

Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : Given names :

Status (prof., assistant prof., ...) :

Laboratory : Website address :

Institution : Website address :

Scientific competence of the supervisor:

Dr SERRA Roger received his Master's degree in 1996 and his PhD degree in 1999 in mechanical engineering from Franche-Comte University, Besancon, France. Since 1999, he is Associate professor at INSA Centre Val de Loire at Blois, France and member of the Laboratory of Mechanics G. Lamé (LaMé). In 2016, he becomes HDR. His research interests include mechanical vibration analysis and structural dynamics, experimental modal identification, structural health and condition monitoring of mechanical structures, machining vibrations, cutting tool wear monitoring, signal processing, vibratory fatigue and dynamic mechanical characterization.

Two major publications in the field proposed for the PhD :

1.
2.

Website address of the personal page :

Supervisor's email :

Description of the research work proposed for a PhD **Topic # (see list) :**

Title :

Subject :

The aim of this work will be the damage detection of complex structures using the response evaluation of fractional damped Euler–Bernoulli vibration beam equation under dynamic loads. To achieve this goal, a non-local fractional Euler-Bernoulli beam theory will be formulated as a generalization of classical Euler-Bernoulli beam using fractional calculus described in time domain. According to the dynamic equation of Euler-Bernoulli beam, the constitutive relation of viscoelastic material and the relationship between strain and displacement, the fractional order governing equation of the beam will be established. In fact, based on the definition and properties of Bernstein polynomials and fractional differential operator, the governing equations of the beam are transformed into the product of a series of correlation matrices which can also be transformed into a system of equations by discrete variables. By solving the equations using for example the Adomian decomposition method and Taylor series or Bernstein Polynomial algorithm, the numerical solutions will be acquired. In addition, the convergence analysis will be studied. Using selected damage model, a new structural health monitoring strategy dedicated to visco-elastic structures will be defined. Numerical examples will be investigated and finally an experimental campaign will be performed to valid the approach.

Keywords :

Expected collaborations :

The objective of this project is to initiate collaborations with Chinese or international researchers working on related topic in order to develop and share the knowledge on this topic. The PhD student will be co-supervised by the Professor Yiming CHEN (Yanshan University, China). The local team will bring skills with non-european students for many years and will ensure a blooming of the PhD student with extracurricular activities like cultural and sport (golf, skiing week, ...). Blois is a little but marvelous historical city in the UNESCO Loire Valley.

Background required from the applicant :

After a top Master graduation in applied mathematics or mechanical engineering where the applicant developed excellent skills on mathematics, programming, engineering science, computational methods, finite element and/or statistical concepts, i am looking for an applicant which has a goal to excel and live up the expectations in performing the project assigned. The applicant should have a great motivation about the field of the thesis and a strong determination to push down scientific limits. The co-supervisors will help the applicant on this relevant topic.

Existence of a PDF file detailing the proposal ("yes" or "no") :

(see guidelines on the website www-csc.utt.fr)