Abstract Submitted
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Effective Use of Storage/Retrieval-Based Chemistry Acceleration in CFD[1] YUHUI WU, DANIEL HAWORTH, The Pennsylvania State University — *In situ* adaptive tabulation (ISAT) [S.B. Pope *Combust. Theory Modell.* 1:41-63, 1997] has proven to be an efficient strategy for incorporating multiple-step chemical kinetics into CFD-based combustion modeling. Most ISAT applications reported in the literature have been for probability density function (PDF)-based simulations of statistically stationary flames, and have been limited to relatively small chemical mechanisms (fewer than 20 independent composition variables). Effective use of ISAT requires judicious specification of several control parameters, including error tolerances and scale factors. Here an ISAT- based algorithm [I. Veljkovic, P. Plassmann and D. Haworth, in *Computational Science and Its Applications ICCSA 2003, Lecture Notes in Computer Science (LNCS 2667)*, Part I, pp. 643-653, Springer Verlag, 2003] is applied to statistically stationary (nonpremixed jet flames) and non-stationary (direct-injection IC engines) combustion systems, using chemical mechanisms that range from fewer than 20 to more than 100 chemical species, with PDF-based and non-PDF-based modeling approaches. Modifications to the original ISAT algorithm are proposed to enhance its effectiveness in nonstationary systems and for larger chemical mechanisms, and recommendations for control-parameter specification are offered for different situations.

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