Abstract Submitted
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Numerical simulation of autoigniting flames RAJAPANDIYAN ASAITHAMBI, KRISHNAN MAHESH, University of Minnesota — Autoignition is highly sensitive to temperature and mixing. A density based method for DNS/LES of compressible chemically reacting flows is proposed with an explicit predictor step for advection and diffusion terms, and a semi-implicit corrector step for stiff chemical source terms. This segregated approach permits independent modification of the Navier-Stokes solver and the time integration algorithm for the chemical source term. The algorithm solves the total chemical and sensible energy equation and heat capacities of species are obtained from thermodynamic tables. Chemical mechanisms in the Chemkin format is parsed and source terms are automatically linearized allowing the ability to simulate multiple fuels with minimal effort. Validation of the algorithm is presented and results from autoigniting non-premixed flames in vitiated coflow with different fuels are discussed.

Rajapandiyan Asaithambi
University of Minnesota

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