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Analysis of higher-order conditional moment closures for combustion with extinction and reignition SEAN SMITH, RODNEY FOX, Iowa State University, VENKAT RAMAN, Stanford University — In order to further understand and improve higher-order conditional moment closures (CMC) for combustion with extinction and reignition, *a priori* and *a posteriori* analyses of reacting isotropic turbulence have been completed. The analyses use data from the direct numerical simulations (DNS) of Sripakagorn et al. (Comb. Flame 136, 351, 2004), and include the transport of a passive scalar and a reaction-progress variable for a reversible reaction at three Damkohler numbers. The DNS data are used to investigate the validity and accuracy of the multi-environment conditional probability density function (MECPDF) model (Fox and Raman, Phys. Fluids 16, 4551, 2004) as compared to that of a second-order CMC model (Klimenko and Bilger, Prog. Energy Comb. Sci. 25. 595, 1999). The study also investigated constraints for any CMC model that accounts for third or higher conditional moments. The results indicate that the mixture-fraction and the mixed conditional dissipation rates can be closed accurately with an extension to the model proposed by Kilmenko and Bilger, even at lower Damkohler numbers and for higher-order conditional moments.

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