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Modeling and Simulation of a H2/O2 Diffusion Flame under Cryogenic Condition using a Consistent Flamelet Formulation YU LV, ZHENG QIAO, Department of Aerospace Engineering,Mississippi State University — Modeling of combustion phenomena under supercritical/transcritical conditions has recently gained growing attentions with the increasing applications of high-pressure combustion and energy devices. Under such thermodynamic conditions combustion dynamics and flame characteristics are strongly impacted by the peculiar thermo-diffusive transport properties and the nonlinear equation-of-state relation. In this study, we first illustrate the those affects through a flamelet study in which the comprehensive and consistent flamelet model is compared against the commonly used flamelet model formulation. Then the consistent flamelet model is employed to the LES of a GH2/LOx cryogenic flame based upon a newly developed computational framework. The simulation results will be extensively discussed and compared qualitatively with the experimental measurements by Candel et al. (2006).

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