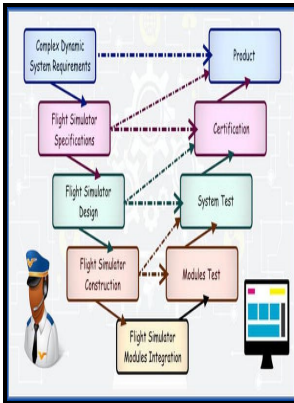# Robustness characteristics of active flight control algorithms.

## University of Salford - Active Adaptive Control Laboratory



Description: -
-Robustness characteristics of active flight control algorithms.
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**Manned and Robust Flight Control**

Though the performance and maneuverability will most likely be reduced in the case of such a failure, it is desirable for a controller to stabilize the system and allow for reduced mode operations such as a safe return, stable hover, etc. According to the characteristics of flight in conversion mode, Tracking Differentiator TD with explicit model is used to solve the problem of multiple integrals when the system is high-order system. By our design, the L $\rho$ also has the robust property that a classical L has in a LQG controller known as loop-transfer-recovery.

**Robust control**

STeVE is a collection of cots simulation tools, integrated with custom built software and hardware modules. MIT will focus on exploring technologies for flight control of highly uncertain air breathing hypersonic vehicles performing complex maneuvers using a 6-DOF simulation. Both baseline linear controllers suffer and lose stability in the middle of the simulation.

**of Robust Control Laws for Disturbance Rejection in by Johannes Verberne**

The disadvantage of a cable drive is that the cable needs to tied to the object beforehand and hence is less practical. For example, the pitch short period mode of VFA can become unstable when wing dihedral is trimmed at a high value4. The control modules in simulation can easily be cast into a real-time control system for the actual flight experiments, thus reducing development time.

**Robust control**

Consequently, our control system design and development primarily aims at providing at least the same level of safety increase as common FbW FCS i. A composite adaptive controller has also been implemented for these quadrotor UAVs. High-gain feedback is a simple example of a robust control method; with sufficiently high gain, the effect of any parameter variations will be negligible.

**Manned and Robust Flight Control**

Flight Test Scenario Analog time delay 60 ms Digital time delay 105 ms Left aileron Locked -10 degu Left inboard elevator Locked 0 deg Bottom rudder Locked 0 deg Top rudder 25% effective Left outboard elevator 50% effective All right elevators 25% effective Center of gravity shift -45% MAC Internal Algorithm Monitors for Adaptive Systems While the field of adaptive control has a long history of theoretical analysis and design methodology, the transfer to practice is still a challenge.

**Manned and Robust Flight Control**

The figure below presents a segement of the simulation to illustrate the mechanism of the adaptive controller.

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Both effects can be modeled as parametric uncertainties in the underlying plant model.

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