

Modern Model-Driven and Data-Driven Computational Approaches in Fluid Mechanics

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ABSTRACT

The need for efficient computational tools in real-life problems triggered different novel approaches based on both model-driven and data-driven paradigms. This is particularly true for complex problems in fluid mechanics. Thanks to data availability from experiments, machine learning techniques can now be used to extract knowledge on the underlying fluid mechanics and to solve optimization and control problems [1] rapidly. On the other hand, model reduction applied to traditional methods of computational mechanics led to the introduction of new model-driven tools that can efficiently solve complex engineering problems [2,3]. In this minisymposium, we aim to gather researchers and experts working in the field of computational fluid mechanics using the different paradigms to promote an insightful discussion on their pros and cons and the opportunity of coupling them for complex problems like turbulence modeling [4]. Talks covering either theoretical aspects or applications (with particular attention to energy and biomedical engineering) are welcome at this event. Organized with the support of NSF Collaborative Grants DMS-2012253, DMS-2012255, and DMS-2012286.

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