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Influence of micro jets on the flow development in the enlarged duct at supersonic Mach number   (Article)

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Abstract   ⌄ View references (63)

In this paper, Computational fluid dynamics method is used to simulate the supersonic flow. Convergent-divergent (C-D) nozzle have been used with sudden expansion. The base pressure controlled by using the microjets of 1 mm of orifice diameter is arranged at ninety degrees at PCD 13 mm. The Mach number is 1.87, and the area ratio of 3.24 was considered for the present study. The L/D of the duct was used 10, and the nozzle pressure ratio (NPR) considered for simulation was from 3, 5, 7, 9 and 11. The two-dimensional planar model has been used using ANSYS commercial software. The total wall pressure distribution and Mach number variation from the inlet to the outlet was observed. From the results, it is found that the microjets are capable of controlling the base pressure, the loss of pressure and decreases in the drag. In the present study, the C-D nozzle designed and modeled: K-ε standard wall function turbulence model has been used and validated with the commercial computational fluid dynamics (CFD). © 2019, IJENS.

SciVal Topic Prominence ⓘ

Topic: Pressure | Nozzles | micro jets

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Author keywords

(C-D nozzle) (CFD) (Flow control) (Microjets) (NPR) (Wall pressure)

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