



Science Arts & Métiers (SAM)

is an open access repository that collects the work of Arts et Métiers ParisTech researchers and makes it freely available over the web where possible.

This is an author-deposited version published in: <https://sam.ensam.eu>
Handle ID: <http://hdl.handle.net/10985/9575>

To cite this version :

Mikael MARTIN, Julien GOMAND, François MALBURET, Pierre-Jean BARRE - Modelling and Control of a Complex Multi-physic System Application to Helicopter flight axis control - In: EMS 2012, 6th European Modelling Symposium on Mathematical modelling and Computer Simulation, Malta, 2012-11-14 - EMS 2012 - 2012

Any correspondence concerning this service should be sent to the repository

Administrator : archiveouverte@ensam.eu



Modelling and Control of a Complex Multi-physic System

Case of Helicopter flight axis control

Mikaël MARTIN

Arts et Metiers ParisTech ; CNRS, LSIS
e-mail: mikael.martin-7@etudiants.ensam.eu

Julien GOMAND

Arts et Metiers ParisTech ; CNRS, LSIS
e-mail: julien.gomand@ensam.eu

François MALBURET

Arts et Metiers ParisTech ; CNRS, LSIS
e-mail: francois.malburet@ensam.eu

Pierre-Jean BARRE

Arts et Metiers ParisTech ; CNRS, LSIS
e-mail: pierre-jean.barre@ensam.eu

Abstract— A helicopter flight axis control, which is a complex multi-physic system, is modelled using an energetic based graphical tool. Element of the system are mainly composed of passive technologies and their number tends to increase years after years to improve the pilots comfort by adding new functions. Thanks to the recent march in electronic fields and in order to simplify flight structures, new active systems have come out in aeronautical systems, a specific sector which requires extreme rigors and approved technology. In this paper, a simplified helicopter flight axis control is modelled with the intention of controlling the helicopter stick force feedback. Using the Energetic Macroscopic Representation the detailed methodology presented in this paper is helpful to determine an adequate control for active systems with sampled signals.

Keywords-*Energetic Macroscopic Representation; modelling; control; sampled signals; Naslin polynomial; Helicopter*