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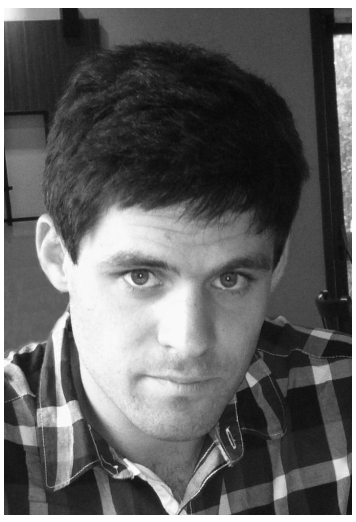
Engineering Institute Lecture Series



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Extremum Seeking for Stabilization and Optimization

Tuesday, February 19, 2013

3:30 - 4:30 PM

Los Alamos Research Park, 2nd Floor, Conference Room 203A

Abstract: In the field of control theory, Extremum Seeking (ES) has a long history as a tool for locating the extremum points of the unknown output functions of known, stable dynamic systems. Recently, by using the ES method to seek the minimum of Lyapunov functions, the ES approach has been demonstrated as a tool for stabilization of unknown, unstable systems, removing the distinction between optimization and stabilization.

This talk first gives a brief review of relevant control and averaging methods and then demonstrates the dual aspects of the ES method for simultaneous stabilization and optimization. The utilization of the resulting control scheme, which optimizes the output of unknown maps, of unknown and possibly unstable, time-varying dynamic systems, is then demonstrated through several simulations and an online in-hardware implementation.

Biography: Alexander Scheinker received the B.A. degrees in mathematics and physics from the Washington University, St. Louis, MO, in 2006, the M.A. degree in mathematics from the University of California in San Diego, in 2008, and a Ph.D. degree in dynamic systems and control from the Mechanical and Aerospace Engineering Department, University of California in San Diego, La Jolla in December 2012. Since 2010 he has been a staff member with the Low Level RF Control Group, Los Alamos National Laboratory, Los Alamos, NM. His research interests include stability and optimization of uncertain nonlinear systems, nonlinear dynamics, and various topics in particle accelerator physics. Mr. Scheinker was a Finalist for the Student Best Paper Award at the 2012 American Control Conference.

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For more information contact the technical host Chuck Farrar, farrar@lanl.gov, 663-5330.

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