Abstract Submitted
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Numerical study of a jet-in-hot-coflow burner with hydrogen-addition using the Flamelet Generated Manifolds technique[1] SEYED EBRAHIM ABTAHIZADEH, JEROEN VAN OIJEN, PHILIP DE GOEY, Eindhoven University of Technology — Recently Mild combustion is subjected to intensive research because of its unique ability to provide high efficiency and low pollutant combustion simultaneously in industrial heating processes. In most practical Mild combustion applications, a fuel jet is ignited due to recirculation of hot burned gases. The impact of burned gases on autoignition and flame stabilization has been studied in a laboratory jet-in-hot-coflow (JHC) burner. Results of this study help us to understand recent experimental observations of the Delft group (DJHC burner) in which Dutch Natural Gas (DNG) is mixed with various amounts of H_2. The main focus is on the modeling of autoignition in the DJHC burner by using the Flamelet Generated Manifolds (FGM) technique. In this technique, kinetic information is tabulated with a few controlling variables which results in a significant decrease in simulation time. The FGM tabulation has been performed using igniting laminar counterflow diffusion flames. Since H_2 is present in the fuel composition, it is essential to include preferential diffusion effects in the table due to the high diffusivity of H_2. Based on results, the FGM table is capable to reproduce the autoignition of hydrogen containing fuel predicted by detailed chemistry in 1D counterflow flames.

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