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DIGITAL TWINNING OF THERMAL AND ENERGY SYSTEMS

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PROPOSAL

A digital twin is conceived as a virtual model of a physical entity, designed to manage and optimize its physical counterpart through a continuous data exchange [1]. The advent and innovation in machine learning and deep learning techniques have propelled the evolution of digital twins towards AI-based solutions, marking a significant leap in this domain. The integration with physics represents a further step where research is intensively focusing, leading to more accurate and predictive models that can effectively blend empirical data with fundamental physical laws [2]. Applications are, for example, thus expanding into optimization and monitoring of cooling systems, or the development of control strategies for smart energy systems [3]. The aim of this mini-symposium is, therefore, to delve into the architectures, strategies, and applications of digital twins, offering a platform to discuss the cutting-edge advancements and challenges in this rapidly evolving field. The topics of the mini-symposium include, but not limited to, the following topics.

- Digital twin and twinning architectures.
- Data and physics-driven digital twins.
- Data integration and model updates.
- Real time digital twins.
- Optimization and control of fundamental and applied heat transfer and energy systems.
- Supervised, unsupervised and Interactive learning-based control strategies.
- Integration of physics and Machine Learning.

All papers submitted to this mini-symposium are invited to submit a full paper to the special issue of International Journal of Numerical Methods for Heat & Fluid Flow by following the link: https://www.emeraldgrouppublishing.com/calls-for-papers/digital-twinning-thermal-and-energy-systems.

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