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VERIFICATION AND VALIDATION IN COMPUTATIONAL FLUID DYNAMICS AND MECHANICS

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ABSTRACT

The progress observed in computer technology over the past decades has enabled the representation of physical processes by computational methods in fluid dynamics and mechanics engineering applications. Their ability to give detailed insight on the problem physics at a faster and cheaper turnaround time make computational methods an attractive complement to traditional experimental measurements. However, despite being distinct areas of mechanical engineering, the use of computational techniques in these fields faces similar challenges: the mathematical model should have an adequate accuracy to the intended application, and the numerical errors resultant from the use of numerical techniques to resolve the model governing equations should be minimized to acceptable levels. Consequently, and independently of employing a finite element bending model or Large-Eddy Simulation, any numerical simulation requires the evaluation of numerical and modeling errors through Verification and Validation exercises [1].

The proposed mini-symposium intends to address the modeling accuracy of mathematical models used to simulate canonical and engineering problems. Naturally, this type of exercise requires the assessment of numerical errors. Therefore, the participants are invited to carry out Verification and Validation exercises to evaluate numerical and modeling errors with the available tools in the literature. Those interested, should contact the session correspondent organizer to receive the latest ASME procedures to assess numerical uncertainties [2-3], and modeling errors based on single and multiple points [4].

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