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Uncertainty Quantification in Complex Flows for Aeronautical & Mechanical Engineering Applications[1] FRANCISCO-JAVIER GRANADOS-ORTIZ, JOAQUIN ORTEGA-CASANOVA, University of Málaga — The classic trend in industrial activities involving fluid mechanics was to perform a decent amount of experimental tests even for prototyping, with few computational works involved. However, nowadays the situation is reversed, and Computational Fluid Dynamics (CFD) are an undeniable essential tool for designs in industry and academia. Whilst experimentalists normally provide uncertainty estimates, the vast majority of computational analysts omit any measure of uncertainty when providing results. To neglect the impact of uncertainty can be misleading and, under certain circumstances, a wrong approach. The effect of uncertainty can be actually exacerbated when several sources of inaccuracy (aleatoric and epistemic) are jointly analysed. This presentation intends to show and demonstrate the importance of uncertainty in CFD simulations of complex flows. Since a classical Monte-Carlo approach directly on the CFD simulations is usually unaffordable, other lower-cost options are applied to these problems. As relevant conclusion, it will be shown that despite a type of uncertainty may be influential for a certain region of the flow, another area may be insensitive. Additionally, the importance of amalgamating both aleatoric and epistemic uncertainty will be outlined.

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