

Abstract Submitted
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Linear stability analysis of planar reacting shear layers YEE CHEE SEE, University of Michigan, MATTHIAS IHME — Non-premixed flames are controlled by the mixing of fuel and oxidizer. These flames are susceptible to instabilities, which arise from hydrodynamic and heat-release instability mechanisms. To characterize these instability modes and their effects on the flame evolution and mixing, a spatial linear instability analysis is performed. In this formulation, a flamelet-formulation is utilized, in order to account for effects of detailed reaction chemistry and variations in thermo-viscous properties. The resulting set of governing equations is solved by employing a matrix method with spectral discretization. By applying this analysis to a methane/air flame in a planar shear layer, effects of molecular transport and reaction chemistry on the flame stability are investigated, and model results are compared detailed computational simulations.

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