88e An *a Priori* Analysis of Mixture-Fraction Based Models in Isotropic Turbulence

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Results of direct numerical simulations of isotropic turbulence have been analyzed for the testing of higher-order conditional-moment closure models for reactions undergoing extinction and reignition. The data considered were generated by Sripakagorn, Kosaly and Riley and are described in (Comb. and Flame 136 (2004), 351-363.) The DNS also included the transport of a passive scalar and a reaction progress variable for a reversible reaction at three different Damkohler numbers. The *a priori* analysis investigated the validity of multi-environment conditional-pdf models as described by Fox and Raman (Phys. of Fluids 16 (2004), 4551-4565.) A more rigorous method was applied for the determination of environment weights and abscissas and also the mixing time scales. The data indicated that the weights were neither constant in mixture faction nor in time as was previously assumed. The dependence of these variables on Damkohler number has been explored. It has been known that modeling of the higher order conditional moments requires an accurate description of conditional expectation of the reaction progress variable dissipation (Klimenko and Bilger, Prog. in Energy and Comb. Sci. 25 (1999), 595-687). The data of this study show that an accurate description of such a variable requires consideration of the fluctuations in reaction progress variable space of the doubly-conditioned dissipation. This analysis has also suggested a direction for the development of better molecular-mixing models for the higher order conditional moment closure and multi-environment conditional pdf methods which direction will also be presented.