Slow Growth Formulation for DNS of Temporally Evolving Boundary Layers VICTOR TOPALIAN, ONKAR SAHNI[1], TODD OLIVER, ROBERT MOSER, University of Texas at Austin — A formulation for DNS of temporally evolving boundary layers is developed and demonstrated. The formulation relies on a multiscale approach to account separately for the slow time evolution of statistical averages, and the fast time evolution of turbulent fluctuations. The source terms that arise from the multiscale analysis are modeled assuming a self-similar evolution of the averages. The performance of the formulation is evaluated using DNS of spatially evolving compressible boundary layers. This formulation was developed to provide data for the calibration of turbulence model parameters and enable the quantification of uncertainty due to the models. The extension of this formulation to homogenize spatially evolving boundary layers will also be discussed. This work is supported by the Department of Energy [National Nuclear Security Administration] under Award Number [DE-FC52-08NA28615].

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