Postdoctoral position

Passive control of pendular vibrations of cable gondola lifts (télécabine)

Global objective and hypotheses

The global objective of the project is to "design" a nonlinear passive system for controlling vibration of the cabin of cable gondola lifts. The design procedure will be carried based on the small rotations assumption for the pendular movements of the cabin. The efficiency of the designed nonlinear passive controller system, will be verified experimentally and numerically on systems without any assumptions on the greatness of rotations. However, if necessary, the design will be carried out without any assumption on the greatness of the rotations. All developments of this project will be in partnership with the relevant company.

Different steps of the project

Theoretical steps

According to the connection condition between the cabin and the cable, two distinct cases will be studied:

- the connection between the cable and the cabin is fixed.
- the connection is not fixed.

When system consists of the fixed connection, both longitudinal and lateral rotations of the cabin should be studied while for the second case, movements of the base of the cabin (connection with cable) can be either considered as input or as parametric excitations (in on, two or three directions).

Experimental step

The developed techniques in previous step will prepare necessary tools for designing absorbers with smooth or nonsmooth nonlineaities. A prototype absorber will be designed and fabricated. The absorber will be mounted on a prototype cabin in the laboratory for testing.

Key Responsibilities

Main responsibilities of the researcher are to

- conduct literature searches and reviews.
- plan and carry out research in accordance with the project aims.
- generate and display the results and interpret their physical implications.
- Develop efficient reduced order modelling method for nonlinear vibration.
- investigate reduced order modelling for nonlinear vibration in the framework of time and frequency domain methods.
- study a multi-scale nonlinear behaviour of a mechanical system coupled to an absorber in order to design and optimize the nonlinear absorber of oscillations.
- design a non linear absorber and to make experiments in the laboratory.
- maintain accurate and complete records of all findings.
- liaise with industrial partners.
- present research findings to colleagues and at conferences.
- develop contacts and research collaborations within the laboratory and wider academic community in order to broaden the project aims.
- observe and comply with all University of Lyon policies and regulations, including the key policies and procedures on confidentiality, conflict of interest, data protection, equal opportunities, financial regulations, health and safety, information technology.

Job descriptions cannot be exhaustive and the post-holder may be required to undertake other duties (commensurate with the grade of the post as directed by the line manager), which are broadly in line with the above key responsibilities.

Requirements

- Ph.D. degree in mechanics (Mechanical or Aerospace or Civil engineering) in the domain of nonlinear dynamics.
- Programming skills in “Matlab®" and “Mathematica® or Maple®".
- Good level in English.
- Backgrounds on experimental testing techniques are appreciated.

Duration, net salary, starting date and work place

- Duration: between 12 to 16 month
- Net Salary: around 2400 € per month
- Starting date: January 2018
- The work place: Université de Lyon, ENTPE, Laboratoire de Tribologie et Dynamique des Systèmes (LTDS), UMR CNRS 5513, rue Maurice Audin, F-69518 Vaulx-en-Velin, France

Necessary documents

Interested candidates should provide their full curriculum vitae and a motivation letter to be sent to:

Prof. Claude-Henri Lamarque
Nonlinear Dynamics and Control of Systems Group
Université de Lyon, ENTPE
Laboratoire de Tribologie et Dynamique des Systèmes (LTDS), UMR CNRS 5513
rue Maurice Audin, F-69518 Vaulx-en-Velin, France
Email: lamarque@entpe.fr
Tel: +33 (0)4 72 04 70 75
—
Dr. Alireza Ture Savadkoohi
Nonlinear Dynamics and Control of Systems Group
Université de Lyon, ENTPE
Laboratoire de Tribologie et Dynamique des Systèmes (LTDS), UMR CNRS 5513
rue Maurice Audin, F-69518 Vaulx-en-Velin, France
Email: alireza.turesavadkoohi@entpe.fr
Tel: +33 (0)4 72 04 72 46