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European Safety and Reliability Conference

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CALL FOR ABSTRACTS

Special session on

***Prognostics and Health Management: From
Condition Monitoring to Predictive Maintenance***

Description

Nowadays, the fourth industrial revolution is making systems more intelligent and ultra-connected day by day. This requires the availability and reliability of production systems as well as the safety of the working environment. One of the levers to achieving these goals is to develop adapted methods, algorithms, and tools that monitor systems to early detect abnormal operating modes, diagnose probable causes, anticipate failures and take appropriate decisions accordingly. These tasks are conducted in the framework of Prognostics and Health Management (PHM), which allows the development of predictive maintenance strategies to improve systems health states while reducing their maintenance and operating costs.

Motivation

In the context of Industry 4.0, the important growing of intelligent and efficient ultra-connected systems poses many challenges for fault detection, diagnostic, prognostics, and maintenance functionalities. Indeed, complex system structures and behaviors need to be studied, analyzed and modeled in a thoughtful and intelligent way. The use of multiple heterogeneous sensor sources requires new powerful methods for acquisition, storage, fusion, and online computing of monitoring data. The prediction of remaining useful life time

of these complex systems requires effective methods and algorithms for handling multiple sources of uncertainties, such as processes, models, measurements and future operating conditions. The merging of digital and physical worlds leads to an increasing number of options to weigh in the optimization of the entire production and maintenance strategy. To achieve these goals with high accuracy, machine learning techniques are becoming complex and less meaningful to humans (especially decision-makers). Explainability therefore appears as a mainstream topic to address in PHM community.

Objective

This session aims to provide researchers, industrial experts and practitioners the opportunity to present and discuss recent solutions to the above-mentioned issues, as well as to share new perspectives. The topics of interest include, but are not limited to:

- Data acquisition, data processing, data fusion and related issues.
- Data-driven, model-based and hybrid fault detection, diagnostics and prognostics.
- Uncertainty quantification and remaining useful life bounds for online decision-making.
- Explainable Artificial Intelligence for Prognostics and Health Management.
- Decision support for condition-based and predictive maintenance.
- Case studies on Prognostics and Health Management.

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