Abstract Submitted
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Uncertainty Quantification and Validation for RANS Turbulence Models TODD OLIVER, ROBERT MOSER, The University of Texas at Austin — Uncertainty quantification and validation procedures for RANS turbulence models are developed and applied. The procedures used here rely on a Bayesian view of probability. In particular, the uncertainty quantification methodology requires stochastic model development, model calibration, and model comparison, all of which are pursued using tools from Bayesian statistics. Model validation is also pursued in a probabilistic framework. The ideas and processes are demonstrated on a channel flow example. Specifically, a set of RANS models—including Baldwin-Lomax, Spalart-Allmaras, k-ϵ, k-ω, and $\overline{v^2}$-f—and uncertainty representations are analyzed using DNS data for fully-developed channel flow. Predictions of various quantities of interest and the validity (or invalidity) of the various models for making those predictions will be examined. This work is supported by the Department of Energy [National Nuclear Security Administration] under Award Number [DE-FC52-08NA28615].

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