

Karina Barbosa

Curriculum Vitae

Academic Contact

Associate Professor
Universidad de Santiago de Chile
Departamento Ingeniería Eléctrica
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Research Interests

Robust control theory
Filter design
Uncertain dynamic systems

Education

Doctoral Degree in Electrical Engineering, May 2003
Universidade Federal de Santa Catarina (UFSC),
Florianópolis, Brazil.
Advisors: Dr. Alexandre Trofino Neto and Dr. Carlos E. de Souza
Thesis: *Design of Robust Filter for Linear and Nonlinear Systems.*
Advisers: Prof. Alexandre Trofino Neto
Prof. Carlos E. de Souza

M.Eng., Electrical Engineering, March 1999
Universidade Federal de Santa Catarina (UFSC),
Florianópolis, Brazil.
Thesis: *LMI Approach to Analysis and Synthesis of Systems with Algebraic Constraints in the State.*
Adviser: Prof. Alexandre Trofino Neto

B.S., Mathematics, March 1997
Universidade Federal do Rio Grande do Sul (UFRGS),
Porto Alegre, Brazil
Area of interest: *Applied and Computational Mathematics*

Employment

07/2005–12/2006 Lecturer in Digital Signal Processing
Laboratório Nacional de Computação Científica-LNCC
Doctor program in Computacional Modelling
Petrópolis, RJ, Brazil. Phone +55 24 22336024

- 03/2004–05/2005 Lecturer in Dynamic Programming, and Programming I
Universidade do Sul de Catarinense, UNISUL
Ponte do Imaruim, SC, Brazil.
- 08/2003–05/2005 Lecturer in Modelling and Simulation, and Linear Algebra
Faculdades Barddal, Florianópolis, SC, Brazil.
- 03/2003–12/2003 Lecturer in Process Control, and Modelling and Simulation
Universidade do Planalto Catarinense Lages, SC, Brazil.
- 03–06/2000 Teaching Internship in Linear Systems
Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil.
One term in 2000.

Research Grants, Projects and Visitor

- 03/2010–03/2013 Fondecyt Regular - 1100568
Departamento Ingeniería Eléctrica,
Universidad de Santiago de Chile
Santiago, Chile.
Project: *Improved robust filtering methods to singular system with deterministic and stochastic uncertainties*
- 03/2009–12/2009 Post-doctoral Grant
Departamento Ingeniería Eléctrica, Escuela de Ingeniería
Pontificia Universidad Católica de Chile,
Santiago, Chile.
Project: *Robust State Estimation and Control Design for Dynamic Uncertain Systems: Descriptor Systems and Multi-dimensional Systems*
Adviser: Aldo Cipriano
- 07/2007–06/2008 Academic Visitor
The ARC Centre for Complex Dynamic Systems and Control (CDSC)
School of Electrical Engineering and Computer Science
University of Newcastle Callaghan NSW 2308 Australia
- 05–07/2007 MCT/PCI-LNCC Grant: Post-Doctoral Grant
Laboratório Nacional de Computação Científica, LNCC, Petrópolis, RJ, Brazil.
Project: *Robust control design for uncertain descriptor systems.*
Note: Finished due my academic visit to The University of Newcastle
- 05/2005–04/2007 CAPES PRODOC Grant: Post -Doctoral Grant
Laboratório Nacional de Computação Científica, LNCC, Petrópolis, RJ, Brazil.
Project: *Robust signal estimation for singular dynamic systems.*
- 01/2000–10/2006 Program for Centres of Excellence (PRONEX/CNPq/Brazil):
The Centre of Research Excellence on Control of Dynamic Systems
Project: *Control of dynamic systems.*
Coordinator: Carlos Emanuel de Souza
Participation as Postgraduate Student and Associate Researcher

- 03/1999–02/2003 CNPq Graduate Grant, 147060/99-0: Doctoral Scholarship
Department of Automation and Systems, PPGEEL, UFSC, Florianópolis, SC, Brazil.
Project: *Robust filter design of linear and nonlinear systems.*
- 03/1997–02/1999 CNPq Graduate Grant: Master Scholarship
Department of Automation and Systems, PPGEEL, UFSC, Florianópolis, SC, Brazil.
Project: *Analysis and synthesis of algebraic-differential systems.*

Reviewer

Journals

IEEE Transactions on Automatic Control; IEEE Transactions on Signal Processing; Automatica (Oxford); System & Control Letters; IEE Proc. Circuits, Devices and Systems; European Journal of Control; International Journal of Robust and Nonlinear Control

Conferences

Brazilian Automatic Conference (CBA); IFAC conferences; America Control Conference (ACC); IEEE Conference on Decision and Control (CDC).

Publications

Journal Papers

11. D. Coutinho, C. E. de Souza, and **K. A. Barbosa**. Robust H_∞ Filter Design for a Class of Discrete-Time Parameter Varying Systems. *Automatica (Oxford)* 45:2946–2954, 2009.
10. D. Coutinho, C. E. de Souza, and **K. A. Barbosa** and A. Trofino. Robust Linear H_∞ Filter Design for a Class of Uncertain Nonlinear Systems: An LMI Approach. *SIAM Journal on Control and Optimization* 48:1452–1472, 2009.
9. F. O. Souza, R. M. Palhares and **K. A. Barbosa**. New improved delay-dependent H_∞ filter design for uncertain neutral systems. *IET Control Theory & Applications*, 2:1033–1043, 2008.
8. C. E. de Souza, **K. A. Barbosa**, and M. FU. Robust filtering for uncertain linear discrete-time descriptor systems. *Automatica (Oxford)*, 44:792–798, 2008.
In the list of 25 hottest articles in *Automatica* from Jan. to Mar. 2008.
7. C. E. de Souza, **K. A. Barbosa**, and A. Trofino. Robust filtering for linear systems with convex bounded uncertain time-varying parameters. *IEEE Transactions on Automatic Control*, 52(6):1132–1138, 2007.
6. C. E. de Souza, A. Trofino, and **K. A. Barbosa**. Mode-independent H_∞ filters for markovian jump linear systems. *IEEE Transactions on Automatic Control*, 51(11):1837–1841, 2006.
5. C. E. de Souza, **K. A. Barbosa**, and A. Trofino. Robust H_∞ filtering for discrete-time linear systems with uncertain time-varying parameters. *IEEE Transactions on Signal Processing*, 54(6):2110–2118, 2006.
4. **K. A. Barbosa**, C.E. de Souza, and A. Trofino. Robust H_2 filtering for uncertain linear systems: LMI based methods with parametric Lyapunov functions. *Systems & Control*

Letters, 54:251–262, 2005.

In the list of Top 25 Hottest Articles in Systems & Control Letters from Oct to Dec 2005.

3. A. Trofino, D. Coutinho, and **K. A. Barbosa**. Improved H_2 and H_∞ conditions for robust analysis and control synthesis of linear systems. *Sba Controle & Automação*, 16(4):427–434, 2005. (SciELO Brasil)
2. **K. A. Barbosa** and A. Trofino. Síntese H_∞ para sistemas com restrições algébricas no estado [H_∞ design for descriptor systems]. *Sba Controle & Automação*, 14(3):254–261, 2003. (SciELO Brasil – in Portuguese)
1. **K. A. Barbosa** and A. Trofino. Técnicas LMI para análise de sistemas com restrições algébricas no estado [LMI techniques for the analysis of systems with algebraic constraints in the state]. *Sba Controle & Automação*, 13(1):34–41, 2002. (SciELO Brasil – in Portuguese)

Accepted Papers

- a. **K. A. Barbosa** and A. Cipriano. Robust H_∞ Filter Design for Singular Systems with Time-Varying Uncertainties. Accepted to IET Control Theory & Applications in January of 2011.

Peer-Reviewed Conference Papers

27. F. O. Souza, R. M. Palhares, **K. A. Barbosa** and M. de Oliveira. New Improved Delay-Dependent H_∞ Filter Design for Uncertain Neutral Systems. *Proc. of XVII Congresso Brasileiro de Automática*, Juiz de Fora, MG, September 2008.
26. C. E. de Souza, L. Xie, and **K. A. Barbosa**. Robust H_∞ Filtering for Linear Descriptor Systems with Convex Bounded Uncertainty. In: *Proc. of The Sixth IEEE International Conference on Control and Automation*, 2007, 47-52, Guangzhou, China. (Invited Paper).
25. C. E. de Souza, and **K. A. Barbosa**. Robust Filtering for Uncertain Linear Descriptor Systems In: *Proc. of the 2007 European Control Conference 2007*, 2867-2874, Kos, Greece.
24. D. F. Coutinho, C. E. de Souza, and **K. A. Barbosa**. Robust H_∞ Filtering for a Class of Nonlinear Discrete-Time Systems. In: *Proc. of the 7th IFAC Symposium on Nonlinear Control Systems, 2007*, 331-336, Pretoria, South Africa.
23. D. F. Coutinho, C. E. de Souza, and **K. A. Barbosa**. Improved Robust H_∞ Filter Design for Discrete-Time Linear Parameter Varying Systems. In: *Proc. of the 3rd IFAC Symposium on System Structure and Control, 2007*, 1-6, Foz do Iguaçu, Brazil.
22. C. E. de Souza, D. F. Coutinho, and **K. A. Barbosa**. H_∞ filtering for a class of markov jump nonlinear systems. In *Proc. of the 45th IEEE Conference on Decision and Control-CDC2006*, 1–6, San Diego, USA, December 2006.
21. **K. A. Barbosa** and C. E. de Souza. Robust H_∞ filtering for linear discrete-time descriptor systems with polytopic uncertainties. In *Proc. of the XVI Congresso Brasileiro de Automática (CBA2006)*, 619–624, Salvador, Ba, October 2006.
20. C. E. de Souza, M. Fu, and **K. A. Barbosa**. Robust filtering for uncertain linear discrete-time descriptor systems. In *Proc. of the 14th IFAC Symp. System Identification*, 1228–1232, Newcastle, Australia, March 2006.

19. M. Coutinho, D. F. Coutinho, A. Trofino, and **K. A. Barbosa**. A new strategy to the multi-objective control of linear systems. In *Proc. of the 44th IEEE Conference Decision on Control and European Control Conference CDC-ECC'05*, 3741–3746, Sevilla, ES, December 2005.
18. C. E. de Souza, A. Trofino, and **K. A. Barbosa**. Mode-independent H_∞ filters for hybrid markov linear systems. In *Proc. of the 43rd IEEE Conference on Decision and Control*, 947–952, Bahamas, December 2004.
17. C. E. de Souza, **K.A. Barbosa** and A. Trofino. Robust H_∞ filtering for uncertain linear systems with unstable modes. In *Proc. of the 2nd IFAC Symposium on System, Structure and Control*, Oaxaca, November 2004.
16. A. Trofino, D. Coutinho, and **K. A. Barbosa**. Improved H_2 and H_∞ conditions for uncertain linear systems. In *Proc. do XV Congresso Brasileiro de Automática*, Gramado, RS, September 2004.
15. D. F. Coutinho, **K. A. Barbosa**, C. E. de Souza, and A. Trofino. Bilinear filters for uncertain nonlinear systems. In *Proc. of XV Congresso Brasileiro de Automática*, Gramado, RS, September 2004.
14. **K. A. Barbosa**, C. E. de Souza, and A. Trofino. Filtragem Robusta para Sistemas com Modos Instáveis [Robust filtering for systems with unstable modes]. In *Proc. of XV Congresso Brasileiro de Automática*, Gramado, RS, September 2004. (In Portuguese).
13. **K. A. Barbosa**, C. E. de Souza, and A. Trofino. Robust filtering for uncertain linear systems with state-dependet noise. In *Proc. of 42nd IEEE Conference on Decision and Control*, 880–885, Maui, Hawaii, December 2003.
12. D. F. Coutinho, **K. A. Barbosa**, A. Trofino, and C. E. de Souza. Linear H_∞ filter design for a class of uncertain nonlinear systems. In *Proc. of the 42nd IEEE Conf. Decision and Control*, p. 380–385, Maui, Hawaii, December 2003.
11. D. F. Coutinho, A. Trofino, and **K. A. Barbosa**. Robust Linear Dynamic Output Feedback Controllers for a Class of Nonlinear Systems. In *Proc. of the 42nd IEEE Conf. Decision and Control*, 356–361, Maui, Hawaii, December 2003.
10. D. F. Coutinho, A. Trofino, and **K. A. Barbosa**. Reduced-order output feedback control of a class of uncertain nonlinear systems. In *Proc. of the 42nd IEEE Conf. Decision and Control*, 356–351, Maui, Hawaii, December 2003.
9. D. F. Coutinho, **K. A. Barbosa**, C. E. de Souza, and A. Trofino. Robust guaranteed cost filtering for a class of nonlinear systems. In *Proc. of the 6th Int'l Conf. Information Fusion*, Cairns, AU, 2003.
8. **K. A. Barbosa**, A. Trofino, and C. E. de Souza. Robust H_2 filtering for linear system with uncertain time-varying parameters. In *Proc. of the 41th IEEE Conf. Decision and Control*, Las Vegas, USA, December 2002.
7. **K. A. Barbosa**, C. E. de Souza, and A. Trofino. Guaranteed variance robust filtering for uncertain systems with state-dependent noise. In *Proc. of the XIV Congresso Brasileiro de Automática*, Natal, RN, September 2002.
6. **K. A. Barbosa**, C. E. de Souza, and A. Trofino. Robust H_2 filter design via parameter-dependent Lyapunov functions. In *Proc. of the 15th IFAC World Congress*, Barcelona, Spain, July 2002.

5. **K. A. Barbosa**, C. E. de Souza, and A. Trofino. Robust H_∞ filtering for linear discrete-time state-space models with uncertain time-varying parameters. In *Proc. IEEE Int. Conf. Acoustics, Speech, and Signal Processing*, 1389–1392, Orlando, USA, 2002.
4. **K. A. Barbosa**, C. E. de Souza, and A. Trofino. Robust H_2 filtering for discrete-time uncertain linear systems using parameter-dependent Lyapunov functions. In *Proc. 2002 American Control Conf.*, Alaska, USA, May 2002.
3. **K. A. Barbosa** and A. Trofino. Síntese H_∞ para sistemas com restrições algébricas no estado [H_∞ synthesis for algebraic-differential system]. In *Proc. of the XIII Congresso Brasileiro de Automática*, Florianópolis, SC, September 2000. (In Portuguese)
2. **K. A. Barbosa** and A. Trofino. Síntese H_2 para sistemas com restrições algébricas [H_2 synthesis for algebraic-differential system]. In *Proc. of the XIII Congresso Brasileiro de Automática*, Florianópolis, SC, September 2000.
1. **K. A. Barbosa** and A. Trofino. Técnicas LMI para análise de sistemas com restrições algébricas no estado [LMI techniques for the analysis of systems with algebraic constraints in the state]. In *Proc. of XIII Congresso Brasileiro de Automática*, Florianópolis, SC, September 2000. (In Portuguese)

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