COMPUTATIONAL STUDY OF A SWIRL STABILIZED FLAME IN A GAS TURBINE COMBUSTOR

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Abstract

Size of recirculation zone and temperature field is examined in a swirl stabilized aero gas turbine combustor using computational fluid dynamics. A sector of 22.5° of an annular combustor is modeled for the study. Unstructured tetrahedral meshes comprising 1.2x10^6 elements are employed in the model where the governing equations are solved using CFD flow solver CFX. Grid sensitivity study and code validation through limited test data has also been carried out. The effect of pressure and fuel-air ratio on the size of recirculation zone and apparent size of flame zone has been studied at steady state conditions. The heat release rate due to combustion is found to affect the length of recirculation zone as well as the velocity field inside the combustion liner.

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