
Effect of the injected jet pressure ratio on rocket engine power characteristics

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We studied how the pressure ratio of a jet being injected into the supercritical portion of a rocket engine nozzle affects rocket engine performance and power characteristics. We solved two test problems in order to verify the computation technique. We analysed the potential of using a modelling software package to calculate how jets interact with a supersonic flow. We used a modern hydrocode to model a supersonic jet being injected into the supercritical nozzle portion. We obtained results of a series of numerical computations for various pressure ratios of the jet being injected, which allowed us to determine the lateral control force as a function of the pressure ratio of the jet injected. The numerical gas dynamics experiment technology presented may be useful for designing rocket control and stabilisation systems.

Keywords: injection thrust vectoring, asymmetrical injection, jet interaction, supersonic flows, gas-dynamics flight controls

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