

Education

- 1997 – 2002 *Massachusetts Institute of Technology, US*
Doctor of Science in Mechanical Engineering, awarded September 2002.
Thesis title: *Efficient Computational Methods for Robustness Analysis*
- 1994 – 1996 *National Taiwan University, Taiwan*
Master of Science in Mechanical Engineering, awarded June 1996.
Thesis title: *Control Designs for Linear Systems Based on the Inversion Transformation*
ranked 1 among 30 graduates.
- 1990 – 1994 *National Taiwan University, Taiwan*
Bachelor of Science in Mechanical Engineering, awarded June 1994.
ranked 3 among 144 graduates.

Awards and Scholarships

- 2003 – 2004 *The Göran Gustafsson Foundation Scholarship, Sweden*
One or two awarded annually to outstanding early career researchers in Physics, Mechanics, or Mathematical Sciences to do research with Swedish higher education institutions. Duration of the scholarship is one year.
- 1995 – 1996 *Graduate Student Scholarship, Ministry of Education, Taiwan*
Awarded annually to postgraduate students among the top 3% of the class.
- 1991 – 1994 *President's Awards (Dean's honor list), National Taiwan University, Taiwan*
Awarded every semester to undergraduate students among the top 5% of the class.

Employment

- Jul. 2004 – present *The University of Melbourne, Australia*
Senior Lecturer in Electrical and Electronic Engineering (position confirmed)
(Equivalent to tenured assistant professor in US)
- Jun. 2003 – Jun. 2004 *Royal Institute of Technology, Sweden*
Research Fellow with the Division of Optimization and Systems Theory
- Jan. 2003 – Jun. 2003 *Royal Swedish Academy of Sciences, Sweden*
Research Fellow with the Mittag-Leffler Institute
- Sep. 2002 – Jan. 2003 *Lund University, Sweden*
Research Fellow with the Department of Automatic Control

Teaching Experience

- Jul. 2004 – present *The University of Melbourne, Australia*
Semester 2, 2004: 431-464 Digital Control and Identification (lecturer)
Semester 1, 2005: 431-204 Digital System 2 (marker)
Semester 2, 2005: 431-464 Control 2 (advanced control) (lecturer)
Semester 1, 2006: 431-658 Linear System Theory (lecturer)
Semester 1, 2006: 431-204 Digital System 2 (tutor, demonstrator, and marker)
Semester 2, 2006: 431-464 Control 2 (advanced control) (lecturer)
Semester 1, 2007: 431-324 Control 1 (fundamental) (lecturer)
- Jun. 2003 – Jun. 2004 *Royal Institute of Technology, Sweden*
Fall Semester, 2003: Robust Control Theory (lecturer)
- Sep. 2002 – Jan. 2003 *Lund University, Sweden*
Fall Semester, 2002: Convex Optimization and Its Applications (lecturer)
- Feb. 1997 – Sep. 2002 *Massachusetts Institute of Technology, US*
Spring Semester, 2001: Multi-variable control system (teaching assistant)
Fall Semester, 2001: Nonlinear system analysis (teaching assistant)

Supervising Experience

- Jul. 2004 – present *The University of Melbourne, Australia*
6 groups of 3rd year design laboratory and 2 groups of 4th year projects
- Jun. 2003 – Jun. 2004 *Royal Institute of Technology, Sweden*
Master's thesis: *Analysis of ECN/AQM Schemes*, by Christer Johansson

Research Grants

- [1] C.-Y. Kao, M. Cantoni, U. Jönsson, "Robustness analysis and control design for distributed and networked systems." ARC discovery Project, DP0664225. A\$252K, 01/2006 to 12/2008.
- [2] C.-Y. Kao, "Analysis and control design of systems with time-varying delays." Melbourne early carrier researcher grant. A\$30K, 01/2005 to 06/2006.

Professional Activities

Invited presentations:

- 2007 Dept. of Mechanical Engineering, National Taiwan University, Taiwan
2007 Dept. of Electrical Engineering, Linköping University, Sweden
2005 Dept. of Mathematics, Royal Institute of Technology, Sweden
2005 Dept. of Apply Analysis and Complex Dynamic System, Kyoto University, Japan
2005 Dept. of Information, Physics, and Computing, The University of Tokyo, Japan
2004 Control with network delay workshop, Lund Institute of Technology, Sweden
2003 Robust control conference, Crimea, Ukraine
2003 Dept. of Electrical and Electronic Engineering, Melbourne University, Australia
2003 Dept. of Mathematics, Royal Institute of Technology, Sweden

- 2003 Dept. of Electrical Engineering, Linköping University, Sweden
2002 Dept. of Automatic Control, Lund Institute of Technology, Sweden

Conference presentations:

- 2006 MTNS
2005 IFAC World Congress, IEEE Conference on Decision and Control
2003 European Control Conference, IEEE Conference on Decision and Control
2001 American Control Conference
2000 American Control Conference

Review activities:

- 2003 Outstanding reviewer for IEEE Transactions on Automatic Control
From 2003 Reviewer for the various international journals and major conferences (>15 reviews/year)

References

- Dr. Alexandre Megretski, Professor, Massachusetts Institute of Technology, USA. (Ph.D. supervisor)
Dept. of Electrical Engineering & Computer Science
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- Dr. Anders Rantzer, Professor, Lund Institute of Technology, Sweden. (Postdoc supervisor)
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- Dr. Ulf Jönsson, Associate Professor, Royal Institute of Technology, Sweden. (Long time collaborator)
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- Dr. Hisaya Fujioka, Associate Professor, Kyoto University, Japan. (Recent collaborator)
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- Dr. Michael Cantoni, Associate Professor, University of Melbourne, Australia. (Current colleague)
Dept. of Electrical & Electronic Engineering
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Parkville 3010. VIC, Australia.
Phone: +61-3-83446697
Email: m.cantoni@ee.unimelb.edu.au

Publications

Refereed Journal Articles (13 published or accepted, 1 under preparation)

- 1 M.-S. Chen, and **C.-Y. Kao**, "Control of linear time-varying systems using forward Riccati equation", *ASME Trans. Journal of Dynamic Systems, Measurement, and Control*, 119, p536-540, 1997.
- 2 **C.-Y. Kao**, "On the L_2 -gain of double integrator with feedback loop saturation nonlinearity." *IEEE Transactions on Automatic Control*, 46(3), p501-504, 2001.
- 3 **C.-Y. Kao**, U. Jönsson and A. Megretski, "A cutting plane algorithm for robustness analysis of periodically time-varying systems." *IEEE Transactions on Automatic Control*, 46(4), p579-592, 2001.
- 4 U. Jönsson, **C.-Y. Kao**, and A. Megretski, "Robustness of periodic trajectories." *IEEE Transactions on Automatic Control*, 47(11), p1842-1856, 2002.
- 5 U. Jönsson, **C.-Y. Kao**, and A. Megretski, "Analysis of periodically forced uncertain feedback systems." *IEEE Transactions on Circuits and Systems I*, 50(2), p244-258, 2003.
- 6 **C.-Y. Kao**, A. Megretski, and U. Jönsson, "Specialized fast algorithms for IQC feasibility and optimization problems." *Automatica*, 40(2), p239-252, 2004.
- 7 **C.-Y. Kao** and B. Lincoln, "Simple stability criteria for systems with time-varying delays." *Automatica*, 40(8), p1429-1434, 2004.
- 8 **C.-Y. Kao** and A. Megretski, "On the interior point method for a class of semi-definite programs." *SIAM Journal on Control and Optimization*, 46(2), p468-495, 2007.
- 9 **C.-Y. Kao** and A. Rantzer, "Stability analysis of systems with uncertain time-varying delays." *Automatica*, 43(6), p959-970, 2007.
- 10 H. Fujioka, **C.-Y. Kao**, S. Almér, and U. Jönsson, "LQ optimal control for a class of pulse width modulated systems." *Automatica*, 43(6), p1009-1020, 2007.
- 11 S. Almér, U. Jönsson, **C.-Y. Kao**, and J. Mari, "Stability analysis of a class of PWM systems." To appear in *IEEE Transactions on Automatic Control*, 2007.
- 12 R. Wallin, **C.-Y. Kao**, and A. Hansson, "A cutting plane method for solving KYP-SDPs." To appear in *Automatica*, 2007.
- 13 U. Jönsson, **C.-Y. Kao** and H. Fujioka, "A Popov criterion for networked systems." To appear in *System and Control Letters*, 2007.
- 14 H. Fujioka, S. Almér, and U. Jönsson, **C.-Y. Kao**, "Control synthesis for a Class of PWM systems for robust tracking and \mathcal{H}_∞ performance." To be submitted to *IEEE Transactions on Automatic Control*.

Refereed Conference Articles (27 published or accepted)

- 15 U. Jönsson, **C.-Y. Kao** and A. Megretski, "Analysis of periodic orbits based on uncertain data", *Proceedings of the 37th IEEE Conference on Decision and Control*, Tampa, FL, USA, 1998.
- 16 **C.-Y. Kao**, U. Jönsson and A. Megretski, "A cutting plane algorithm for robustness analysis of periodic systems." *Proceedings of the American Control Conference*, San Diego, CA, 1999.
- 17 U. Jönsson, **C.-Y. Kao** and A. Megretski, "Robustness analysis of periodic systems." *Proceedings of the 38th IEEE Conference on Decision and Control*, Phoenix, AZ, USA, 1999.
- 18 **C.-Y. Kao**, U. Jönsson and A. Megretski, "An algorithm for solving optimization problems involving special frequency dependent LMIs." *Proceedings of American Control Conference*, Chicago, IL, 2000.
- 19 U. Jönsson, **C.-Y. Kao** and A. Megretski, "Robustness of periodic trajectories." *Proceedings of American Control Conference*, Chicago, IL, 2000.
- 20 A. Megretski, U. Jönsson and **C.-Y. Kao**, "Estimation of sensitivity of periodic trajectories with respect to structured uncertainty." *Proceedings of American Control Conference*, Chicago, IL, 2000.

- 21 **C.-Y. Kao**, M. Ravuri and A. Megretski, "Control synthesis with dynamic integral quadratic constraints – LMI approach." *Proceedings of 39th IEEE Conference on Decision and Control*, Sydney, Australia, 2000.
- 22 M. Ravuri, **C.-Y. Kao** and A. Megretski, "Hierarchical optimization in the presence of an intelligent adversary - an H-infinity approach." *Proceedings of 39th IEEE Conference on Decision and Control*, Sydney Australia, 2000.
- 23 **C.-Y. Kao** and A. Megretski, "Specialized fast algorithms for IQC optimization problems." *Proceedings of American Control Conference*, Arlington, VA, 2001.
- 24 U. Jönsson, **C.-Y. Kao**, and A. Megretski, "A semi-infinite optimization problem in harmonic analysis of uncertain systems." *Proceedings of American Control Conference*, Arlington, VA 2001.
- 25 **C.-Y. Kao**, and S. R. Venkatesh, "Stabilization of linear systems with limited information - multiple inputs case." *Proceedings of American Control Conference*, Anchorage, Alaska, 2002.
- 26 **C.-Y. Kao** and A. Megretski, "A new barrier function for IQC optimization problems." *Proceedings of American Control Conference*, Denver, CO, 2003.
- 27 S. Almér, U. Jönsson, **C.-Y. Kao**, and J. Mari, "Stability analysis of a class of PWM systems using sampled-data modeling." *Proceedings of 42nd IEEE Conference on Decision and Control*, Maui, Hawaii, USA, 2003.
- 28 **C.-Y. Kao** and A. Rantzer, "Stability criteria for systems with bounded uncertain time-varying delays." *Proceedings of European Control Conference*, Cambridge, UK, 2003.
- 29 S. Almér, U. Jönsson, **C.-Y. Kao**, and J. Mari, "Global stability analysis of DC-DC converters using sampled-data modelling." *Proceedings of American Control Conference*, Boston, MA, 2004.
- 30 **C.-Y. Kao**, A. Megretski, U. Jönsson, and A. Rantzer, "A MATLAB toolbox for robustness analysis." *Proceedings of IEEE Conference on Computer Aided Control Systems Design*, Taipei, Taiwan, 2004.
- 31 **C.-Y. Kao** and A. Rantzer, "Robustness analysis of linear systems with time-varying delays." *Proceedings of 2005 IFAC world congress*, Prague, Czech Republic, 2005.
- 32 H. Fujioka, **C.-Y. Kao**, S. Almér, and U. Jönsson, "LQ optimal control synthesis for a class of pulse modulated systems." *Proceedings of 2005 IFAC world congress*, Prague, Czech Republic, 2005.
- 33 R. Wallin, **C.-Y. Kao**, and A. Hansson "A decomposition approach for solving KYP-SPDs." *Proceedings of 2005 IFAC world congress*, Prague, Czech Republic, 2005.
- 34 H. Fujioka, **C.-Y. Kao**, S. Almér, and U. Jönsson, "Sampled-data H_∞ control design for a class of PWM systems." *Proceedings of 45th IEEE Conference on Decision and Control*, Seville, Spain, 2005.
- 35 U. Jönsson, H. Fujioka, and **C.-Y. Kao**, "A Popov criterion for networked systems." *17th International Symposium on Mathematical Theory of Networks and Systems*, Kyoto, Japan, 2006.
- 36 **C.-Y. Kao**, "Stability analysis of systems with bounded uncertain time-varying delays." *17th International Symposium on Mathematical Theory of Networks and Systems*, Kyoto, Japan, 2006.
- 37 H. Fujioka, S. Almér, U. Jönsson, and **C.-Y. Kao**, "Control synthesis for a class of PWM systems for robust tracking and H_∞ performance." *Proceedings of 45th IEEE Conference on Decision and Control*, San Diego, CA, USA, 2006.
- 38 **C.-Y. Kao**, U. Jönsson, and H. Fujioka. "Characterization of Robust Stability of a Class of Interconnected Systems." Accepted by American Control Conference 2007.
- 39 S. Almér, H. Fujioka, U. T. Jönsson, **C.-Y. Kao**, D. Patino, P. Riedinger, T. Geyer, A. Giovanni Beccuti, G. Papafotiou, M. Morari, A. Wernrud, A. Rantzer. "Hybrid Control Techniques for Synchronous DC-DC Converters Part I: The Step-Down Topology." Accepted by American Control Conference 2007 (invited paper).

- 40 A. Giovanni Beccuti, G. Papafotiou, M. Morari, S. Almér, H. Fujioka, U. T. Jönsson, **C.-Y. Kao**, A. Wernrud, A. Rantzer, M. Bâja, H. Cormerais, J. Buisson “Hybrid Control Techniques for Synchronous DC-DC Converters, Part II: The Step-Up Topology.” Accepted by American Control Conference 2007 (invited paper).
- 41 U. Jönsson, **C.-Y. Kao**, and H. Fujioka. “Low Dimensional Stability Criteria for Large-Scale Interconnected Systems.” Accepted by European Control Conference 2007.

Other Publications:

- 42 **C.-Y. Kao**, A. Megretski, U. Jönsson and A. Rantzer “ IQC_β , MATLAB Package for Robust Analysis of Feedback Systems.” Available on-line at www.ee.unimelb.edu.au/staff/cykao/
- 43 **C.-Y. Kao** “New barrier functions and interior path-following algorithms for IQC optimization problems.” Technical Report. ISSN 1103-467X, ISRN IML-R-24-02/03-SE+spring, Insitut Mittag-Leffler, Royal Swedish Academy of Sciences, Sweden, 2003.