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VSFMDF for LES of Sandia's turbulent piloted jet flame S. MEHDI B. NIK, M. REZA H. SHEIKHI, PEYMAN GIVI, University of Pittsburgh, STEPHEN B. POPE, Cornell University — The “joint velocity-scalar filtered mass density function” (VSFMDf) [1] methodology is employed for large eddy simulation of Sandia Flame D [2]. This is a turbulent piloted nonpremixed methane jet flame. In VSFMDf, the effects of the subgrid scale chemical reaction and convection appear in closed forms. The unclosed terms in the VSFMDf transport equation are modeled in a fashion similar to PDF methods. The modeled VSFMDf is obtained by solving its transport equation by a hybrid finite-difference/Monte Carlo scheme. For this flame (which exhibits little local extinction), a simple flamelet model is employed to relate the instantaneous composition to mixture fraction. The results are compared with experimental data. It is shown that the method captures important features of this flame as observed experimentally.

[1] Phys. Fluids (2007), in press.

[2] <http://www.ca.sandia.gov/tnf>.

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