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Multiscalar Subfilter PDF Modeling for Large Eddy Simulation of Turbulent Piloted Flames with Inhomogeneous Inlets BRUCE A. PERRY, MICHAEL E. MUELLER, Princeton Univ — Reduced-order manifold approaches for Large Eddy Simulation (LES) of turbulent combustion are usually combined with presumed subfilter Probability Density Function (PDF) models to close filtered quantities dependent on the thermochemical state. To further reduce computational cost, convolution of the manifold with the presumed PDF is conducted *a priori*. This work addresses two challenges associated with increasing the dimensionality of reduced-order manifolds to incorporate multiple mixture fractions for systems with multiple or inhomogeneous inlets. First, many models for the required multiscalar PDF have been proposed (Dirichlet, Conner-Mosimann, and five-parameter bivariate beta distributions), but the impact of these models has not been assessed in *a posteriori* LES. Second, *a priori* convolution of these presumed PDF models with the reduced-order manifolds becomes intractable. In this work, an *a posteriori* analysis comparing results using various presumed PDF models in LES is conducted for a turbulent piloted jet flame with inhomogeneous inlets to assess the sensitivity to the subfilter PDF model form, leveraging a new 'on-the-fly' strategy for convolution of the presumed PDF with the manifold.

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