

RECENT TRENDS IN ADVANCED FLIGHT CONTROL

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1 INTRODUCTION

The development of future aircraft that involves the expanded flight envelop will place increased performance requirements on the design of the flight control system. Maneuvering areas are expanding into flight envelopes characterized by significantly larger levels of modeling uncertainty than encountered in present flight control designs. Conventional flight control techniques that ignore the effects of large parameter variations, modeling uncertainties and nonlinearities, will likely produce designs with poor performance and robustness.

Recent advances in modern control theories called advanced control theories, most notably the H_∞ synthesis technique, adaptive control and neural network application, offer the promise of a design technique that can produce both high-performance and robust controllers for next generation aircraft.

This special lecture will survey the recent development in advanced flight control and review the possible application of advanced control theories.

2 ACTIVE FLIGHT CONTROL TECHNOLOGY

- 2.1 Definition of Active Control Technology (ACT)
- 2.2 CCV and Key Technologies

- 2.3 High Angle of Attack Control via Thrust Vectoring (TV)
 - Post Stall Maneuver (Herbst Maneuver)

- 2.4 Self Repairing Flight Control System

3 APPLICATION OF ADVANCED CONTROL THEORIES

- 3.1 Adaptive Control
- 3.2 H_∞ and μ -Synthesis
- 3.3 Dynamic inversion
- 3.4 Eigen structure synthesis
- 3.5 Neural network

4 FUTURE TRENDS AND CONCLUSION

