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 : KOUTA Given names :

Status (prof., assistant prof., …) : Assistant Prof. (HDR)

Laboratory :	Interdisciplinary research on Society-Technology-Environment interactions (InSyTE)	Website address : https://recherche.utt.fr/interdisciplinary-research-on-soc
Institution :	University of Technology of Troyes	Website address : https://www.utt.fr/

Scientific competence of the supervisor:

Doctor in Mechanics of Lyon Academy (1994). Since 1995, associate professor at the University of Technology of Belfort Montbéliard (France) - Since 2016, Research Director. Since 2017, Associated researcher at UTT. Expert in RAMS (reliability, maintainability, availability, safety). The research activities are in interaction between physics and reliability and of dependability for technological entities in their real conditions of uses.

Two major publications in the field proposed for the PhD :

1. R. KOUTA, Modeling of the Influence of the Mechanical Aspects (Static, Dynamic) on the Production of Electric Power of a Fuel Cell (PEMFC), CatScience-2019; December 02-04, 2019; Melbourne, Australia
2. R. KOUTA, D. PLAY, Intégration de l'entropie des sollicitations en service dans l'évaluation de l'endommagement en fatigue, Conférence internationale Fatigue Design, Senlis (France), 21-22 novembre

Website address of the personal page : https://scholar.google.com/citations?hl=fr&user=PT996u8AAAAJ

Supervisor's email : raed.kouta@utbm.fr

Description of the research work proposed for a PhD ***Topic # (see list) :*** I-1 ; VI-2

Title : Stochastic approaches and information entropy theory for modeling uncertainties and bifurcations in large multi-source datasets- applications to sociotechnical systems

Subject :

The aim of this PhD is to develop a methodological corpus for the design of complex multidisciplinary systems (and processes) in the presence of uncertainty. The systems and processes concerned will be considered according to their formulations rather than the professions they represent. Rather, the functions of the system or process will be considered. The goal is to design predictive indicators to assist in decision-making or strategic choices in an uncertain context. Particular attention will be paid to structuring an approach for defining safety and confidence margins for decisions made.
To develop the research work in this thesis, the following tasks will be carried out:
Task 1: Conduct a state-of-the-art review of uncertainty definitions in a wide range of fields.
Task 2: Classify the complexity of a multidisciplinary and multi-objective system.
Task 3: Classify methods for measuring, analyzing, modeling, and interpreting uncertainties.
Task 4: Development of hybrid approaches and methods and their performance indicators.
Task 5: Development of approaches and methods for defining confidence (or safety) margins.
Task 6: Development of several applications in sociotechnical contexts.

Keywords :

stochastic processes; probability and statistics; entropy; information theory; Differential equations; Uncertainty propagation; sociotechnical systems

Expected collaborations :

Background required from the applicant :

Strong mathematical and statistical probability skills. General knowledge of reliability in the technological field will be of interest

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

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