

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:

Mr Cheng Gang received his PhD degree in 2014 in mechanical engineering from University of Franche-Comté, Besançon, France. He is Associate Professor at INSA Centre Val de Loire in France, and member of the Laboratory of Mechanics G. Lamé (LaMé). His research interests include: mechanical and rheological characterization of materials' physical properties; identification of viscoelastic and viscoplastic behavior laws; multi-physics and multi-scale modeling of the physical behavior of polymers, filled polymers and composites and numerical simulations by finite elements method of the replication processes.

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 objective of the thesis is to propose the material models with constant fractional order or variable fractional order to perform the dynamic analysis of the nonlinear structures. The existed viscoelastic or viscoplastic models based on the fractional order will be firstly studied in the literature. Several models will be selected according to the specification of the polymers and their composites. The mechanical testing, including the dynamic test and the static test, will be effectuated in order to identify the material parameter and the fractional order in the differential equations. According to the characteristics of the established model, suitable functions will be adopted to search the solutions, such as Legendre wavelet function, Haar wavelet function...

In this research work, the mathematical model for viscoelastic polymers based on the theory of fractional calculus will be established, then the material parameters will be characterized by the mechanical tests and finally the fractional order differential equations will be solved with polynomial functions. The polynomials can be used to approximate the unknown function on the specific interval, making it easier to solve variable fractional differential equations with physical background. Both the mathematical and mechanical capacities are desired in this research topic, especially in computational mathematics and dynamic mechanical testing.

Keywords :

Expected collaborations :

Background required from the applicant :

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

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