

Fault Diagnosis, Fault-tolerant Control, and Cooperative Control of Manned and Unmanned Aircraft Systems

Youmin Zhang

Diagnosis, Flight Control and Simulation (DFCS) Lab
Networked Autonomous Vehicles (NAV) Lab

Department of Mechanical and Industrial Engineering
& Concordia Institute of Aerospace Design and Innovation (CIADI)
& Concordia Institute for Water, Energy and Sustainable Systems (CIWESS)

Concordia University
Montreal, Quebec, H3G 1M8, Canada
Phone: +1 (514) 848-2424, ext. 5225
E-mail: Youmin.Zhang@concordia.ca

Web: <http://users.encs.concordia.ca/~ymzhang/>

Outline of the Tutorial

1. 08:30 - 09:05 Introduction to Fault-tolerant Control and Cooperative Control: Motivation, Concept, History, Existing and Future Developments (Dr. Zhang)
2. 09:05 - 09:40 Developments on Fault Diagnosis, Fault-tolerant Control and Cooperative Control with Applications to Fixed-wing and Quadrotor UAVs Testbeds (Dr. Zhang)
3. 09:40 - 10:15: Iterative Design Towards Improved Fault Tolerance: A Framework for Improved SUAS Airworthiness (Dr. Chen)
- 10:15 - 10:30 Coffee Break/Networking
4. 10:30 - 11:05 Sliding Mode Schemes for Fault Detection and Fault Tolerant Control (Dr. Edwards)
5. 11:05 - 11:40 H_{∞} Detection, Isolation and Tolerant Control: A Tutorial on Aerospace Applications (Dr. Marcos)
6. 11:40 - 12:15 Reconfigurable Flight Fault Tolerant Control for Nonlinear Unmanned Aerial Vehicle (Dr. Patton)
- 12:15 - 13:30 Lunch

Outline of the Tutorial

7. 13:30 - 14:05 Nonlinear Fault Diagnosis and Fault Tolerant Control Schemes for Aerospace Applications (Dr. Castaldi and Dr. Simani)
8. 14:05 - 14:40 Design of Fault-tolerant Control Methods Based on Reliability (Dr. Theilliol & Dr. Zhang)
9. 14:40 - 15:15 Multiple UAS Operations: Toward Verifiable Autonomy (Dr. Tsourdos)
15:15 - 15:30 Coffee Break/Networking
10. 15:30 - 16:05 Fault Diagnosis and Tolerant Control of Aerospace Systems using LPV Techniques (Dr. Puig)
11. 16:05 - 16:40 Fault Diagnosis and Fault Tolerant Control for Civil Aircraft: Industrial State-of-Practice for Flight Control Systems (Dr. Goupil)
16:40 - 17:00 Summary, Discussion, and Feedback (All)