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Uncertainty Quantification and Machine Learning in Industry: Current Practices and Challenges in Industrial Applications for Low-Carbon Electricity Production

lundi 27 novembre 2023 15:00 (25 minutes)

This talk will focus on a panel of current practices and challenges regarding both Uncertainty Quantification (UQ) and Artificial Intelligence (mainly from the Machine Learning (ML) point of view), in EDF's industrial applications, especially in the topics of risk management of industrial production assets. From our point of view, these two core topics, UQ & AI are, today, closely related to one another, especially when targeted applications are critical industrial systems (such as, e.g., nuclear reactors, dams, or wind farms). After presenting the commonly accepted methodology for UQ (and its link with ML) in numerical simulation codes, this talk will try to provide a panel of motivating applications that EDF R&D is confronted with, together with the industrial problems they arise. Then, a variety of technical and scientific challenges will be derived from these applications to introduce several research tracks we developed and pursued in the last decade. In addition to these methodological contributions, an emphasis will be put on the various open-source tools and software that have been produced as byproducts of this long-term research endeavour. Finally, a few current open questions will be discussed at the end of the talk while opening the path to future research questions and applications.

Auteur principal: CHABRIDON, Vincent (EDF R&D)

Co-auteurs: Dr AJENJO, Antoine (EDF R&D); Dr BAUDIN, Michaël (EDF R&D); Dr BOUSQUET, Nicolas (EDF R&D); M. FEKHARI, Elias (EDF R&D); Dr IOOSS, Bertrand (EDF R&D); Dr KELLER, Merlin (EDF R&D); Dr MURÉ, Joseph (EDF R&D); Dr PELAMATTI, Julien (EDF R&D); M. REMY, Emmanuel (EDF R&D); M. SUEUR, Roman (EDF R&D)

Orateur: CHABRIDON, Vincent (EDF R&D)

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