Announcing the Final Examination of Juan Vega-Nevarez for the degree of Master of Science

Time & Location: October 31, 2012 at 2:00 PM in HEC 450
Title: Online Path Planning and Control Solution for a Coordinated Attack of Multiple Unmanned Aerial Vehicles in a Dynamic Environment

The role of the unmanned aerial vehicle (UAV) has significantly expanded in the military sector during the last decade mainly due to their cost effectiveness and their ability to eliminate the human life risk. Current UAV technology ranges widely to support a variety of missions; however, one particular field of interest is the area of the low cost expendable UAV since its small price tag makes it an attractive solution for target suppression. A swarm of these low cost UAVs can be utilized as guided munitions or kamikaze UAVs to attack multiple targets simultaneously. The focus of this thesis is the development of a cooperative online path planning algorithm that coordinates the trajectories of these UAVs to achieve a simultaneous arrival time to their dynamic targets. A nonlinear autopilot design based on the dynamic inversion technique is also presented which stabilizes the dynamics of the UAV in its entire operating envelope. A nonlinear high fidelity six degrees of freedom model of a fixed wing aircraft was developed as well to act as a test bed to verify the performance of the presented algorithms.

Major: Electrical Engineering

Educational Career:
Bachelor’s of Electrical Engineering, BS, 2003, University of Puerto Rico

Committee in Charge:
Dr. Zhihua Qu, Chair, Electrical Engineering
Michael Haralambous, Electrical Engineering
Yunjun Xu, Aerospace Engineering

Approved for distribution by Dr. Zhihua Qu, Committee Chair, on October 16, 2012.

The public is welcome to attend.