

Towards Enhanced Reliability in CFD Predictions

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With the growing application of CFD and multi-physics simulations in industrial analysis and design, the question of the level of reliability of the predictions becomes critical when making design decisions based on simulations, as we have to ensure that the designed system will respond to the objectives, when put in operation in “real-life” environments.

There are indeed many potential sources of errors and uncertainties, as advanced CFD tools suffer from grid dependence; limited validity of turbulence models, particularly for separated flows; limited accuracy of multiphase, combustion, a.o. models.

Dedicated methodologies have to be applied to address these issues, by developing tools for highly efficient CFD predictions; best practices for families of applications; uncertainty quantification to handle geometrical and operational uncertain conditions; robust optimization taking into account uncertainties.

The lecture will cover some of the most relevant topics.