Abstract Submitted
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LES of Swirling Reacting Flows via the Unstructured scalar-FDF Solver NASEEM ANSARI, University of Pittsburgh, ANSYS Inc., PATRICK PISCIUNERI, University of Pittsburgh, PETER STRAKEY, National Energy Technology Laboratory, PEYMAN GIVI, University of Pittsburgh — Swirling flames pose a significant challenge for computational modeling due to the presence of recirculation regions and vortex shedding. In this work, results are presented of LES of two swirl stabilized non-premixed flames (SM1 and SM2) [1] via the FDF methodology. These flames are part of the database for validation of turbulent-combustion models [1]. The scalar-FDF is simulated on a domain discretized by unstructured meshes, and is coupled with a finite volume flow solver. In the SM1 flame (with a low swirl number) chemistry is described by the flamelet model based on the full GRI 2.11 mechanism. The SM2 flame (with a high swirl number) is simulated via a 46-step 17-species mechanism. The simulated results are assessed via comparison with experimental data.

[1] Sandia National Laboratories, TNF Workshop Website, Bluff-Body Flames, www.ca.sandia.gov/TNF/bluffbod.html, 2011.

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