

**CUTTING-EDGE MODEL ORDER REDUCTION TECHNIQUES FOR COMPUTATIONAL FLUID  
DYNAMICS**

**TRACK NUMBER (800)**

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**ABSTRACT**

Lately, model order reduction (MOR) techniques have emerged as an effective and helpful tool to alleviate the computational costs related to complex simulations in computational fluid dynamics (CFD). This field features an increasing need for low-dimensional models capable of providing fast and accurate real-time responses to better analyze flow problems and to accelerate time-consuming related studies such as parameter estimation, uncertainty quantification, and control.

Applying MOR techniques to CFD problems might be challenging. Differently from other branches, classical reduction techniques show several complications in this field, among which slow Kolmogorov  $n$ -width decay, instabilities, failure in extrapolatory regimes, etc. That is why it is of paramount importance to carefully design reduced order models (ROM) that are able to stably, accurately and efficiently approximate CFD simulations.

The mini-symposium aims at providing novel insights on MOR in the context of CFD, moving from the state-of-the-art to the latest advances in the field, opening a fruitful discussion on its challenges and future directions.

The main objectives of the mini-symposium are:

- Exchange ideas on developing and implementing novel MOR-based strategies, highlighting their advantages and limitations in diverse CFD applications.
- Showcase innovative approaches and robust techniques to exploit in advanced decision-making frameworks such as data parametric uncertainties and control.
- Discuss the effectivity of MOR strategies in complex CFD settings such as turbulent flows, multiphysics simulations, and coupled systems.