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Slow Growth Formulation for DNS of Chemically Reacting Temporal Boundary Layers with Forcing VICTOR TOPALIAN, TODD OLIVER, ROBERT MOSER, University of Texas at Austin — Extensions to a previously developed formulation for DNS of temporally evolving boundary layers are presented. The original formulation, which allows characterization of turbulence in a temporal boundary layer at a chosen stage of the development, uses a multiscale approach where the fast evolution of the turbulent fluctuations is simulated directly while the slow evolution of averaged quantities is modeled. Specifically, the source terms from slow evolution are modeled assuming self-similarity in the evolution of mean and RMS quantities. Here, the formulation is extended to enable DNS of chemically reacting boundary layers with forcing. These extensions are used to obtain DNS data for conditions similar to those observed in the boundary layer during athmospheric reentry of the NASA CEV. Data from this simulation will be used to inform turbulence model calibration and UQ. This work is supported by the Department of Energy [National Nuclear Security Administration] under Award Number [DE-FC52-08NA28615].

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