



RESEARCH MASTER INTERNSHIP

Department of Mathematics Computer and Automatic
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INTERNSHIP DESCRIPTION

Domain : ADIS : Automatic and Dynamic Systems

Title : **Kinematic modelling of gear transmission systems**

Description: This internship is linked to a HUMS (Health and Usage Monitoring System) project for helicopters and more precisely to the vibration analysis and diagnosis of the rotor primary transmission gear box. Such a gear box is composed of several stages of epicyclic trains and involves several gears and ball bearings. Signal processing tools used for vibration analysis and diagnosis require a kinematic model of the gear box, that is the set of angular periods (seen from the input shaft) for all contacts in the gear box. The objective of the internship is:

- to develop a general tool to built such a kinematic model from the joint graph-based description of any given mechanisms,
- to develop interfaces to link this tool with modelling softwares for multi-body systems or mechanisms such as SIMECHNANICS (MATLAB) or CATIA,
- to write a publication on this subject.

References: *C.A. Nelson and R. J. Cipra:* "Simplified kinematic analysis of bevel epicyclic gear trains with application to power-flow and efficiency analysis" ASME - Journal of Mechanical Design, March 2005, Vol. 127, pp 278-286.

Theoretical Research

50 % Applied Research

50 % Experimental Research

Possibility to go on a Ph.D.:

Yes

No

APPLICANT PROFILE

Duration: 5 or 6 months

Working language: French or English

Knowledge and required level:

Candidate profile: Master of Science in Mechanical engineering or equivalent

Location: ONERA/DCSD (Toulouse)

Applications should be sent by e-mail to the supervisor.