Postdoctoral Position

Enhancing monitoring and diagnosis of electromagnetic devices through advanced numerical tools development for optimal sensor placement

Start	: Available immediately
Duration	: 12 months, possibly extendable to 24 months
Location	: University of Lille
Net salary	: around 2400€ (depending on situation)
Application	: Cover letter, CV, and contact information for 2-3 references
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Context and objective

There is a growing need for Electrical Rotating Machines (ERM) in various applications: energy production, automotive, marine and aerospace propulsion, machine tools, medical equipment, etc. Today, in most of these applications, their reliability, efficiency, performance, energy consumption, and operational safety have become critical issues. To tackle these issues, the world of ERM industries currently faces many challenges: from embedded intelligence inside machines to customer requirements for more customized machines, from environmental and government regulations to requirements of Industry 4.0 and other smart factory initiatives. The key to solve these issues is not only to fully consider the factors affecting the operation of ERM at the beginning of the design but also to strengthen the monitoring and analysis during the operation of the equipment and to become more innovative from design and development to the end of the product lifecycle. All these issues indicate that ERM needs to become smarter and smarter, enabling the implementation of its digital twin (DT) model. The DT is a virtual copy of the physical system that must represent as much as possible the real behavior of the machine. For most industrial organizations, this approach is becoming a way to digitize industrial assets, systems, and processes to understand better, predict, and optimize industrial performance. The advantages of the DT are not only to replicate the machine and watch its evolution but also to optimize business operations for equipment suppliers and consumers. A key enabling technology for DT implementation is low-cost, easy-to-deploy sensing methods that monitor diverse physical quantities.

This postdoctoral position is partially funded by the « Electrical Energy (EE) 4.0 » project of the Hauts-de-France State-Region Planning Contract (CPER). The recruited researcher will collaborate with the OMN team at the L2EP laboratory. The primary objective of this position is to develop advanced numerical tools for optimizing sensor placement in electrical machines. This optimization process takes into account various factors, including thermal, vibration, and magnetic conditions. The ultimate goal is to attain accurate values for specific quantities of interest, thereby enhancing conventional machine diagnosis and facilitating the development of its DT model.

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Expected profile

A Ph.D. degree is mandatory for this position. The recruited candidate should have a strong background in numerical simulation in electrical engineering or applied mathematics, with previous experience in numerical analysis, scientific computing, or statistics highly appreciated.

Etablissement de votre correspondant

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