

# Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website [www-csc.utt.fr](http://www-csc.utt.fr))

Supervisor's name : KRATZ Given names : Frédéric

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

Laboratory : PRISME Website address : [www.univ-orleans.fr/prisme](http://www.univ-orleans.fr/prisme)

Institution : INSA Centre Val de Loire Website address : [www.insa-centrevaldeloire.fr](http://www.insa-centrevaldeloire.fr)

Scientific competence of the supervisor:

The team « Automatic Control » of the PRISME laboratory is specialised in RAMS, diagnosis, maintainability and state-observers theory.

Professor KRATZ is an expert on diagnosis model-based, supervision and estimation of the degradation of complex systems. The co-supervisor of the thesis, namely Associate Prof. Vincent IDASIAK, has a strong expertise in the field of model-based systems engineering.

Two major publications in the field proposed for the PhD :

1. Cressent R., David P., Idasiak V., Kratz F.: Designing the database for a reliability aware Model-Based System Engineering process, Reliability Engineering and System Safety 111 (2013), pages 171-182.
2. Zhang T., Kratz F., Hou Y., Idasiak V.: A Continuous-Discrete Finite Memory Observer Design for a Class of Nonlinear Systems: Application to Fault Diagnosis, Mathematical Problems in Engineering, vol. 2020, 2020

Website address of the personal page :

Supervisor's email : [frederic.kratz@insa-cvl.fr](mailto:frederic.kratz@insa-cvl.fr)

Description of the research work proposed for a PhD

Topic # (see list) : VI-2, I-17

Title : A hybrid approach of fault detection and identification throughout two different engineering disciplines aiming at complementary objectives: Systems Engineering and control theory.

Subject :

Fault detection and diagnosis is an important problem in process engineering. Hence, there is considerable interest in this field now from industrial practitioners as well as academic researchers, as opposed to thirty years ago. There is an abundance of literature on process fault diagnosis ranging from analytical methods to artificial intelligence and statistical approaches. In this thesis, we propose to develop a diagnostic tool for complex systems that take into account the information delivered by conventional diagnostic strategy from observers as well as also the information contained in models of systems engineering. In particular, the fault location can be improved by using the information contained in the FMCEA and dysfunctional models developed in the context of the Medisis method.

Keywords :

Security of Cyber-Physical Systems, RAMS (Reliability, Availability, Maintainability, Safety) Model Based System Engineering, Diagnosis

Expected collaborations :

French research groupe AFIS  
French research groupe GdR MACS

Background required from the applicant :

Master degree in electrical engineering, control engineering and eventually in object-oriented software engineering with background in reliability and modelization for systems engineering applications.

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

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