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- Education**
- Massachusetts Institute of Technology** Cambridge, MA
Doctor of Philosophy in Electrical Engineering and Computer Science September 2000
Dissertation Title: *Constructive Global Analysis of Hybrid Systems*.
Advisers: Professors Munther Dahleh and Alexandre Megretski.
Minor in Mathematics. Area Exam in “Congestion Control in the Internet.”
- Massachusetts Institute of Technology** Cambridge, MA
Master of Science in Electrical Engineering and Computer Science June 1995
Dissertation Title: *Robust Stability of a Class of Nonlinear Systems*.
Adviser: Professor Munther Dahleh. GPA: 5.0 out of 5.0.
- Faculty of Engineering of University of Porto** Porto, Portugal
Licenciatura (5-year S.B.) in Electrical Engineering and Computer Science August 1993
Senior design project: *Optimal Control: Applications and Algorithms*
Supervisor: Professor Fernando Lobo Pereira.
- Awards**
- *Best Student Paper Award* at the Automatic Control Conference, Chicago, IL June 2000
Paper title: Global Stability of Relay Feedback Systems
 - Best session presentation awards in *all* American Control Conferences and Conferences on Decision and Control where a paper was presented.
 - Postdoctoral Fellowship from Portuguese Foundation for Science and Technology 2000–2001
 - Doctoral Fellowship from Portuguese Foundation for Science and Technology (JNICT) 1993–1997
 - Undergraduate Young Researcher Fellowship from JNICT 1993
 - Valedictorian of Gaia High School (V. N. de Gaia, Portugal), graduating class 1988 1988
- Research Interests** Modeling, analysis, and control of complex systems. Applications to interdisciplinary fields like biological systems, economic markets, walking robots, and statistical mechanics. Analysis and control of hybrid and nonlinear systems using piecewise linear systems.
- Research Experience**
- University of Cambridge, CUED** Cambridge, UK
University Lecturer April 2004–present
- California Institute of Technology, CDS** Pasadena, CA
Postdoctoral Scholar April 2001–March 2004
Research in complex systems with application to several multidisciplinary areas like biological systems, economic markets, statistical mechanics, communication networks. Proof methods and algorithmic complexity. Constructive analysis and control of nonlinear and hybrid systems. Involved in the preparation of several research funding proposals and co-advising graduate students.
- Massachusetts Institute of Technology, LIDS** Cambridge, MA
Postdoctoral Fellow Fall 2000–Spring 2001
Analysis of hybrid systems. Theoretical developments of constructive and systematic global analysis tools and then used in certain applications. Robustness of nonlinear systems. Analysis of uncertain linear systems in feedback with static nonlinearities like saturations and hysteresis.
- Research Assistant Fall 1995–Summer 2000
Global stability, robustness, and performance analysis of hybrid systems. Development of an entirely new constructive methodology to efficiently globally analyze classes of hybrid systems.

Research Assistant Fall 1993–Summer 1995
Robustness analysis of nonlinear systems. Necessary conditions for monotone stability of nonlinear systems.

Teaching Experience **University of Cambridge** Cambridge, UK
Lecturer in *Signals and Systems*. Fall 2004

California Institute of Technology Pasadena, CA
Lecturer in *Robust Control*. Winters 2002, 2003, and 2004

Lecturer in *Introduction to Modern Control*. Falls 2001, 2002, and 2003

Resident Associate Fall 2001–Spring 2004
Responsible for the academic and social well-being of an undergraduate house with 80 students. Involves not only academic guidance, but also crises intervention, leadership, counseling, etc.

Massachusetts Institute of Technology Cambridge, MA
Recitation Instructor in *Intro. to Communication, Control, and Signal Processing* Spring 2000
Invited by the Department to teach a recitation section, typically assigned to a faculty member.

Teaching Assistant in *Signals and Systems* Fall 1998

Teaching Assistant in *Dynamic Systems* Fall 1996

Graduate Resident Tutor 1996–2001
Responsible for the academic and social well-being of an undergraduate floor in a dormitory.

INESC - Institute of Systems and Control Engineering Porto, Portugal
Teaching Assistant in *Eng. Economic Analysis and Project Management* 1992–1993

Journal Publications Jorge Gonçalves and Tau-Mu Yi. *Circadian Rhythms: Model Reduction and Stability Analysis*, in preparation.

Tau-Mu Yi, B. Ingalls, Jorge Gonçalves, H. M. Sauro, and John Doyle. *A Conservation of Fragility Law and Consequences for Biological Systems*, in preparation.

Jorge Gonçalves. *Regions of Stability for Limit Cycle Oscillations via Piecewise Linear Systems*, submitted to IEEE Transactions on Automatic Control.

Jorge Gonçalves, Alexandre Megretski, and Munther A. Dahleh. *Global Analysis of Piecewise Linear Systems Using Impact Maps and Quadratic Surface Lyapunov Functions*, IEEE Transactions on Automatic Control, Vol. 48, No. 12, December 2003.

Jorge Gonçalves. *\mathcal{L}_2 -Gain of Double Integrators with Saturation Nonlinearity*, IEEE Transactions on Automatic Control, Vol. 47, No. 12, December 2002.

Jorge Gonçalves, Alexandre Megretski, and Munther Dahleh. *Global Stability of Relay Feedback Systems*, IEEE Transactions on Automatic Control, Vol. 46, No. 4, April 2001.

Jorge Gonçalves and Munther Dahleh. *Necessary Conditions for Robust Stability of a Class of Nonlinear Systems*, Automatica, Vol. 34, No. 6, 1998.

Selected Conference Publications Jorge Gonçalves and Tau-Mu Yi. *Drosophila Circadian Rhythms: Stability Robustness Analysis and Model Reduction*, submitted to the Symposium on Mathematical Theory of Networks and Systems, Leuven, Belgium, July 2004.

Demetri P. Spanos and Jorge Gonçalves. *High-Order-Polynomial Surface Lyapunov Functions for Global Stability Analysis of Limit Cycle Oscillations in Piecewise Linear Systems*, American Control Conference, Boston, MA, June 2004.

Jorge Gonçalves. *Regions of Stability for Limit Cycles of Piecewise Linear Systems*, IEEE Conference on Decision and Control, Maui, Hawaii, December 2003.

Jorge Gonçalves. *\mathcal{L}_2 -Gain of Double Integrators with Saturation Nonlinearity*, IFAC, Barcelona, Spain, July 2002.

Jorge Gonçalves. *Global Asymptotic Stability of Oscillations with Sliding Modes*, IFAC, Barcelona, Spain, July 2002.

Jorge Gonçalves. *Quadratic Surface Lyapunov Functions in the Analysis of Feedback Systems with Double Integrators and Saturations*, Mediterranean Control Conference, Lisbon, Portugal, July 2002.

Jorge Gonçalves, Alexandre Megretski, and Munther A. Dahleh. *Global Analysis of Piecewise Linear Systems Using Impact Maps and Quadratic Surface Lyapunov Functions*, European Control Conference, Porto, Portugal, September 2001.

Jorge Gonçalves. *Quadratic Surface Lyapunov Functions in Global Stability Analysis of Saturation Systems*, American Control Conference, Arlington, VA, June 2001.

Jorge Gonçalves. *Global Stability Analysis of On/Off Systems*, IEEE Conference on Decision and Control, Sydney, Australia, December 2000.

Jorge Gonçalves, Alexandre Megretski, and Munther Dahleh. *Global Stability of Relay Feedback Systems*, American Control Conference, Chicago, IL, June 2000.

Jorge Gonçalves, Alexandre Megretski, and Munther Dahleh. *Semi-Global Analysis of Relay Feedback Systems*, IEEE Conference on Decision and Control, Tampa, FL, December 1998.

Jorge Gonçalves and Munther Dahleh. *Necessary and Sufficient Conditions for Robust Stability of a Class of Nonlinear Systems*, IEEE Conference on Decision and Control, New Orleans, LA, December 1995.

Invited Talks University of Cambridge, University of Toronto, McGill University, University of Illinois at Urbana-Champaign, INRIA-Paris, University of California at Los Angeles, University of California at Santa Barbara, Yale University, California Institute of Technology, Technical Institute of Lisbon, MIT, Royal Institute of Technology (KTH), University of Lund, University of Liège.

Other Presentations *A Conservation of Fragility Law and Its Consequences for Biochemical Network Dynamics*, Workshop on Complexity and Modeling of Biological Networks, GBF Bioforum, Braunschweig, Germany, October 2004.

Lyapunov Stability and Sum of Squares, Workshop on Robustness Analysis Tools with Applications to the Biological and Physical Sciences: The Challenge of Complexity, UCSB, March 2003.

Conservation of Robustness and Application to Biological Systems, 4th Southern California Non-Linear Control Workshop, UCSB, June 2002.

Analysis of Switching Systems, LIDS Student Conference, Cambridge, MA, January 2000.

Global Quadratic Stability of Limit Cycles is Common in Relay Feedback Systems, Workshop on the Dynamics of Switching, Liège, Belgium, August 1999.

Activities

- Member of the Program Committee of the *International Conference on Informatics in Control, Automation and Robotics*, Setúbal, Portugal 2004 (<http://www.icinco.org/>).
- Organizer of the *Workshop on Robustness Analysis Tools with Applications to the Biological and Physical Sciences: The Challenge of Complexity*, Kavli Institute for Theoretical Physics, UCSB, March 2003 (http://online.kitp.ucsb.edu/online/bionet_w03/).
- Co-chair of IEEE Technical Committee on Robust Control.
- Member of the Program Committee of the 41st *IEEE Conference on Decision and Control*, Las Vegas, NV, December 2002.
- Referee for “IEEE Transactions on Automatic Control”, “Automatica”, “IEEE Transactions on Circuits and Systems”, “IEEE Transactions on Control Systems Technology”, “International Journal of Control”, “International Journal of Robust and Nonlinear Control”, “ASME Journal of Dynamic Systems, Measurement, and Control”, “Systems, Man, and Cybernetics”, “Mathematics of Control, Signals, and Systems”, “IEEE Transactions on Control Systems Technology”, “Journal of Guidance, Control, and Dynamics”, and major control and related conferences like ACC, CDC, ECC, IFAC, ISCAS.

References Professor John Doyle
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