CV- Rafael Vazquez

Personal Data

Name: Rafael Vazquez Valenzuela
Nationality: Spanish
Date of Birth: 7 April 1975
Address: Escuela Superior de Ingenieros, Departamento de Ingeniería Aeroespacial, Avda. de los Descubrimientos s.n., 41092 Seville, Spain
Fax number: (34) 954 486041
Phone number: (34) 954 488148
Current position: Associate Professor, Aerospace Engineering Department, University of Seville, Spain
NIF: 28.739.184-V

Education

Ph.D. in Aerospace Engineering, 2006, University of California, San Diego
Master in Aerospace Engineering, 2004, University of California, San Diego
B.S. in Electrical Engineering, 1999, University of Seville, Spain
B.S. in Mathematics, 2003, University of Seville, Spain

Previous Positions

2002-2006: *Graduate Research Assistant*, Mechanical and Aerospace Department, UCSD
Summer 2003: *Teaching Assistant*, MAE140 Linear Circuits, MAE Department, UCSD
Spring 2006: *Teaching Assistant*, MAE143B Linear Control, MAE Department, UCSD
Summer 2006: *Reader*, MAE143A Signals and Systems and MAE143B Linear Control, MAE Department, UCSD
April-December 2005: *Marie Curie Fellow* (CTS program), Departement de Mathematique, Universite Paris-Sud XI, Paris-Orsay, France
August-September 2004, August 2005: *Visiting Researcher*, Tribology and Nanomanipulation Group,Ludwig-Maximilians-Universitat Munich, Germany
2000-2001: *System Administrator and Systems Engineer*, Telvent Interactiva

Awards and Honors

Finalist of the 2005 IEEE Best Student Paper Award, Conference on Decision and Control, December 2005, Seville, Spain
E.U. Marie Curie Fellow, 2005, CTS (Control Training Site) Program.
Highest Academic Achievement in Graduate Studies, Mechanical and Aerospace Engineering Department, University of California, San Diego.

Publications

Books:

1. R. Vazquez and M. Krstic, *Control of Turbulent and Magnetohydrodynamic Channel Flows*, Birkhauser, in press, 2007.

Book Chapters:

2. M. Krstic, J. Cochran, and R. Vazquez, "*Backstepping Controllers for Stabilization of Turbulent Flow PDEs*," in P. Ioannou and I. Pitsilides (Eds.), Modeling and Control of Complex Systems, CRC Press, to appear.
3. R. Vazquez, E. Trelat, J.-M. Coron, "*Fast Tracking of Poiseuille Trajectories in Navier-Stokes 2-D Channel Flow,"* in F. Lamnabhi-Lagarrigue, S. Laghrouche, A. Loria and E. Panteley (Eds.), Taming Heterogeneity and Complexity of Networked Embedded Systems, ISTE Ltd., London, UK, 2007.
4. M. Krstic and R. Vazquez, "*Magnetohydrodynamic channel flow: An exponentially convergent estimator with explicit gain functions*," in S. Seenith (Ed.), Nonlinear Problems in Aviation and Aerospace, Cambridge Scientific Publishers, 2007.

Journal Papers:

1. R. Vazquez and M. Krstic, "*Explicit integral operator feedback for local stabilization of nonlinear thermal convection loop PDEs*," **System and Control Letters**, vol. 55, pp. 624—632, 2006.
2. F. J. Rubio-Sierra, R. Vazquez and R. W. Stark, "*Transfer function analysis of the micro cantilever used in atomic force microscopy*," **IEEE Transactions on Nanotechnology**, vol. 5, pp. 692—700, 2006.
3. R. Vazquez, F. J. Rubio-Sierra and R. W. Stark, "*Multimodal analysis of force spectroscopy based on a transfer function study of micro-cantilevers*," **Nanotechnology**, vol. 18, 185504, 2007.
4. R. Vazquez and M. Krstic, "*A closed-form feedback controller for stabilization of the linearized 2D Navier-Stokes Poiseuille flow*," accepted in **IEEE Transactions on Automatic Control**, 2008.

5. R. Vazquez, E. Schuster and M. Krstic, "*Magnetohydrodynamic state estimation with boundary sensors*," under consideration, 2006.
6. R. Vazquez and M. Krstic, "*Boundary observer for output-feedback stabilization of thermal convection loop*," under consideration, 2006.
7. C. Xu, E. Schuster, R. Vazquez and M. Krstic, "*Stabilization of linearized 2D magnetohydrodynamic channel flow by backstepping boundary control*," under consideration, 2006.
8. R. Vazquez and M. Krstic, "*Control of 1-D parabolic PDEs with Volterra nonlinearities – Part I: Design*," under consideration, 2006.
9. R. Vazquez and M. Krstic, "*Control of 1-D parabolic PDEs with Volterra nonlinearities – Part II: Analysis*," under consideration, 2006.
10. R. Vazquez, E. Trelat and J.-M. Coron, "*Control for fast and stable laminar-to-high-Reynolds-numbers transfer in a 2D Navier-Stokes channel flow,*" under consideration, 2007.
11. M. Krstic, L. Magnis, and R. Vazquez, "*Nonlinear stabilization, trajectory generation, and tracking for the Burgers PDE*," under consideration, 2007.

Refeered Conference Papers:

1. R. Vazquez and M. Krstic, "*Volterra boundary control laws for a class of nonlinear parabolic partial differential equations*," **IFAC Symposium on Nonlinear Control Systems**, 2004.
2. R. Vazquez and M. Krstic, "*Thermal convection loop control by continuous backstepping and singular perturbations*," **American Control Conference**, 2005.
3. R. Vazquez and M. Krstic, "*Explicit feedback control for a thermal convection loop*," **Third MIT Conference on Computational Fluid and Solid Mechanics**, 2005.
4. F.J. Rubio-Sierra, R. Vazquez and R. Stark, "*Transfer function analysis of atomic force microscope cantilevers*," **IMECE2005**, Orlando, Florida, 2005.
5. R. Vazquez and M. Krstic, "*A closed form feedback controller for stabilization of linearized Navier-Stokes equations: The 2D Poiseuille flow*," **IEEE Conference on Decision and Control**, 2005.
6. R. Vazquez and M. Krstic, "*A closed form observer for the channel flow Navier-Stokes system*," **IEEE Conference on Decision and Control**, 2005.
7. R. Vazquez and M. Krstic, "*Higher-order stability properties of a Navier-Stokes system with an explicit boundary controller*," **American Control Conference**, 2006.
8. J. Cochran, R. Vazquez, and M. Krstic, "*Backstepping boundary control of Navier-Stokes channel flow: A 3D extension*," **American Control Conference**, 2006.
9. R. Vazquez, J.R. Rubio-Sierra and R. Stark, "*Transfer function analysis of a surface coupled atomic force microscope cantilever system*," **American Control Conference**, 2006.

10. R. Vazquez, J.M. Coron and E. Trelat, "*Stable Poiseuille Flow Transfer for a Navier-Stokes System*," **American Control Conference**, 2006.
11. M. Krstic, R. Vazquez, A. Siranosian, and M. Bement, "*Sensing schemes for state estimation in turbulent flows and flexible structures*," **Proceedings of SPIE, Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems**, Paper Number: 6174-28, 2006.
12. M. Krstic, J. Cochran, and R. Vazquez, "*Decoupling and stabilizing Orr-Sommerfield and Squire systems by boundary control*," **3rd AIAA Flow Control Conference**, 2006.
13. R. Vazquez, E. Trelat, J.-M. Coron, "*Fast Tracking of Poiseuille Trajectories in Navier-Stokes 2-D Channel Flow,"* **Joint CTS-HYCON Workshop**, Paris, France, 2006.
14. R. Vazquez, E. Schuster, Miroslav Krstic, "*A closed-form observer for the 3D inductionless Hartmann flow*," **Proceedings of the Conference on Active Flow Control**, Berlin, Germany, 2006.
15. M. Krstic, A. Smyshlyaev, and R. Vazquez, "*Boundary control of PDEs and applications to turbulent flows and flexible structures*," **Proceedings of the 25th Chinese Control Conference**, Harbin, China, 2006.
16. J. Cochran, R. Vazquez, and M. Krstic, "*Backstepping boundary control of Navier-Stokes channel flow: Explicit gain formulae in 3D*," **IEEE Conference on Decision and Control**, 2006.
17. R. Vazquez, E. Schuster, and M. Krstic, "*A closed-form observer for the 3D inductionless MHD and Navier-Stokes channel flow*," **IEEE Conference on Decision and Control**, 2006.
18. R. Vazquez and M. Krstic, "*Explicit output feedback stabilization of a thermal convection loop by continuous backstepping and singular perturbations*," **American Control Conference**, 2007.
19. C. Xu, E. Schuster, R. Vazquez, and M. Krstic, "*Stabilization of linearized 2D magnetohydrodynamic channel flow by backstepping boundary control*," **American Control Conference**, 2007.
20. R. Vazquez, J. Cochran, O. M. Aamo, and M. Krstic, "*Control of channel flow turbulence, vortex shedding, and thermal convection by backstepping boundary control*," **American Control Conference**, 2007.
21. R. Vazquez, E. Schuster, and M. Krstic, "*A closed-form feedback controller for stabilization of magnetohydrodynamic channel flow*," **2007 European Control Conference**, 2007.
22. R. Vazquez, M. Krstic, "*Boundary control of nonlinear PDEs by Volterra feedback linearization*," **2007 European Control Conference**, 2007.
23. R. Vazquez, M. Krstic, "*Backstepping Boundary Control of Magnetohydrodynamic Channel Flow*," I**FAC Symposium on Nonlinear Control Systems (NOLCOS)**, 2007.
24. R. Vazquez, M. Krstic, "*Boundary control laws for parabolic PDEs with Volterra nonlinearities. Part I: Design*," I**FAC Symposium on Nonlinear Control Systems (NOLCOS)**, 2007.

25. R. Vazquez, M. Krstic, "*Boundary control laws for parabolic PDEs with Volterra nonlinearities*. *Part II: Examples*," I**FAC Symposium on Nonlinear Control Systems (NOLCOS)**, 2007.
26. R. Vazquez, M. Krstic, "*Boundary control laws for parabolic PDEs with Volterra nonlinearities*. *Part III: Analysis*," I**FAC Symposium on Nonlinear Control Systems (NOLCOS)**, 2007.