

ANAK AGUNG JULIUS

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EDUCATION

Doctor in Applied Mathematics,

Universiteit Twente, Enschede, The Netherlands February 2005
Thesis: *On interconnection and equivalence of continuous and discrete systems: a behavioral perspective*
Advisor: Arjan van der Schaft
Committee: Arun Bagchi, Arjan van der Schaft, Ed Brinksma, Hans Schumacher, Jan Willems, George Pappas, Jan Willem Polderman, Rom Langerak.

Master of Science in Applied Mathematics (with distinction),

Universiteit Twente, Enschede, The Netherlands June 2001
Thesis: *Evolution of the modal densities of a class of stochastic hybrid systems*
Advisor: Arjan van der Schaft, Henk Blom (NLR), Bert Bakker (NLR)

Bachelor of Engineering in Electrical Engineering (cum laude),

Institut Teknologi Bandung, Bandung, Indonesia October 1998
Thesis: *Visual based control of a robotic arm* (written in Indonesian)
Advisor: Bambang Riyanto

PROFESSIONAL AND RESEARCH EXPERIENCE

University of Pennsylvania

June 2005 - date
Dept. Electrical and Systems Engineering, Philadelphia, USA (Postdoctoral researcher)
My line of research includes systems biology, mathematical models in systems biology, control of biological systems, hybrid systems, reduction of complex systems, verification and robust testing of hybrid systems.

University of Twente

December 2000 - March 2005
Dept. Applied Mathematics, Enschede, The Netherlands (Doctoral student)

The Netherlands National Aerospace Lab.

December 2000 - June 2001
Air traffic management section, Amsterdam, The Netherlands (Student researcher)
Engaged in research on analysis of density functions of stochastic hybrid systems. The result of the research was reported as my MSc thesis.

Swiss Federal Lab for Materials Science and Technology

June - August 2000
Acoustic Department, Dubendorf, Switzerland (Summer intern)
Worked on a joint project between Automatic Control Lab. of ETH Zurich and Acoustic Dept. of EMPA Dubendorf. The project was about the control of sound transmission through a double panel system. I was involved in the modeling and model validation of the plant.

Control Systems Lab. December 1998 - July 1999
Dept. Electrical Engineering, ITB, Indonesia (Research assistant)
Engaged in research on system identification for active noise control. The approach was based on using artificial neural network for identifying nonlinear dynamical systems.

Control Systems Lab. March - September 1998
Dept. Electrical Engineering, ITB, Indonesia (Final project)
Developed a visual based control system for a robotic arm.

Signal and Systems Lab. September - December 1997
Dept. Electrical Engineering, ITB, Indonesia (Student researcher)
Developed a DSP based system that can alter the timbre of human voices.

PT. Pupuk Sriwijaya June - August 1997
Instruments maintenance unit, Palembang, Indonesia (Practical trainee)
Embedded in the instruments maintenance unit of the largest fertilizer factory in Indonesia.

TEACHING EXPERIENCE

University of Pennsylvania Spring 2008
Dept. Electrical and Systems Engineering, Philadelphia, USA
Teaching a graduate level course on Nonlinear Control Systems (ESE617).

University of Pennsylvania Spring 2007
Dept. Electrical and Systems Engineering, Philadelphia, USA
Co-teaching and designing a graduate level course on Systems Biology (ESE680-003).

University of Pennsylvania Fall 2006
Dept. Electrical and Systems Engineering, Philadelphia, USA
Alternative instructor for a graduate level course on Nonlinear Control Systems (ESE617).

University of Pennsylvania Spring 2006
Dept. Electrical and Systems Engineering, Philadelphia, USA
Designing and teaching a graduate level course on Hybrid Systems (ESE601).

Institut Teknologi Bandung April - June 1999
Dept. Electrical Engineering, Bandung, Indonesia
Teaching assistant for an undergraduate course on Optimization Methods.

Institut Teknologi Nasional April - June 1999
Dept. Electrical Engineering, Bandung, Indonesia
Teaching as a substitute lecturer for an undergraduate course on Digital Control System.

AWARDS AND FELLOWSHIPS

NWO (Dutch National Science Organization) funding for my doctoral study 2000 - 2004

Summer Research Fellowship
Swiss Federal Lab for Materials Science and Technology (EMPA) Summer 2000

VNO - NCW fellowship from NLR (The Netherlands National Aerospace Lab) 1999 - 2001

Nominated as Best Student of Electrical Engineering Dept, ITB

1998

Top ten graduates of Electrical Engineering Dept, ITB

October 1998

PUBLICATIONS

Thesis

- A.A. Julius, *On interconnection and equivalence of continuous and discrete systems: a behavioral perspective*, Doctoral dissertation, Dept. Applied Mathematics, University of Twente, The Netherlands, 2005.
- A.A. Julius, *Evolution of the modal densities of a class of stochastic hybrid systems*, Master thesis, Dept. Applied Mathematics, University of Twente, The Netherlands, 2001.

Journal papers and book chapters

- A.A. Julius, M. Zavlanos, S.P. Boyd, G.J. Pappas, Genetic network identification using convex programming, submitted for publication, 2007.
- P. Tabuada, A.D. Ames, A.A. Julius, G.J. Pappas, Approximate reduction of dynamical systems, provisionally accepted for publication in *Systems and Control Letters*, 2007.
- A.A. Julius, A. Halasz, M.S. Sakar, H. Rubin, V. Kumar, G.J. Pappas, Stochastic modeling and control of biological systems: the lactose regulation system of *Escherichia coli*, accepted for publication in *IEEE Trans. Automatic Control* and *IEEE Trans. Circuits and Systems* joint special issue on Systems biology, 2007.
- A.A. Julius, G. Fainekos, M. Anand, I. Lee, G.J. Pappas, Model-based Robust Test Generation and Coverage for Hybrid Systems, in *Hybrid Systems: Computation and Control*, Lecture Notes in Computer Science vol. 4416, pp. 329-342, Springer Verlag, 2007.
- A.A. Julius, J.W. Polderman, A.J. van der Schaft, Parametrization of the regular equivalences of the canonical controller, accepted for publication in *IEEE Trans. Automatic Control*, 2007.
- A. Girard, A.A. Julius, G.J. Pappas, Approximate simulation relations for hybrid systems, accepted for publication in *Int. J. Discrete Event Dynamic Systems*, 2006.
- A.A. Julius, G.J. Pappas, Approximate equivalence and synchronization of metric transition systems, submitted to the *Systems and Control Letters*, 2006.
- A.A. Julius, G.J. Pappas, Approximate abstraction of stochastic hybrid systems, provisionally accepted for publication in *IEEE Trans. Automatic Control*, 2006.
- A.A. Julius, Approximate abstraction of stochastic hybrid automata, in *Hybrid Systems: Computation and Control*, Lecture Notes in Computer Science vol. 3927, pp. 318-332, Springer Verlag, 2006.
- A.A. Julius, J.C. Willems, M.N. Belur, H.L. Trentelman, The canonical controllers and regular interconnection, in *Systems and Control Letters*, 8(54), pp 787-797, August 2005.

Conference abstract and poster

- A.A. Julius, M. Zavlanos, S. Boyd, G.J. Pappas, Genetic network identification using convex programming, at the *8th International Conference on Systems Biology*, Long Beach, USA, 2007.
- M.S. Sakar, E. Steager, A.A. Julius, V. Kumar, M.J. Kim, G.J. Pappas, Microfabricated structures powered by flagellated bacteria, at the *8th International Conference on Systems Biology*, Long Beach, USA, 2007.
- A.A. Julius, A. Halasz, V. Kumar, G.J. Pappas, A finite model for the random behavior in the lactose regulation system of *Escherichia coli*, at the *7th International Conference on Systems Biology*, Yokohama, Japan, 2006.

Peer reviewed conference papers

- A.A. Julius, M.S. Sakar, A. Bemporad, G.J. Pappas, Hybrid model predictive control of induction of *Escherichia coli*, to appear in the *Proc. 46th IEEE Conf. Decision and Control*, New Orleans, USA, 2007.
- A. D’Innocenzo, A.A. Julius, G.J. Pappas, M.D. Di Benedetto, S. Di Gennaro, Verification of temporal properties on hybrid automata by simulation relations, to appear in the *Proc. 46th IEEE Conf. Decision and Control*, New Orleans, USA, 2007.
- A. D’Innocenzo, A.A. Julius, M.D. Di Benedetto, G.J. Pappas, Approximate timed abstractions of hybrid automata, to appear in the *Proc. 46th IEEE Conf. Decision and Control*, New Orleans, USA, 2007.
- A.A. Julius, A. Halasz, V. Kumar, G.J. Pappas, Controlling biological systems: the lactose regulation system of *Escherichia coli*, in the *Proc. American Control Conference*, New York, USA, 2007.
- A.A. Julius, A. Halasz, V. Kumar, G.J. Pappas, Finite state abstraction of a stochastic model of the lactose regulation system of *Escherichia coli*, in the *Proc. 45th IEEE Conf. Decision and Control*, San Diego, USA, 2006. ***Best paper of the session***
- A.A. Julius, G.J. Pappas, Approximate equivalence and approximate synchronization of metric transition systems, in the *Proc. 45th IEEE Conf. Decision and Control*, San Diego, USA, 2006.
- P. Tabuada, A. Ames, A.A. Julius, G.J. Pappas, Approximate reduction of dynamical systems, in the *Proc. 45th IEEE Conf. Decision and Control*, San Diego, USA, 2006.
- A. Girard, A.A. Julius, G.J. Pappas, Approximate simulation relations for hybrid systems, in the *Proc. IFAC Conf. Analysis and Design of Hybrid Systems*, Alghero, Italy, 2006.
- A.A. Julius, A. Girard, G.J. Pappas, Approximate bisimulation for a class of stochastic hybrid systems, in the *Proc. American Control Conference*, Minneapolis, USA, 2006.
- A.A. Julius, M.N. Belur, Behavioral control in the presence of disturbances, in the *Proc. 44th IEEE Conf. Decision and Control*, Seville, Spain, 2005.
- A.A. Julius, A.J. van der Schaft, Bisimulation as congruence in the behavioral setting, in the *Proc. 44th IEEE Conf. Decision and Control*, Seville, Spain, 2005.
- A.A. Julius, J.W. Polderman, A.J. van der Schaft, Controller with minimal interaction, in the *Proc. IFAC World Congress*, Prague, Czech Republic, 2005.
- A.A. Julius, A.J. van der Schaft, State maps of general behaviors, their lattice structure and bisimulations, in the *Proc. Conference on Mathematical Theory of Networks and Systems*, Leuven, Belgium, 2004.
- A.A. Julius, A.J. van der Schaft, A behavioral framework for compositionality: linear systems, discrete event systems and hybrid systems, in the *Proc. Conference on Mathematical Theory of Networks and Systems*, Leuven, Belgium, 2004.
- J.C. Willems, M.N. Belur, A.A. Julius, H.L. Trentelman, The canonical controller and its regularity, in the *Proc. 42nd IEEE Conf. Decision and Control*, pp 1639-1644, Hawaii, USA, 2003.
- A.A. Julius, A.J. van der Schaft, Compatibility of behavioral interconnections, in the *Proc. European Control Conf.*, Cambridge, UK, 2003.
- S.N. Strubbe, A.A. Julius, A.J. van der Schaft, Communicating Piecewise Deterministic Markov Processes, in the *Proc. IFAC Conf. Analysis and Design of Hybrid Systems*, pp 349-354, St. Malo, France, 2003.
- A.A. Julius, S.N. Strubbe, A.J. van der Schaft, Control of hybrid behavioral automata by interconnection, in the *Proc. IFAC Conf. Analysis and Design of Hybrid Systems*, pp 135-140, St. Malo, France, 2003.
- A.J. van der Schaft, A.A. Julius, Achievable behavior by composition, in the *Proc. 41st IEEE Conf. Decision and Control*, pp 7-12, Las Vegas, USA, 2002.

- A.A. Julius, A.J. van der Schaft, The maximal controlled invariant sets of switched linear systems, in the *Proc. 41st IEEE Conf. Decision and Control*, pp 3174-3179, Las Vegas, USA, 2002.
- O.E. Kaiser, A.A. Julius, S. Pietrzko, M. Morari, Uncontrollable modes in double wall panels, in the *Proc. 17th Int. Congress on Acoustics*, Paper no. 7P.09., Rome, Italy, 2001.

Technical reports

- A.A. Julius, M. Zavlanos, S. Boyd, G.J. Pappas, Genetic network identification using convex programming, Technical Report MS-CIS-07-20, Department of Computer and Information Science, University of Pennsylvania, 2007.
- A.A. Julius, O.E. Kaiser, S. Pietrzko, M. Morari, *Modeling, optimisation, and analysis of noise transmission through a double panes system*, Technical report AUT00-17, Automatic Control Lab, Dept. Electrical Engineering, ETH Zurich, 2000.

INVITED TALKS AND LECTURES

Katholieke Universiteit Leuven (2003), University of Groningen (2004), CWI Amsterdam (Center for Mathematics and Informatics) (2004), Carnegie Mellon University (2005), Drexel University (2006,2007), University of New Mexico (2007).

PROFESSIONAL ACTIVITIES

- IEEE member,
- Reviewer for IEEE Transaction on Automatic Control, SIAM J. Control and Optimization, Systems and Control Letters, and various conferences.
- Organizer of an invited session on Stochastic Hybrid Systems at the 2006 American Control Conference. Chair person of a session at the American Control Conference 2006 and European Control Conference 2003.

SKILLS

Languages

- Indonesian: mother tongue
- English: fluent
- Dutch: state diploma of "Dutch as a second language"

Computer software: C/C++, Pascal, MATLAB, Maple, L^AT_EX, and others.

REFERENCES

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