

Department of Electrical and Computer Engineering

Title: «*Cooperative Tracking For A Swarm Of Unmanned Aerial Vehicles: A Distributed Takagi-Sugeno Fuzzy Framework Design*»

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Room ΠΤΕΡ – E010, Old Campus
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Abstract: This presentation focuses on a systematic analysis for the tracking problem in swarm-based missions for Unmanned Aerial Vehicles (UAVs) with linear and angular velocity constraints. In this work the nonlinear model of the dynamics are represented by Takagi-Sugeno (TS) fuzzy models. A distributed control law is introduced which is composed of both node and network level information. Firstly feedback gains are synthesised for the isolated UAVs ignoring interconnections. The resulting common Lyapunov matrix is utilised at network level, to incorporate into the control law the relative differences in the states of the agents, to induce cooperative behaviour. Eventually stability is guaranteed for the entire swarm. The control synthesis is all performed subject to design criteria, posed as Linear Matrix Inequalities (LMIs). An illustrative example based on a UAV tracking scenario is included to outline the potential of the analysis.

Biography: **Dr Georgios P. Kladis** received his undergraduate Degree in Control from the Technological Educational Institute of Piraeus (TEI), Department of Automation in 2005, and the Master by Research (MRes) in 2006 from ASTON University of Birmingham, UK in the Neural Computing Research Group (NCRG). He received his Ph.D degree in control and robotics for Unmanned Aerial Vehicles in 2010, from the Department of Aerospace, Power and Sensors at Cranfield University, The Defence Academy of the UK. Currently, he is affiliated with the University of Leicester UK, as a Research Associate at the Department of Engineering, Control Group. He served as a Specialised Scientist with the Hellenic Army for Monitoring and Systems information Battalion from November 2011 to July 2012. His research interests include control of nonlinear autonomous multi-agent systems, intelligent systems and control, robotics, decision making techniques, and applications