

ROLE OF VISCOSITY IN HYPERSONIC INTAKE STARTING PHENOMENON

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Abstract

Starting and unstarting characteristics of a hypersonic air intake is studied through inviscid and viscous simulations. Comparison of simulated center body Mach number obtained from Euler simulations for different free stream Mach numbers show a much crisper solution for the present computation as compared to other simulations reported in the literature. For Euler simulation, hysteresis effect of intake pressure recovery and mass capture ratio were observed. The hysteresis of pressure recovery clearly showed distinct point of starting / unstarting of the intake. The same hysteresis effect could not be observed for viscous simulation. Well resolved viscous simulations are required for estimation of hypersonic intake characteristics.