curves, Tops and Constrained Geodesic Problems, *Contemporary Trends in Control Theory and Applications World, Scientific Publishing, Feb 2002* edited by B. Bonnard, J.P. Gauthier and F. Monroy-Pérez
6. Integrable Hamiltonian Systems on Complex Lie Groups, *Memoirs Amer. Math. Soc.*, Vol 178, No 838, 2005, 1-133.
7. V. Jurdjevic and J. Zimmerman, Rolling Sphere Problems on Spaces of Constant Curvature, *Math. Proc. Camb. Phil. Soc*, (144), 2008, 729-747.
8. V. Jurdjevic, The Maximum Principle in Optimal Control, in *Encyclopedia of Complexity and Systems Science* (edited by R.A. Meyers), (2009), Part 13, pp. 5440-5450.
9. V. Jurdjevic, The symplectic structure of curves in three dimensional spaces of constant curvature and the equations of mathematical physics, *Ann. I. H. Poincare* (26), 2009, 1483-1515.
10. V. Jurdjevic, Optimal control systems on Lie groups and integrable Hamiltonian Systems *Jour. of Regular and Chaotic Dynamics* Vol 16, No. 5 (2011), pp. 514-545.
11. V. Jurdjevic, Elastic Problems and Optimal Control: Integrable systems, to appear in *Zbornik Radova, Serbian Academy of Sciences*.
12. V. Jurdjevic, Affine-Quadratic problem on Lie groups, to appear in the *Mathematical Control and related fields* in the special issue dedicated to B. Bonnard on his 60th Birthday.
13. V. Jurdjevic, Second-order Systems and the Hybrid Maximum Principle, to appear in the special issue dedicated to A. Agrachev on the occasion of his 60th Birthday, *Springer INDAM Series*.



PhysCon2013

Modeling and control of the underactuated mechanical systems

Schedule: Th-am1, 9:00- 10:00hrs

Auditorium: "Rafael Nieto" Rectory Building UASLP



Speaker: Professor RN Dr. Sergej Čelikovský

**Institute of Information Theory and Automation
Academy of Sciences of the Czech Republic, Prague**

Czech Republic

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<http://staff.utia.cas.cz/celikovsky/>

Abstract:

Underactuated mechanical systems are those having less actuators than degrees of freedom. Therefore, their control requires intrinsically nonlinear techniques. Among them, various kinds of exact feedback linearizations and nonlinear decompositions are useful. Corresponding transformations often stem from an insight based on the knowledge from physics. As a consequence, this area serves as an excellent example of the natural interconnection of physics and control. The prominent role among underactuated mechanical systems play underactuated walking robots, typically modeled as the n -link chain with $(n-1)$ actuators between its links. The simplest underactuated system resembling the walking-like movements is the so-called Acrobot, called also as the biped or compass gait walker. As a matter of fact, it is possible to show via certain global system transformation and embedding technique that the control algorithms developed for the Acrobot may be directly extended to the case of a more general underactuated n -link. This technique may be also interpreted as the so-called virtual constraint technique using part of control inputs to impose suitable pre-selected additional virtual constraints. The purpose of this lecture will be to present the basic ideas from the underactuated mechanical systems control research and to briefly present the above mentioned exact feedback linearization and embedding techniques.

Short CV:

Sergej Čelikovský received his MSc. in Applied Mathematics in 1984 from Optimal Control Department, Moscow State University and his PhD. in Technical Cybernetics in 1988 from Academy of Sciences of the Czech Republic. He worked as the visiting researcher at University of Twente, Enschede, NL 1996; Department of Mechanical and Automation Engineering, Chinese University of Hong Kong 1998; and CINVESTAV del I.P.N., Mexico 1998-2000. Currently he works as the Senior Researcher and the Head of the Control Theory Department, Institute of Information Theory and Automation, Academy of Sciences of the Czech Republic. He is Full Professor at the Department of Control Engineering, Czech Technical University in Prague. He is member of IEEE since 1996, Senior Member of IEEE since 2002 and Chairman of Action Group "Chaos Control and Synchronization" of IEEE TC on Computer Aided Control Systems Design since 2004. His research interests include nonlinear systems, exact feedback linearization, stabilization, chaotic systems, output feedback control, underactuated mechanical systems and walking robots. S. Čelikovský is co-author of one book and two book chapters, co-editor of the book, he authored or co-authored over 40 papers in international journals, over 80 papers in international conference proceedings, resulting in over 1000 SCI citations (autocitations excluded). He served as the Subarea Chair of the IPC of the IFAC NOLCOS 2007 and 2010, as well as the member of IPC of other numerous international conferences. He has been member of IFAC TC on Nonlinear Systems since 1997 and its vice-chair during 1997-2002. Sergej Čelikovský served as the Associate Editor of: Dynamics of Continuous, Discrete and Impulsive Systems (2004-2006); IEEE Transaction on Automatic Control (2006-2009); currently, he is Member of Editorial Board of Kybernetika, Associate Editor of the Journal of Franklin Institute, IET Control Theory & Applications and International Journal of Bifurcation and Chaos.



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Schedule: Mo-am1, 10:15- 12:30 Room: 1 "Capilla"				
General 1: Linear and Nonlinear Dynamical Systems I.				
Chair: Gualberto Solís-Perales, CUCEI- U de G, Guadalajara, México				
Time	Paper Ref.	Title	Authors	Affiliation
10:15-10:45	39	Hopf bifurcation analysis of distributed delay equations.	Franco S. Gentile, Jorge L. Moiola.	<i>Universidad Nacional del Sur, Argentina</i>
10:45-11:15	11	Output-feedback global stabilization of uncoupled PVTOL aircraft with bounded inputs.	Arturo Zavala-Rio, Isabelle Fantoni.	<i>IPICYT, México; UTC-CNRS, France.</i>
11:15-11:45	55	Controlling the dynamics of physical systems by Poincare coupling.	Luis Javier Ontañón-García, Eric Campos-Cantón	<i>UASLP, México; IPICYT, México</i>
11:45-12:00	<i>Break (Coffee)</i>			
12:00-12:30	32	Solid cylinder with viscous filling on rough plane.	Marat Dosaev.	<i>Lomonosov Moscow State University, Russia</i>



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Schedule: Mo-am2, 10:15- 13:30 **Room:** 2 “Catedral”

Invited 2.I: Mechanics, dynamical systems and control: theory and applications (I)

Chair: Felipe Monroy-Perez UAM-A, México DF, México

Time	Paper Ref.	Title	Authors	Affiliation
10:15-10:45	36	State Estimation for a Class of Nonlinear Dynamic Systems with Uncertainty through Dynamic Programming Technique.	Tatiana Filippova	<i>Ural Federal University, Russia</i>
10:45-11:15	58	Optimal control of non-holonomic 3-step nilpotent systems.	A. Anzaldo-Meneses, F. Monroy-Pérez.	<i>UAM-A, México</i>
11:15-11:45	69	A discontinuous controller for a class of mechanical systems with second-order non-holonomic constraints.	O. Peñaloza-Mejía, Joaquín Alvarez, Luis A. Márquez-Martínez.	<i>CICESE, México</i>
11:45-12:00	<i>Break (Coffee)</i>			
12:00-12:30	71	Formation Maneuvers via Adaptive Super Twisting Approach.	Rubén Hernández, Oscar Salas, Jesús de León-Morales.	<i>UANL, México</i>
12:30-13:00	34	An Algorithm of Route Planning Through the Set of Nonconvex Obstacles.	S. V. Kruglikov, A.S. Kruglikov	<i>Ural Branch of RAS, Russia; Ural Federal University, Russia</i>
13:00-13:30	61	Smooth interpolation on ellipsoids via rolling motions.	Krzysztof A. Krakowski, Fátima Silva Leite.	<i>University of New England, Australia; University of Coimbra, Portugal</i>



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Schedule: Mo-pm1, 15:00- 17:45 **Room:** 1 “Capilla”

Invited 1.I: Chaotic and Complex Dynamics and Applications (I)

Chair: Jesús M. Seoane, Universidad Rey Juan Carlos, Madrid, Spain.

Time	Paper Ref.	Title	Authors	Affiliation
15:00-15:30	7	Effects of weak noise and forcing in chaotic scattering.	Jesús M. Seoane	<i>Universidad Rey Juan Carlos, Spain.</i>
15:30-16:00	44	Analysis of global dynamics based on localization of compact invariant sets of some cancer tumor growth models.	Konstantin E. Starkov	<i>CITEDI-IPN, México</i>
16:00-16:30	78	Mathematical model describing tumor growth under a treatment by chemotherapy.	K. C. Iarosz, F. S. Borges, A. M. Batista, R. A. N. Siqueira, H. P. Ren, M. S. Baptista, C. Grebogi, R. L. Viana, S. R. Lopes.	<i>Universidade de Ponta Grossa, Brazil; Xian University of Technology, China; University of Aberdeen, United Kingdom; Universidade Federal do Paraná, Brazil</i>
16:30-16:45	<i>Break (Coffee)</i>			
16:45-17:15	79	Chaos detection tools: The LP-VICODE and its applications.	Mr. Luciano Darriba, Dr. Pablo Cincotta, Dr. Nicolás Maffione, Dr. Claudia Giordano.	<i>Universidad Nacional de La Plata, Argentina;</i>
17:15-17:45	87	Controlling Complex Dynamics in Chaotic Scattering.	Mattia Coccolo, Jesús M. Seoane, Miguel A.F. Sanjuán	<i>Universidad Rey Juan Carlos, Spain.</i>



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Schedule: Mo-pm2, 15:00- 17:45 **Room:** 2 "Catedral"

Invited 3: Control of Complex Systems, Networks and Self-Organization.

Chair: M. A. Aziz Alaoui, Université du Havre, Le Havre (Normandie), France.

Time	Paper Ref.	Title	Authors	Affiliation
15:00-15:30	92	Self-adaptive control within a chaotic ant system for optimization.	Rodolphe Charrier, Cyrille Bertelle.	<i>Normandy University, France</i>
15:30-16:00	26	Lyapunov-type theorems for estimation of output of control system with periodic differentiable nonlinearity.	Aleksey Perkin, Anton Proskurnikov, Vera Smirnova, Alexander Shepeljavyi.	<i>St. Petersburg State University, Russia</i>
16:00-16:30	27	Nonsmooth \mathcal{L}_2 gain analysis of twisting controller.	Israel U. Ponce, Yury Orlov, Luis T. Aguilar.	<i>CICESE, México; CITEDI-IPN, México</i>
16:30-16:45	<i>Break (Coffee)</i>			
16:45-17:15	38	Solving Discrete-time Algebraic Riccati Equations Using Modified Newton's Method.	Vasile Sima.	<i>National Institute for Research & Development in Informatics, Romania</i>
17:15-17:45	90	Synchronization and parameter identification of uncertain complex network via adaptive-impulsive control.	M.A. Aziz-Alaoui, Qunjiao Zhang, Cyrille Bertelle.	<i>Normandy University, France.</i>



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Schedule: Tu-am1, 10:15- 13:00 **Room:** 1 "Capilla"
Invited 1-II: Chaotic and Complex Dynamics and Applications (II).
Chair: Álvaro G. López, Universidad Rey Juan Carlos, Madrid, Spain.

Time	Paper Ref.	Title	Authors	Affiliation
10:15-10:45	46	Control of dynamical states in a network: firing death and multistability.	Marzena Ciszak, Stefano Euzzor, F. Tito Arecchi, Riccardo Meucci.	<i>CNR-Istituto Nazionale di Ottic, Italy</i>
10:45-11:15	42	Effective suppressibility of chaos.	Alvaro G. López, Jesús M. Seoane and Miguel A.F. Sanjuán.	<i>Universidad Rey Juan Carlos, Spain.</i>
11:15-11:45	56	Control of bursting synchronization in networks of thermally sensitive neurons with chemical synapses.	C. A. S. Batista; R. L. Viana.	<i>Federal University of Parana, Brazil.</i>
11:45-12:00	<i>Break (Coffee)</i>			
12:00-12:30	77	Suppression of bursting synchronization in a scale-free network.	A. M. Batista, E. L. Lameu, K. C. Iarosz, C. A. S. Batista, R. L. Viana, S. R. Lopes.	<i>Universidade Estadual de Ponta Grossa, Brazil; Universidade Federal do Paraná, Brazil.</i>
12:30-13:00	76	A mechanism for anomalous transport.	S. Roberto Lopes, J. Danilo Szezech Jr, Rodrigo F. Pereira, Ricardo Luiz, V. Andressa Antonini.	<i>Federal University of Paraná, Brazil; State University of Ponta Grossa, Brazil; Federal University of Rio Grande do Sul, Brazil.</i>



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Schedule: Tu-am2, 10:15- 13:30 Room: 2 "Catedral" Invited 2-II: Mechanics, dynamical systems and control: theory and applications (II). Chair: Cutberto Romero Melendez, UAM-A, México DF, México.				
Time	Paper Ref.	Title	Authors	Affiliation
10:15-10:45	67	Approach of nonlinear control applied on PVTOL with cartesian dynamic restricted.	Omar Sánchez-Rodríguez, Ricardo Barrón-Fernández, Juan-Carlos Chimal-Egüia.	<i>CIC-IPN, México</i>
10:45-11:15	68	Modeling and control of a unirotor vehicle.	Omar Sánchez-Rodríguez, Ricardo Barrón-Fernández, Juan-Carlos Chimal-Egüia.	<i>CIC-IPN, México</i>
11:15-11:45	70	Motion planning and differential flatness.	Cutberto Romero-Meléndez.	<i>UAM-A, México.</i>
11:45-12:00	<i>Break (Coffee)</i>			
12:00-12:30	28	Parametric resonance in nonlinear vibrations of elastic stretched string under harmonic heating.	E.V. Kurmyshev, L.J. López-Reyes.	<i>U. de G., Centro Universitario de los Lagos, México</i>
12:30-13:00	48	Observer-based attitude control for a two-rotor aerodynamical system.	Oscar Salas, Herman Castañeda, Jesús de León-Morales.	<i>UANL, México</i>
13:00-13:30	50	Robust Autopilot for a fixed wing UAV using Adaptive Super Twisting technique.	Herman Castañeda, Oscar S. Salas Peña, Jesús de León Morales	<i>UANL, México</i>

Schedule: Tu-pm1, 15:00- 19:00 **Room:** 1 “Capilla”

Invited 4: Control and Linear Algebra: Theory and Applications.

Chair: M. Isabel García-Planas, Universidad Politècnica de Catalunya, Barcelona Spain.

Time	Paper Ref.	Title	Authors	Affiliation
15:00-15:25	1	Versal deformations of bilinear systems under output-injection equivalence.	M. I. García-Planas	<i>Universitat Politècnica de Catalunya, Spain.</i>
15:25-15:50	5	Perturbation analysis of simple eigenvalues of singular linear systems.	Sonia Tarragona, M. I. García-Planas.	<i>Universidad de León, Spain; Universitat Politècnica de Catalunya, Spain.</i>
15:50-16:15	6	Cyclic codes as hyperinvariant subspaces.	M. I. García-Planas, M. Dolors Magret, M. Eulalia Montoro.	<i>Universitat Politècnica de Catalunya, Spain.</i>
16:15-16:40	63	The Evolution of the Relative Gain Array Matrix: the Multivariable Structure Function.	L. Antonio Amézquita - Brooks, Carlos E. Ugalde-Loo, Eduardo Licéaga-Castro, Jesús Licéaga-Castro.	<i>UANL, México; Cardiff University Wales, UK; UAM-A., México.</i>
16:40-16:55	<i>Break (Coffee)</i>			
16:55-17:20	65	Structural Robustness of Electric Machine Applications using the ICAD Framework.	Carlos E. Ugalde-Loo, L. Antonio Amézquita - Brooks, Eduardo Licéaga-Castro, Jesús Licéaga-Castro.	<i>UANL, México; Cardiff University Wales, UK; UAM-A., México.</i>
17:20-17:45	22	Analysis of support structure of wind turbine tower.	Begona Mediano-Valiente, José L. Domínguez-García, M. I. García-Planas.	<i>Universitat Politècnica de Catalunya, Spain; IREC, Spain.</i>
17:45-18:10	23	Functional output-controllability analysis of fixed speed wind turbine.	José L. Domínguez-García, M. I. García-Planas.	<i>IREC, Spain; Universitat Politècnica de Catalunya, Spain.</i>
18:10-18:35	49	Feedback actions on linear parameter-varying systems.	Miguel V. Carriegos, R. Marta García-Fernández.	<i>Universidad de León, Spain.</i>
18:35-19:00	57	A quick look at row echelon form of multi-input control systems.	Miguel V. Carriegos, Montserrat M. Cb López.	<i>Universidad de León, Spain.</i>



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Schedule: Tu-pm2, 15:00- 17:15 **Room:** 2 “Catedral”

Invited 5: Synchronization On Complex Systems And Networks.

Chair: J. Gonzalo Barajas Ramírez, DMAP-IPICyT, San Luis Potosí, México.

Time	Paper Ref.	Title	Authors	Affiliation
15:00-15:30	3	Enhancing synchronizability on growing networks.	J. Gonzalo Barajas-Ramírez.	<i>IPICyT, México.</i>
15:30-16:00	53	Synchronization of complex networks with negative couplings.	Gualberto Solís-Perales, José L. Zapata.	<i>U. de G. / CUCEI, México.</i>
16:00-16:30	9	Synchronization on growing dynamical networks: a discrete event approach.	A. Anzo, J. Gonzalo Barajas-Ramírez.	<i>IPICyT, México.</i>
16:30-16:45	<i>Break (Coffee)</i>			
16:45-17:15	66	Inverse optimal control approach for pinning complex dynamical networks.	Edgar N. Sánchez, David I. Rodríguez.	<i>CINVESTAV-Guadalajara, México.</i>



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Schedule: We-am1, 10:15- 12:30 Room: 1 "Capilla" Invited 1-III: Chaotic and Complex Dynamics and Applications (III). Chair: Wei Lin, Fudan University. Shanghai, China.				
Time	Paper Ref.	Title	Authors	Affiliation
10:15-10:45	54	Stochastic adaptive control and synchronization of chaotic dynamical systems.	Wei Lin.	<i>Fudan University, China</i>
10:45-11:15	59	Experimental observation of on-off intermittency in two mutually coupled semiconductor lasers.	Alfredo Campos, Alexander Pisarchik.	<i>Centro de Investigaciones en Óptica, México</i>
11:15-11:45	80	Adaptive filter to automatic preprocessing of young adults tachograms.	Lurita dos Santos, Elbert E. N. Macau, Joaquim J. Barroso, Moacir F. de Godoy.	<i>National Institute for Space Research, Brazil</i>
11:45-12:00	<i>Break (Coffee)</i>			
12:00-12:30	83	Enhancing synchrony in chaotic oscillators by dynamic relaying.	S.K. Dana, R. Banerjee, E. Padmanaban, D. Ghosh, R. Ramaswamy, L. M. Pecora.	<i>Indian Institute of Chemical Biology, India; Dinabandhu Andrews College, India; University of Hyderabad, India; Naval Research Laboratory, USA.</i>



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Schedule: We-am2, 10:15- 13:00 **Room:** 2 “Catedral”

Invited 6: Analysis and Control of Bioprocesses.

Chair: Ricardo Femat, DMAP-IPICYT, San Luis Potosí, México.

Time	Paper Ref.	Title	Authors	Affiliation
10:15-10:45	31	VFA and COD regulation in a two-stage anaerobic digester used in the treatment of tequila vinasses.	Armando Campos-Rodríguez, Juan Paulo García-Sandoval, Hugo Oscar Méndez-Acosta, Víctor González-Álvarez.	<i>University of Guadalajara, México</i>
10:45-11:15	40	Nonlinear protein production tracking in a fed-batch culture.	H.O. Mendez-Acosta, E.J. Herrera-Lopez, R. Femat.	<i>Universidad de Guadalajara, México; CIATEJ, México; IPICYT, México.</i>
11:15-11:45	43	Inducing oscillations in a gas-lift bioreactor via anaerobic/aerobic switching.	L. F. Calderón-Soto, R. Femat, G. Lara-Cisneros.	<i>IPICYT, México.</i>
11:45-12:00	<i>Break (Coffee)</i>			
12:00-12:30	74	Self-optimal stabilization of a class of positive compartmental systems via variable-structure control: Bioreactors.	G. Lara-Cisneros, J. Álvarez-Ramírez, R. Femat, L. Calderón-Soto.	<i>IPICYT, México; UAM-I, México</i>
12:30-13:00	62	Robust nonlinear observer design applied to a class of oscillatory continuous chemostat.	Rigel Valentín Gómez-Acata, Ricardo Aguilar-López.	<i>CINVESTAV-IPN, México.</i>



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Schedule: We-pm1, 15:00- 17:15 **Room:** 1 “Capilla”

General 2: Linear and Nonlinear Dynamical Systems II.

Chair: Eric Campos-Cantón, DMAP IPICYT, San Luis Potosí, México.

Time	Paper Ref.	Title	Authors	Affiliation
15:00-15:30	24	Minimum-time damping of a physical pendulum.	Alexander Ovseevich.	<i>Institute for Problems in Mechanics of the Russian Academy of Sciences, Russia</i>
15:30-16:00	45	Open problems on Hurwitz polynomials.	Baltazar Aguirre-Hernández, Carlos Arturo Loredo-Villalobos, Faustino Ricardo García-Sosa.	<i>UMA-I, México; UPIICSA-IPN, México.</i>
16:00-16:30	30	Two-level hierarchical min-max program control problem of the process of terminal approach with incomplete information for the discrete-time dynamical system.	Andrey F. Shorikov	<i>Ural Federal University, Russia</i>
16:30-16:45	<i>Break (Coffee)</i>			
16:45-17:15	91	To reduction principle in dynamics of complex nonlinear systems.	Lyudmila K. Kuzmina.	<i>Kazan Aviation Institute (KNRTU), RUSSIA</i>



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Schedule: We-pm2, 15:00- 17:15 **Room:** 2 "Catedral"

General 3: Analysis and Control of Physical Systems I.

Chair: S. K. Dana, Indian Institute of Chemical Biology, India.

Time	Paper Ref.	Title	Authors	Affiliation
15:00-15:30	73	Feedback control of fermi-pasta-ulam lattice.	Egor Usik, Alexander Fradkov.	<i>Saint-Petersburg State University, Russia.</i>
15:30-16:00	81	Quantum agents that obey bose distribution.	Teturo Itami.	<i>Hiroshima International University, Japan.</i>
16:00-16:30	25	Adaptive control of networks of delay-coupled chaotic systems.	P. Yu. Guzenko, J. Lehnert, A. Fradkov, E. Schöll.	<i>SPb State Polytechnical University, Russia; Technische Universit"at Berlin, Germany; Saint-Petersburg State University, Russia.</i>
16:30-16:45	<i>Break (Coffee)</i>			
16:45-17:15	35	Consensus between nonlinearly coupled delayed agents.	Anton Proskurnikov.	<i>Saint-Petersburg State University, Russia.</i>



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Schedule: Th-am1, 10:15- 12:30 Room: 1 "Capilla"				
General 4: Analysis and Control of Physical Systems II.				
Chair: Gerardo Lara Cisneros, DMAP-IPICYT, San Luis Potosí, México.				
Time	Paper Ref.	Title	Authors	Affiliation
10:15-10:45	12	On physical nature of low-frequency beatings in systems with pulse-phase synchronization mechanism.	Olga G. Antonovskaya, Vladimir I. Goryunov.	<i>Nizhny Novgorod State University, Russia</i>
10:45-11:15	14	Control of limit cycle bifurcations in general Liénard's polynomial system.	Valery A. Gaiko.	<i>National Academy of Sciences of Belarus, Belarus</i>
11:15-11:45	20	Nonlinear Dynamics of Mini-satellite Respinup by Weak Internal Control Torques.	Ye. Somov.	<i>Samara State Technical University, Russia.</i>
11:45-12:00	<i>Break (Coffee)</i>			
12:00-12:30	15	Nonlinear digital and pulse-width attitude control of information mini-satellites.	Ye. Somov, S. Butyrin, S. Somov.	<i>Samara State Technical University, Russia.</i>



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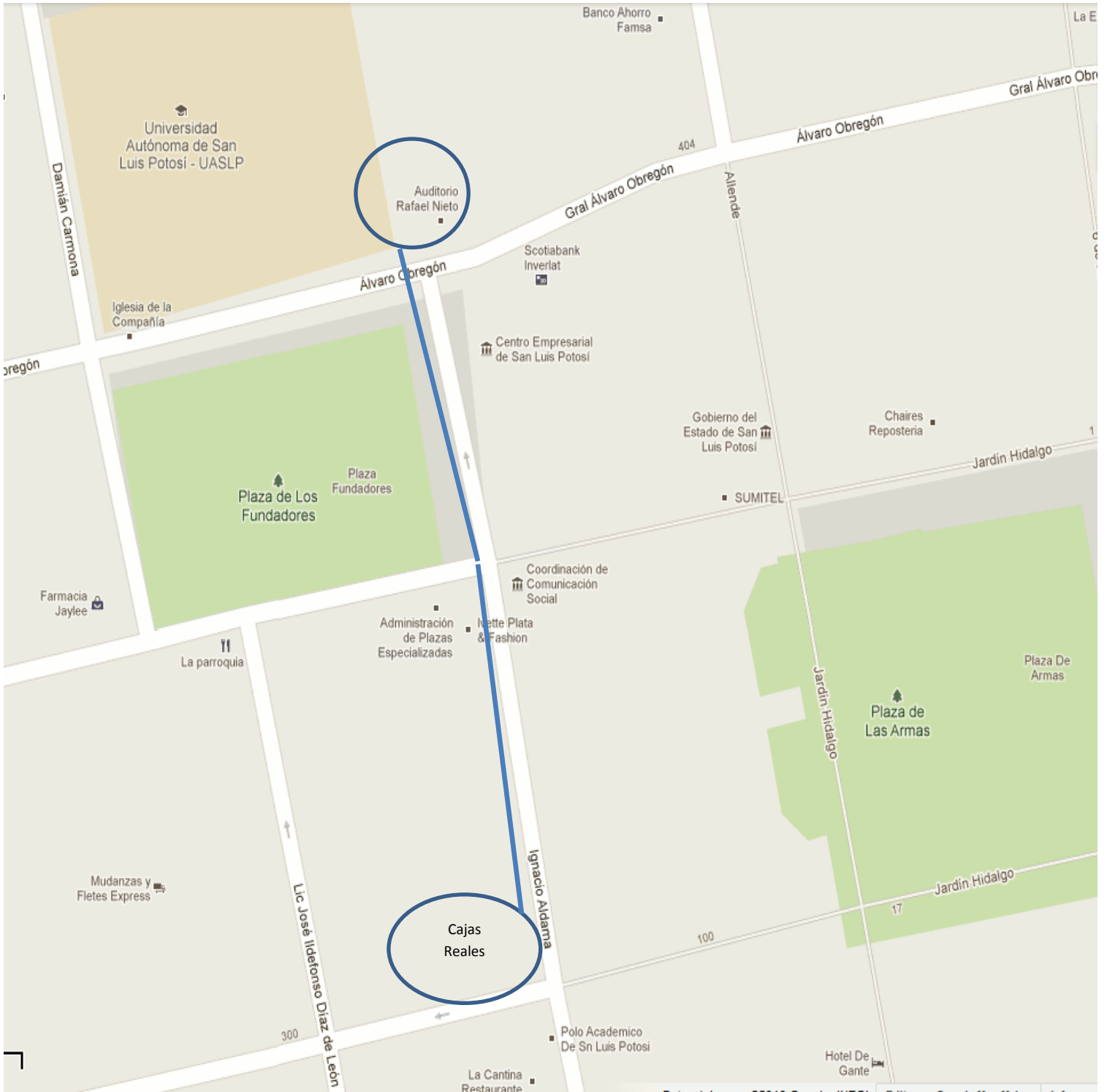
Schedule: Th-am2, 10:15- 12:30 **Room:** 2 “Catedral”

General 5: Analysis and Control of Physical Systems II.

Chair: Ervin Álvarez Sánchez, U. Veracruzana, Xalapa, México.

Time	Paper Ref.	Title	Authors	Affiliation
10:15-10:45	13	Algorithmization concept for quasi-magnetostatic simulation in tokamak-type machines.	V. Amoskov, Z. Andreeva, D. Arslanova, A. Belov, V. Belyakov, E. Gaponok, M. Hokhlov, N. Krylova, V. Kukhtin, A. Labusov, E. Lamzin, B. Lyublin, A. Malkov, N. Maksimenkova, I. Mazul, I. Rodin, S. Sychevskiy.	<i>D.V.Efremov Scientific Research Institute, Russia.</i>
10:45-11:15	29	The influence of the stabilizer and the builder on the optical and luminescence properties of colloidal binary solid solutions $(Zn_xCd_{(1-x)})S$ -manganese.	Nina Sergeeva, Natalia M. Schmidt, Margaret N. Tsvetkova, Andrew M. Abyzov, Natalia Pavlenko.	<i>Saint-Petersburg State Technological Institute, Russia; Saint - Petersburg Ioffe Physico-Technical Institute, Russia; FBUZ, Russia.</i>
11:15-11:45	51	Controller-estimator design for a quarter-car suspension system under road disturbances.	Ervin Jesus Alvarez-Sanchez, Rosario Aldana-Franco, Andres Lopez-Velazquez.	<i>Universidad Veracruzana, México.</i>
11:45-12:00	<i>Break (Coffee)</i>			
12:00-12:30	82	Synchronization of time-varying two-rotor vibration system.	I.V. Kudryavtseva.	<i>Kiev Technical University, Russia.</i>

MAP of Venues Location



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