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 : AOUES Given names : Younes

Status (prof., assistant prof., …) : Associate Professor

Laboratory :	LMN - Laboratory of Mechanics of Normandy	Website address : https://www.insa-rouen.fr/recherche/laboratoires/lmn
Institution :	INSA Rouen Normandie	Website address : http://www.insa-rouen.fr/

Scientific competence of the supervisor:

Structural Mechanics, Finite Elements, Computational Mechanics, Exprimental tests, structural dynamic behaviour, Reliability analysis, Numerical Optimization, Reliability-based optimisation, wind turbine technology.

Two major publications in the field proposed for the PhD :

1. B. Wisner, K. Mazur, and A. Kontsos, The Use of Non-destructive Evaluation Methods in Fatigue: A Review, Fatigue and Fracture of Engineering Materials and Structures 43, no. 5 (2020): 859–878,
2. Jiezhong Huang, Sijie Yuan, Dongsheng Li and Tao Jiang, A Novel Nonlinear Output-Only Damage Detection Method Based on the Prediction Error of PCA Euclidean Distances Under Environmental and

Website address of the personal page :

Supervisor's email : younes.aoues@insa-rouen.fr

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

Title : Reliability and environmental sensitivity for vibration-base monitoring of wind-turbines under data and sensors scarcity

Subject :

The damage detection and its evolution in structural components for aging civil engineering structures like monopile foundation will be addressed. The focus will be put on identifying the proper travelling waves, fitted to specific structural patterns. Actual surrounding environmental conditions and tuning to existing structures are intended to be particularly studied. The monitoring strategies shall adapt to existing structures that were not initially designed to support embedded control components.
Numerical developments will be considered. Simulations of the damage sensitivity for typical structures will be analysed. The assessment of the structural architecture variability influence on the damage severity evaluation will be analysed. Comparisons real-test cases will be carried out on existing open-access data bases, fully accessible to worldwide researchers.
Milestones: definition of characteristic scenari to address the bottlenecks, evaluation of discontinuous data collection, evaluation of environmental and aging influence on the monitoring reliability, dedicated monitoring for distant, large scale and robust monitoring system, extraction of design parameters, exploration of the design space to define dynamic scenario and adaptative situations for vibration-based, sensors' low density, data scarcity.

Keywords :

reliability, condition-based maintenance, reliabilirty-based maintenance, structural health monitoring, lifetime improvement, damage, vibration analysis.

Expected collaborations :

French international engineering companies, LOMC (Laboratoire d'Ondes et milieux complexes)

Background required from the applicant :

Structural Mechanics, probability and statistics, applied mathematics, finite Element Method, signals processing, vibrations.

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

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