Announcing the Final Examination of Kun Zhang for the degree of Doctor of Philosophy

Time & Location: November 14, 2014 at 2:00 PM in HEC 113
Title: Lyapunov-based Robust and Adaptive Control Design for Nonlinear Uncertain Systems

The control of system with uncertain nonlinear dynamics has been an important field of control science attracting decades of focus. In the defense, two different control strategies are presented using sliding mode control, adaptive control and dynamic compensation for nonlinear system with bounded uncertainties and external disturbance. In the first part, a robust output feedback control strategy will be discussed for the vibration suppression of aeroelastic system operating in an unsteady aerodynamic incompressible flowfield. The aeroelastic system is actively actuated using a combination of a leading-edge (LE) and trailing-edge (TE) flap in the presence of different kinds of gust disturbance. The second part will deal with the design of continuous robust control law for a kind of single input and single output system with uncertainties and an aeroelastic system with TE flap taken as control input will be considered as the plant for demonstration of effectiveness of the controller. Semiglobal asymptotic stability results on system outputs in those two parts are provided by Lyapunov stability analysis. The robustness and efficacy of both controllers is validated by simulation results under different operating conditions and disturbances.

Major: Electrical Engineering

Educational Career:
Bachelor's of Automation, BS, 2007, Wuhan University of Technology
Master's of Control Science and Engineering, MS, 2011, Huazhong University of Science and Technology

Committee in Charge:
Aman Behal, Chair, EECS
Pier Marzocca, MAE, Clarkson University
Lotzi Boloni, EECS, University of Central Florida
Michael Haralambous, EECS, University of Central Florida
Yunjun Xu, MME, University of Central Florida

Approved for distribution by Aman Behal, Committee Chair, on March 28, 2015.

The public is welcome to attend.