

Aranya Chakraborty
PhD Candidate
Center for Automation Technologies and Systems (CATS)
Rensselaer Polytechnic Institute

Research Description:

My research interests span the area of control theory and applications with particular focus on nonlinear, robust and adaptive control designs. As a doctorate student in Rensselaer, my research has largely been bifurcated into two parts. One part deals with the design of robust, nonlinear controllers for various classes of uncertain nonlinear systems with the objective of stabilization and nominal performance recovery, with diverse applications ranging from aircrafts and other safety critical systems to faulted power systems, marine vehicles etc. The other part focuses on parameter estimation and transient stability analysis problems in large-scale electric power systems based on synchronized phasor measurements, and involves the formulation of coherency based estimation methods exploiting the characteristics of spatial variation of phasors in power transmission networks. Some of my other recent research interests include observer designs for differential-algebraic systems, passivity based control designs for power systems, fuel cell systems modeling and control, control of PDE's etc.

Advisor: Dr. Murat Arcak, Dr. Joe. H. Chow (co-advisor)

Thesis Title: "Estimation, Analysis and Control Methods in Large-scale Electric Power Systems based on Synchronized Phasor Measurements"

Education

Rensselaer Polytechnic Institute, Troy, NY, USA
PhD, Electrical Engineering, Expected August 2008 (GPA: 4.0)

Rensselaer Polytechnic Institute, Troy, NY, USA
M.S., Electrical Engineering, 2005 (GPA: 4.0)

Jadavpur University, Calcutta, India
B.E., Electrical Engineering, 2004 (GPA: 3.7)

Honors

- Best Graduate TA Award, 2006, *Eta Kappa Nu Honor Society and ECSE Department, Rensselaer Polytechnic Institute.*
- Student support for attending IEEE Power Engineering Society General Meeting (2006) in Montreal, Canada, and General Meeting (2007) in Tampa, FL.
- Vice-chancellor's silver medal for ranking 2nd with First Class Honors in Bachelor of Electrical Engineering, class of 2004, Jadavpur University, Calcutta, India, 2005.

Publications and Patents

Journal Publications:

- Aranya Chakraborty and Murat Arcak, 'Time-Scale Separation Redesigns for Robust Stabilization and Performance Recovery of Uncertain Nonlinear Systems,' *scheduled to appear soon in Automatica.*
- Aranya Chakraborty, Ernt Scholtz, and Murat Arcak, 'Performance Recovery of Power Systems with Uncertain Parameters and Faults,' *submitted to IEEE Transactions on Circuits and Systems, 2007.*
- Joe. H. Chow, Aranya Chakraborty, Luigi Vanfretti, and Murat Arcak, 'Estimation of Radial Power System Transfer Path Dynamic Parameters using Synchronized Phasor Data.' under review in *IEEE Transactions on Power Systems, 2007.*
- Joe H. Chow, Aranya Chakraborty, Murat Arcak, Bharat Bhargava, and Armando Salazar, 'Synchronized Phasor Data Based Energy Function Analysis of Dominant Power Transfer Paths in Large Power Systems,' *IEEE Transactions on Power Systems, Vol. 22, no. 2, May 2007.*

Conference Publications

- Aranya Chakraborty and Murat Arcak, 'A Three-Time Scale Redesign for Stabilization and Performance Recovery of Nonlinear Systems with Unmodeled Dynamics', *submitted to American Control Conference, Seattle, WA 2008.*
- Aranya Chakraborty and Joe. H. Chow, 'Synchronized Phasor Data Estimation of Dynamic Parameters in Radial Power System Transfer Path with Voltage Reinforcement', *submitted to the 11th Symposium of Specialists in Electric Operational and Expansion Planning (SEPOPE), Belem, Brazil, 2008.*
- Aranya Chakraborty and Murat Arcak, 'A Three-Time Scale Redesign for Robust Stabilization and Performance Recovery of Nonlinear Systems with Input Uncertainties', *to appear in the proceedings of the 46th IEEE Conference on Decision and Control, New Orleans, LA, 2007.*
- Aranya Chakraborty, Ernst Scholtz, and Murat Arcak, 'Performance Recovery of Power Systems with Uncertain Parameters and Faults', *to appear in the proceedings of the 46th IEEE Conference on Decision and Control, New Orleans, LA, 2007.*
- Aranya Chakraborty and Murat Arcak, 'A Two-Time Scale Redesign for Robust Stabilization and Performance Recovery of Uncertain Nonlinear Systems', *in proceedings of American Control Conference, New York, 2007.*
- Joe H. Chow, Aranya Chakraborty, Murat Arcak, Bharat Bhargava, and Armando Salazar, 'Synchronized Phasor Data Based Energy Function Analysis of Power Transfer Paths', *in proceedings of IEEE Power Systems General Meeting, Montreal, Quebec, Canada, June 2006.*

Memberships and Activities

- Student Member, IEEE and IEEE Control Systems Society
- Active Member of Power Systems Research Consortium (Rensselaer, Virginia Tech, Univ. of Wyoming, Montana Tech)
- Reviewer for Automatica, IEEE Transactions on Automatic Control, Transactions on Control Systems Technology, Journal of Process Control, Journal of Control Engineering Practice International Journal of Hydrogen Energy, Mathematical Problems in Engineering, IEEE Conference on Decision and Control, American Control Conference

Computer Skills

- Matlab, Scilab, Labview
- Working knowledge of C and C++

Contact Information

2403 21st Street, Apt. 3,
Troy, NY 12180
(518-892-4308)
chakra@rpi.edu
www.rpi.edu/~chakra