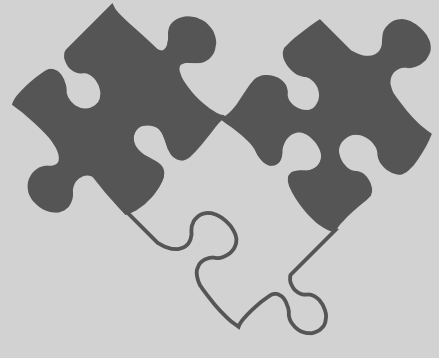
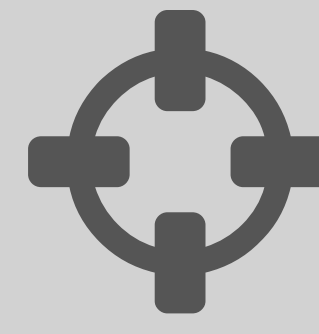
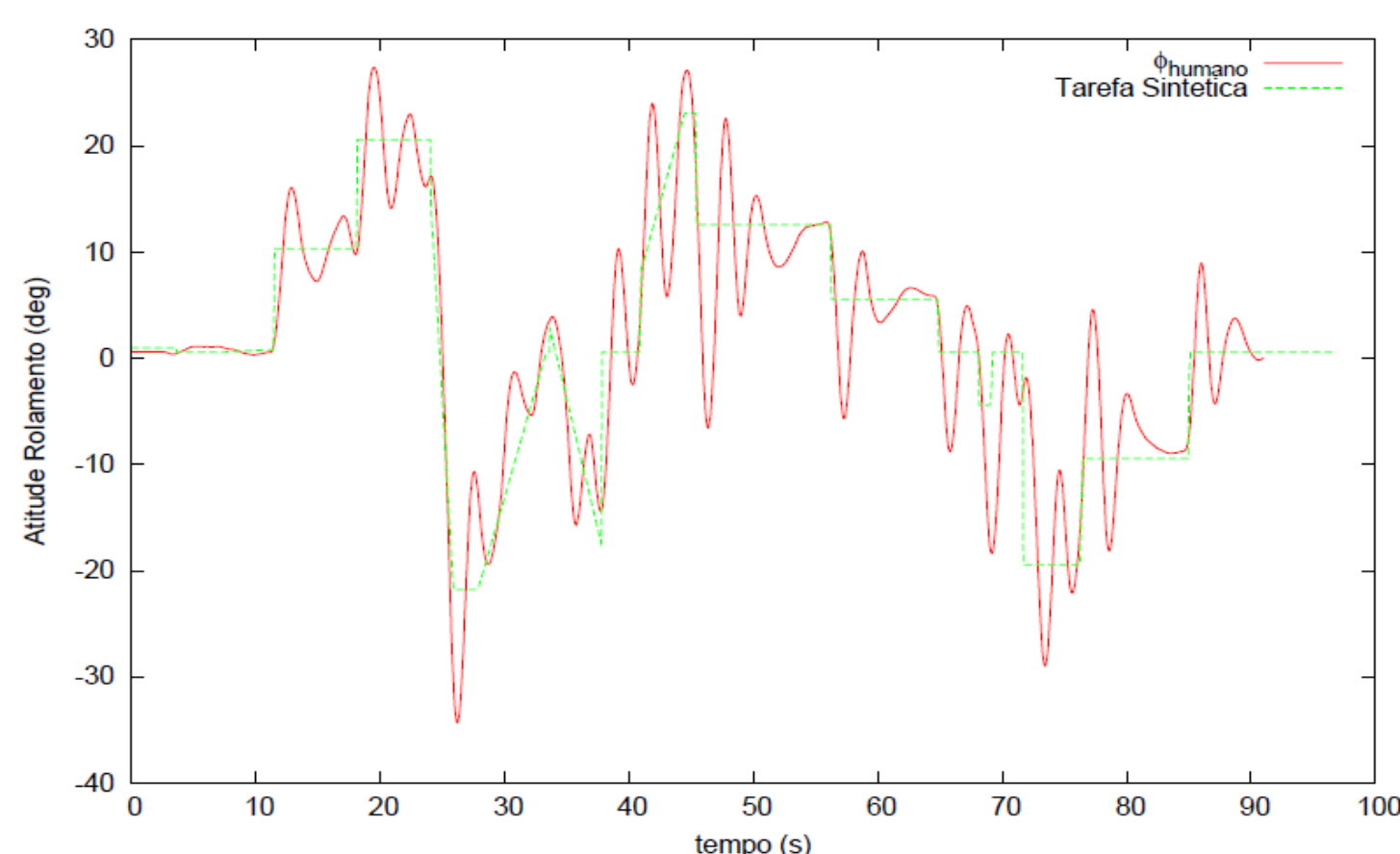


Study of PIO Susceptibility in Aircraft Automatic Control Systems

BACKGROUND



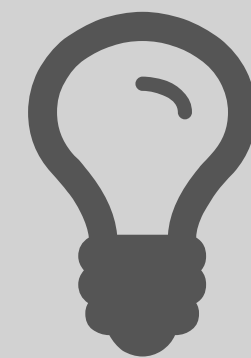
- PIO (Pilot Induced Oscillation) is a self sustained oscillation, induced by the pilot-in-the-loop, which can result in instability
- Lots of studies in conventional aircraft. Few studies for Fly-by-wire aircraft



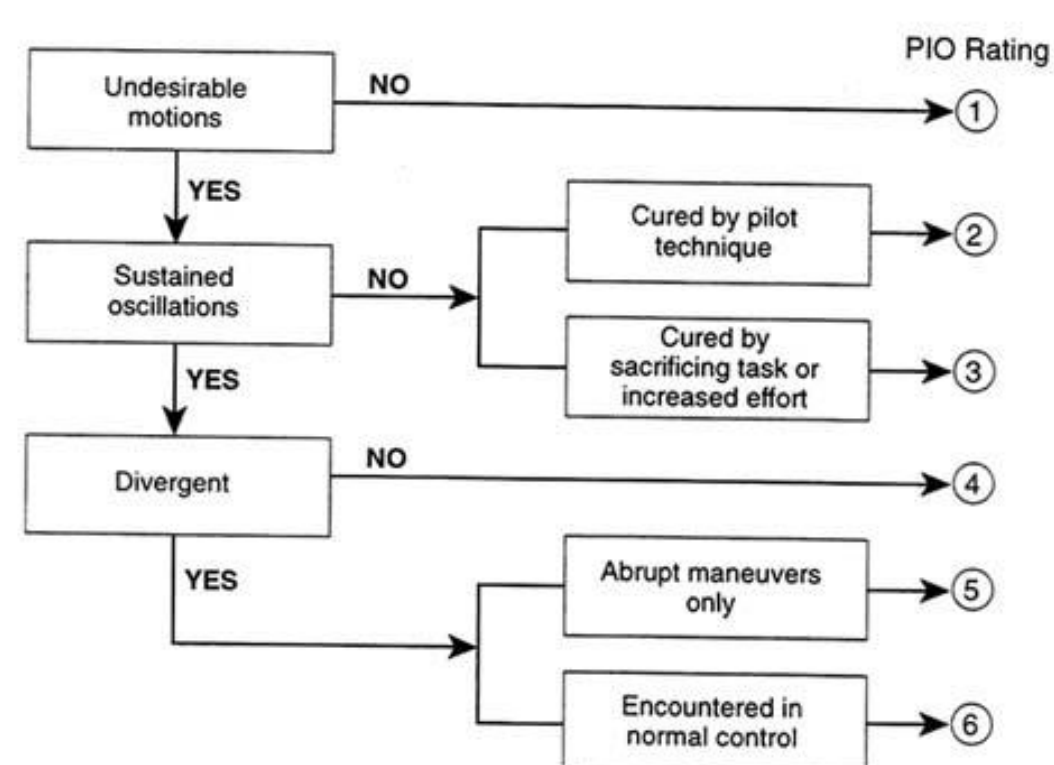
GOALS

- Main objectives:
 - To study the susceptibility of aircraft to PIO, by the variation of the Control Derivatives
- Secondary objectives:
 - Create a procedure to analyse PIO flight tests, which could give PIO coefficients and an acceptable limit for it
 - To perform PIO tests with different pilot categories (Flight Test Pilot, Airline Pilot, Private Pilot, etc.) and compare its susceptibility by category

APPROACH



PIO Rate Scale



Synthetic Task

- Use of a motion base simulator
- Development of synthetic task generator
- Test with several pilots' categories, classifying the maneuvers using PIO scale
- Statistic methods to find limits for dynamic derivatives in order to avoid PIO

Pilots

- Flight Test
- Airliners
- Private Pilots



Flight Simulator

Statistic Methods

Information

- Limit for Dynamic Derivatives
- PIO Coefficient to Rate Maneuvers (Data Based)
- Difference in response according to Pilots' categories

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