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Filtered chemical source term modeling for LES of high Karlovitz number premixed flames SIMON LAPOINTE, GUILLAUME BLANQUART, Caltech — Tabulated chemistry with the transport of a single progress variable is a popular technique for large eddy simulations of premixed turbulent flames. Since the reaction zone thickness is usually smaller than the LES grid size, modeling of the filtered progress variable reaction rate is required. Most models assume that the filtered progress variable reaction rate is a function of the filtered progress variable and its variance where the dependence can be obtained through the probability density function (PDF) of the progress variable. Among the most common approaches, the PDF can be presumed (usually as a β -PDF) or computed using spatially filtered one dimensional laminar flames (FLF). Models for the filtered source term are studied *a priori* using results from DNS of turbulent *n*-heptane/air premixed flames at varying Karlovitz numbers. Predictions from the optimal estimator and models based on laminar flames using a β -PDF or a FLF-PDF are compared to the exact filtered source term. For all filter widths and Karlovitz numbers, the optimal estimator yields small errors while β -PDF and FLF-PDF approaches present larger errors. Sources of differences are discussed.

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