

Education

Ph.D., Mechanical Engineering, Massachusetts Institute of Technology, USA, 2002

M.S., Mechanical Engineering, National Taiwan University, Taiwan, 1996

B.S., Mechanical Engineering, National Taiwan University, Taiwan, 1994

Teaching and Research Positions

2004 – present Senior Lecturer, EEE, University of Melbourne, Australia
2003 – 2004 Research Fellow, Department of Mathematics, KTH, Sweden
2003 Research Fellow, Inst. Mittag-Leffler, Royal Swedish Academy of Sciences
2002 – 2003 Research Fellow, Department of Automatic Control, LTH, Sweden
1997 – 2002 Research Assistant, Department of Electrical Engineering, MIT, USA
1994 – 1996 Research Assistant, Department of Mechanical Engineering, NTU, Taiwan

Research Interests

Robustness of systems with uncertain time delays
Analysis of networked systems
Control of switching systems
Efficient computational algorithms for analyzing complex systems
Control applications
Convex optimization and its applications in different engineering disciplines

Teaching Activities

Senior Lecturer, University of Melbourne, Australia

- Digital Control and Identification (undergraduate level)
- Control 2 (advanced control) (undergraduate level)
- Digital System 2 (undergraduate level)
- Linear System Theory (graduate level)

Guest Lecturer, Royal Institute of Technology (KTH), Sweden

- Robust Control Theory (graduate level)

Guest Lecturer, Lund Institute of Technology (LTH), Sweden

- Convex Optimization and Its Applications (graduate level)

Teaching Assistant, Massachusetts Institute of Technology, USA

- Nonlinear system analysis (graduate level)
- Multi-variable control system (graduate level)

Supervising Experiences

University of Melbourne, Australia

- Various 3rd and 4th year undergraduate student projects.

Royal Institute of Technology (KTH), Sweden

- Master's thesis: *Analysis of ECN/AQM Schemes*, by Christer Johansson

Grants

- 2006 – 2008 Large ARC Discovery Grant (A\$ 252k)
- 2005 Melbourne Early Career Researcher Grant (A\$ 30k)

Awards and Honor

- 2003 – 2004 The Göran Gustafsson Foundation Scholarship, Stockholm, Sweden
- 1995 – 1996 Graduate Student Scholarship, Ministry of Education, Taiwan
- 1991 – 1994 National Taiwan University President's Awards (Dean's honor list), for 5 consecutive semesters

Professional Activities

Invited presentations:

- 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:

- 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
- 2003,– Reviewer for the various international journals and major conferences (> 10 reviews/year)

References

Dr. Ulf Jönsson, Associate Professor, Royal Institute of Technology, Sweden

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Dr. Hisaya Fujioka, Associate Professor, Kyoto University, Japan.

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Dr. Alexandre Megretski, Associate Professor, Massachusetts Institute of Technology, USA

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Dr. Anders Rantzer, Professor, Lund Institute of Technology, Sweden.

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Bibliography

Journal articles: 9 published or accepted, 4 submitted.

Conference articles: 22 published or accepted, 2 submitted.

Other publications: 2.

Referred Journal articles

- 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." Accepted (with minor revision) to be published in *SIAM Journal of Control and Optimization*.
- 9 C.-Y. Kao and A. Rantzer, "Stability analysis of systems with uncertain time-varying delays." Accepted (with minor revision) to be published in *Automatica*.
- 10 S. Almér, U. Jönsson, C.-Y. Kao, and J. Mari, "Stability Analysis of a Class of PWM Systems." Submitted to *IEEE Transactions on Automatic Control*.
- 11 R. Wallin, C.-Y. Kao, and A. Hansson, "A cutting plane method for solving KYP-SDPs." Submitted to *Automatica*.
- 12 H. Fujioka, C.-Y. Kao, S. Almér, and U. Jönsson, "LQ optimal control for a class of pulse width modulated systems." Submitted to *Automatica*.
- 13 U. Jönsson, C.-Y. Kao and H. Fujioka, "A Popov Criterion for Networked Systems." Submitted to *System and Control Letters*.

Referred Conference articles

- 1 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.
- 2 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.
- 3 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.
- 4 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.
- 5 U. Jönsson, C.-Y. Kao and A. Megretski, "Robustness of periodic trajectories." *Proceedings of American Control Conference*, Chicago, IL, 2000.

- 6 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.
- 7 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.
- 8 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.
- 9 C.-Y. Kao and A. Megretski, "Specialized fast algorithms for IQC optimization problems." *Proceedings of American Control Conference*, Arlington, VA, 2001.
- 10 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.
- 11 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.
- 12 C.-Y. Kao and A. Megretski, "A new barrier function for IQC optimization problems." *Proceedings of American Control Conference*, Denver, CO, 2003.
- 13 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.
- 14 C.-Y. Kao and A. Rantzer, "Stability criteria for systems with bounded uncertain time-varying delays." *Proceedings of European Control Conference*, Cambridge, UK, 2003.
- 15 S. Almér, U. Jönsson, C.-Y. Kao, and J. Mari, "Global stability analysis of DC-DC converters using sampled-data modeling." *Proceedings of American Control Conference*, Boston, MA, 2004.
- 16 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.
- 17 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.
- 18 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.
- 19 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.
- 20 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.
- 21 U. Jönsson, H. Fujioka, and C.-Y. Kao, "A Popov criterion for networked systems." Accepted by *17th International Symposium on Mathematical Theory of Networks and Systems*, Kyoto, Japan, 2006.
- 22 C.-Y. Kao, "Stability analysis of systems with bounded uncertain time-varying delays." Accepted by *17th International Symposium on Mathematical Theory of Networks and Systems*, Kyoto, Japan, 2006.
- 23 C.-Y. Kao, U. Jönsson, and H. Fujioka. "Robust stability of heterogenous networked systems." Submitted to *45th IEEE Conference on Decision and Control*, San Diego, CA, USA, 2006.
- 24 H. Fujioka, S. Almér, U. Jönsson, and C.-Y. Kao, "Control synthesis for a class of PWM systems for robust tracking and H_∞ performance." Submitted to *45th IEEE Conference on Decision and Control*, San Diego, CA, USA, 2006.

Other Publication:

- 1 C.-Y. Kao, A. Megretski, U. Jönsson and A. Rantzer “ $\text{IQC}\beta$, MATLAB Package for Robust Analysis of Feedback Systems.” Available on-line at www.ee.unimelb.edu.au/staff/cykao/
- 2 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.