

RECENT ADVANCES IN NUMERICAL METHODS FOR COMPLEX CFD SIMULATIONS

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ABSTRACT

In scientific and engineering simulation frameworks, the need of enhanced accuracy, computational efficiency, and numerical robustness remains mandatory. This mini-symposium aims to investigate recent developments in numerical methods and algorithms, specifically designed for Computational Fluid Dynamics (CFD) problems across several application fields.

The symposium emphasizes several crucial aspects, covering advanced discretization techniques, reduced order models, and the integration of machine learning for data-driven simulations. These advancements provide a reliable contribution to improve significantly the efficiency and accuracy of the methodologies across different sectors (aerospace, automotive, energy), as well as biomedical and environmental engineering applications.

More specifically, this mini-symposium will allow researchers to exchange insights and new ideas on novel approaches going beyond traditional methods. In this framework, novel contributions in finite element, finite volume, finite difference, spectral, meshless, and non-matching methods demonstrating their efficacy in capturing complex flow phenomena are welcome.

Moreover, the combination of reduced order models (ROMs) with the aforementioned techniques constitutes another key aspect of this symposium. The discussions will encompass intrusive/non-intrusive and linear/non-linear approaches, as well as data-driven techniques powered by scientific machine learning tools and algorithms used by the scientific community for addressing complex fluid mechanics problems coming from real-world applications.