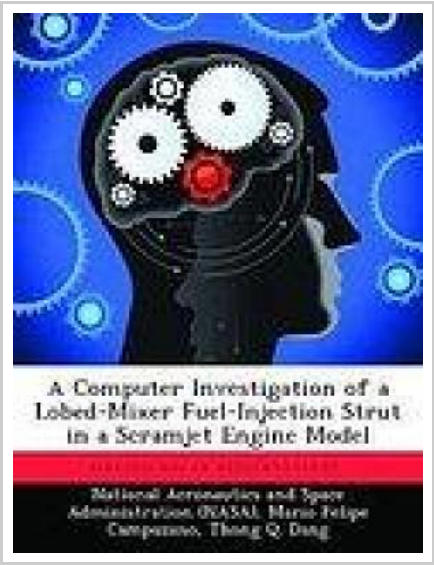

A Computer Investigation of a Lobed-Mixer Fuel-Injection Strut in a Scramjet Engine Model

By National Aeronautics and Space Administration (NASA)

Bibliioscholar Mrz 2013, 2013. Taschenbuch. Book Condition: Neu. 246x189x6 mm. This item is printed on demand - Print on Demand Neuware - A method of enhancing fuel/air mixing using streamwise vorticity for scramjet applications is presented. The generation of large-scale streamwise vortices is achieved by the incorporation of a lobed-mixer device into the fuel-injection struts of a proposed NASA scramjet engine. Conceptually, the lobed-mixer strut design is a three-dimensional lifting surface with a sinusoidal spanwise lift distribution. In the flow passage between the strut leading- and trailing-edges, the presence of a spanwise pressure gradient generates secondary flows. In the region behind the strut, which is a lifting surface, the shed vorticity system consists of periodic large-scale counter-rotating streamwise vortices. To evaluate this hypermixer concept, CFD calculations were carried out at supersonic combustor inlet Mach numbers ranging from 2 to 3 for cold flows. This concept is first analyzed for a 3D cascade of struts in inviscid flows. Results from this preliminary work reveal that significant secondary flows are generated in and behind the strut regions, while the additional shock losses associated with the lobed strut is small. Results confirm that the mechanism of generating streamwise vorticity is an inviscid phenomenon;...

Reviews

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