

MAKAN FARDAD

Electrical Engineering & Computer Science
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Academic Appointments

Assistant Professor Syracuse University, Aug 2008–present
Department of Electrical Engineering and Computer Science.

Postdoctoral Associate University of Minnesota, Sept 2006–May 2008
Department of Electrical and Computer Engineering.

Education

PhD in Mechanical Engineering University of California, Santa Barbara, 2006
Thesis: *The Analysis of Distributed Spatially Periodic Systems*.
Advisor: Professor Bassam Bamieh.

MS in Electrical Engineering Iran University of Science and Technology, Iran, 2000
Thesis: *Optimal Discretization of Continuous-Time Systems*.
Advisors: Professor A. H. Davaie-Markazi and Professor J. Poshtan.

BS in Electrical Engineering Sharif University of Technology, Iran, 1998

Experience

Graduate Researcher University of California, Santa Barbara, 2000–2006

Visiting Researcher Massachusetts Institute of Technology, Fall 2005

Teaching and Lab Assistant University of California, Santa Barbara, 2000–2003

Teaching Assistant Iran University of Science and Technology, Iran, 1999–2000

Awards and Recognitions

NATIONAL SCIENCE FOUNDATION AWARD, Aug 2009–July 2012.

INVITED PRESENTATION, American Control Conference, 2008, 2009.

PRESIDENT'S WORK-STUDY AWARD, University of California, Santa Barbara, 2003–2006.

BEST SESSION PRESENTATION AWARD, American Control Conference, 2005.

RANKED 1ST IN ELECTRICAL ENGINEERING GRADUATE PROGRAM (in class of approximately 90 students), Iran University of Science and Technology, Iran, Spring 2000.

RANKED TOP 5% OF NATIONAL GRADUATE PROGRAM ENTRANCE EXAM, Iran, 1998.

RANKED TOP 1% OF NATIONAL UNDERGRADUATE ENTRANCE EXAM, Iran, 1994.

Publications (Available in pdf format at <http://www.lcs.syr.edu/faculty/fardad>)

Journals

- [1] M. Fardad and B. Bamieh, “A necessary and sufficient frequency domain criterion for the passivity of siso sampled-data systems,” *IEEE Transactions on Automatic Control*, vol. 54, no. 3, pp. 611–614, 2009.
- [2] M. Fardad and B. Bamieh, “Perturbation methods in stability and norm analysis of spatially periodic systems,” *SIAM Journal on Control and Optimization*, vol. 47, no. 2, pp. 997–1021, 2008.
- [3] M. Fardad, M. R. Jovanović, and B. Bamieh, “Frequency analysis and norms of distributed spatially periodic systems,” *IEEE Transactions on Automatic Control*, vol. 53, no. 10, pp. 2266–2279, 2008.
- [4] M. Fardad and B. Bamieh, “An extension of the argument principle and Nyquist criterion to a class of systems with unbounded generators,” *IEEE Transactions on Automatic Control*, vol. 53, no. 1, pp. 379–384, 2008.
- [5] M. R. Jovanović and M. Fardad, “ H^2 norm of linear time-periodic systems: A perturbation analysis,” *Automatica*, pp. 2090–2098, 2008.
- [6] R. Rajaram, U. Vaidya, M. Fardad, and B. Ganapathysubramanian, “Stability in the almost everywhere sense: A linear transfer operator approach,” submitted to *Applicable Analysis*, 2008.
- [7] M. Fardad, “The operator algebra of almost Toeplitz matrices and the optimal control of large-scale systems,” submitted to *SIAM Journal on Matrix Analysis and Applications*, 2008.

Conferences [Refereed Proceedings]

- [1] M. Fardad, F. Lin, and M. R. Jovanović, “Optimal design of structured feedback gains for interconnected systems,” accepted for *48th IEEE Conference on Decision and Control*, 2009.
- [2] M. Fardad, “The operator algebra of almost Toeplitz matrices and the optimal control of large-scale systems,” in *Proceedings of the 2009 American Control Conference*, pp. 854–859, 2009, **(Invited Paper)**.
- [3] M. Fardad, M. R. Jovanović, and M. V. Salapaka, “Damping mechanisms in dynamic mode atomic force microscopy applications,” in *Proceedings of the 2009 American Control Conference*, pp. 2272–2277, 2009.
- [4] M. Fardad and M. R. Jovanović, “On the state-space design of optimal controllers for distributed systems with finite communication speed,” in *Proceedings of the 47th IEEE Conference on Decision and Control*, pp. 5488–5493, 2008.

- [5] R. Moarref, M. Fardad, and M. R. Jovanović, “Perturbation analysis of eigenvalues of a class of self-adjoint operators,” in *Proceedings of the 2008 American Control Conference*, pp. 955–960, 2008, **(Invited Paper)**.
- [6] R. Rajaram, U. Vaidya, and M. Fardad, “Connection between almost everywhere stability of an ODE and the advection PDE,” in *Proceedings of the 46th IEEE Conference on Decision and Control*, pp. 5880–5885, 2007.
- [7] M. Fardad and B. Bamieh, “On stability and the spectrum determined growth condition for spatially periodic systems,” in *Proceedings of the 45th IEEE Conference on Decision and Control*, pp. 3956–3961, 2006.
- [8] M. Fardad and B. Bamieh, “The Nyquist stability criterion for a class of spatially periodic systems,” in *Proceedings of the 44th IEEE Conference on Decision and Control*, pp. 5275–5280, 2005.
- [9] M. Fardad and B. Bamieh, “A perturbation approach to the H^2 analysis of spatially periodic systems,” in *Proceedings of the 2005 American Control Conference*, pp. 4838–4843, 2005.
- [10] M. Fardad and B. Bamieh, “A perturbation analysis of parametric resonance and periodic control in spatially distributed systems,” in *Proceedings of the 43rd IEEE Conference on Decision and Control*, pp. 3786–3791, 2004.
- [11] M. Fardad and B. Bamieh, “A frequency domain analysis and synthesis of the passivity of sampled-data systems,” in *Proceedings of the 43rd IEEE Conference on Decision and Control*, pp. 2358–2363, 2004.
- [12] B. Bamieh, I. Mezic, and M. Fardad, “A framework for destabilization of dynamical systems and mixing enhancement,” in *Proceedings of the 40th IEEE Conference on Decision and Control*, pp. 4980–4983, 2001.
- [13] A. H. D. Markazi and M. Fardad, “A new L^∞ -induced norm evaluation of classical techniques for discrete time approximation of continuous time functions,” *IUST International Journal of Engineering*, vol. 12, no. 2, pp. 135–149, 2001.
- [14] A. H. D. Markazi and M. Fardad, “An operator theoretic approach to the optimal discretization of continuous time systems,” in *2nd International Conference on Applied Mathematics, ICAM*, 2000.

Presentations

- [1] “Damping mechanisms in dynamic mode atomic force microscopy applications,” *2009 American Control Conference*, St. Louis, Missouri, June 2009.
- [2] “The operator algebra of almost Toeplitz matrices and the optimal control of large-scale systems,” *2009 American Control Conference*, St. Louis, Missouri, June 2009.
- [3] “State-space design of optimal distributed controllers with finite communication speed,” *Sensor Fusion Lab*, Syracuse University, February 2009.

- [4] “State-space design of optimal controllers for distributed systems with architectural constraints,” *Communications Seminar Series (SPiNCom)*, University of Minnesota, May 2008.
- [5] “Structured problems in analysis and control of spatially distributed systems,” Syracuse University, New York, November 2007.
- [6] “On stability and the spectrum determined growth condition for spatially periodic systems,” *45th IEEE Conference on Decision and Control*, San Diego, California, December 2006.
- [7] “Analysis of spatially periodic systems,” *Control Science and Dynamical Systems Center (CSDy)*, University of Minnesota, October 2006.
- [8] “The Nyquist stability criterion for a class of spatially periodic systems,” *44th IEEE Conference on Decision and Control*, Seville, Spain, December 2005.
- [9] “A perturbation approach to the H^2 analysis of spatially periodic systems,” *2005 American Control Conference*, Portland, Oregon, June 2005.
- [10] “A perturbation approach to the H^2 analysis of spatially periodic systems,” *Southern California Nonlinear Control Workshop*, University of California, San Diego, May 2005.
- [11] “A perturbation analysis of parametric resonance and periodic control in spatially distributed systems,” *Pre-CDC Workshop*, University of California, Santa Barbara, December 2004.
- [12] “A frequency domain analysis and synthesis of the passivity of sampled-data systems,” *Pre-CDC Workshop*, University of California, Santa Barbara, December 2004.

Primary Research Areas

Structured control of spatially distributed and large-scale systems.

Input–output analysis of partial differential equations.

Parametric resonance in spatio-temporal systems.

Primary Teaching Areas

Undergraduate Courses: Control Systems, Dynamical Systems, Signals and Systems, Circuit Theory, Numerical Analysis, Mathematics of Engineering.

Graduate Courses: Linear Systems, Optimal Control, Control of Spatially Distributed Systems.

Professional Activities

Referee for *SIAM Journal on Control and Optimization*, *IEEE Transactions on Automatic Control*, *Automatica*, *Control Systems Magazine*, *IEEE Conference on Decision and Control*, *American Control Conference*.