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Numerical solution of an edge flame boundary value problem<sup>1</sup> BENJAMIN SHIELDS, JONATHAN FREUND, CARLOS PANTANO, University of Illinois at Urbana-Champaign — We study edge flames for modeling extinction, reignition, and flame lifting in turbulent non-premixed combustion. An adaptive resolution finite element method is developed for solving a strained laminar edge flame in the intrinsic moving frame of reference of a spatially evolving shear layer. The variable-density zero Mach Navier-Stokes equations are used to solve for both advancing and retreating edge flames. The eigenvalues of the system are determined simultaneously (implicitly) with the scalar fields using a Schur complement strategy. A homotopy transformation over density is used to transition from constant- to variable-density, and pseudo arc-length continuation is used for parametric tracing of solutions. Full details of the edge flames as a function of strain and Lewis numbers will be discussed.

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