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FDF Simulation of the PRECCINSTA Burner NASEEM ANSARI, University of Pittsburgh, ANSYS Inc., GRAHAM M. GOLDIN, ANSYS Inc., PETER A. STRAKEY, National Energy Technology Laboratory, PEYMAN GIVI, University of Pittsburgh — Since its original development over a decade ago, the filtered density function (FDF) has experienced widespread application for LES of a variety of turbulent reacting flows. The present work demonstrates that the FDF can now be considered for LES of complex flames in complex combustors. This is done by implementation of the scalar FDF on a domain portrayed by an unstructured grid. The modeled transport equation for the FDF is solved by a Lagrangian Monte Carlo method, coupled with the finite-volume solution of the transport flow variables. The resulting hybrid solver is employed for LES of the PRECCINSTA burner from DLR. The predictive capability of the FDF is assessed by comparison of the Reynolds-averaged statistics of the thermo-chemical variables with measured data. In general, the agreements are very good. This warrants future applications of the methodology for LES of practical combustors.

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