



**Ottawa  
Section**



**Seminar by IEEE Ottawa Section Joint Chapter of Robotics & Automation, and Control Systems Societies (RCS), Aerospace and Electronic Systems Society (AESS), Power Engineering Society (PES), Reliability Society (RS), Instrumentation and Measurement Society (IMS) Chapters and Educational Activities**

*The IEEE Ottawa Section is inviting all interested IEEE members, students, and nonmembers to a seminar on*

**New Developments in Cooperative Control with Application to Formation Flying**

by

**Dr. Amir Aghdam, Concordia University, Montreal**

**DATE:** Wednesday, December 05, 2007.

**TIME:** 1:00 p.m. – 2:30 p.m. Refreshments will be provided.

**PLACE:** University of Ottawa, School of Information Technology and Engineering (SITE), 800 King Edward Ave., 5<sup>th</sup> Floor, Board Room 5084.

**PARKING:** Please respect restricted parking areas around University of Ottawa.

**Abstract** In this presentation, the control problem for a number of cooperative spacecraft with communication constraints will be investigated. It is assumed that a set of cooperative local controllers corresponding to the individual spacecraft is given which satisfies the desired objectives of the formation. It is to be noted that due to the information exchange between the local controllers, the overall control structure can be considered centralized in general. However, communication in flight formation is expensive. Thus, it is desired to have some form of decentralization in control structure, which has a lower communication requirement. This decentralized controller consists of local estimators inherently, so that each local controller estimates the state of the whole formation. Necessary and sufficient conditions for the stability of the formation under the proposed decentralized controller are obtained. It is shown that the decentralized control system, if stable, behaves almost the same as its centralized counterpart. Moreover, robustness of the decentralized controller is studied and compared to that of the corresponding centralized controller. It is finally shown that the proposed decentralized controller comprises most of the features of its centralized counterpart. The efficacy of the proposed method is demonstrated through simulations.

**Amir G. Aghdam** received the B.A.Sc. degree from Isfahan University of Technology, Isfahan, Iran and the M.A.Sc. degree from Sharif University of Technology, Tehran, Iran, both in Electrical Engineering. He received his Ph.D. degree from the University of Toronto in 2000 and is presently an associate professor at the Department of Electrical and Computer Engineering at Concordia University. Dr. Aghdam has published more than 70 refereed papers and holds two patents with the US Patent Office. He served as Chair of the IEEE Montreal Section and Chair of the Control Systems Chapter of the IEEE Montreal Section in 2005 and 2006, and is presently Chair of the IEEE Eastern Canada Area. Dr. Aghdam has received more than \$2.0M research grant since June 1, 2002 (as an individual or joint grantee) and has been a consultant for Centillum, Inc. and GlobVision, Inc. He was an associate editor of the 2007 IEEE Conference on Control Applications and is presently an associate editor of the IEEE Systems Journal and a member of the editorial advisory board of the Recent Patents on Electrical Engineering journal. Dr. Aghdam is a member of Professional Engineers of Ontario and a senior member of the IEEE.

**Admission:** Free. Registration required.

Please register by e-mail contacting: [branislav@ieee.org](mailto:branislav@ieee.org)