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Numerical simulation of injector diameter variations on thrust vector control by secondary injection

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Abstract

This paper presents a numerical study by using fluent software aimed at understanding the effects of the injector diameters variations for thrust vector control of a rocket engine by secondary injection. In the situations that aerodynamic forces are negligible (like flight at high altitude), engine thrust vector control is an appropriate method for control and navigation of a rocket. Thrust vector control systems include mechanical and fluidic methods. Fluidic systems don't need mechanical actuators and so they response quickly. In this work, three-dimensional simulations of the Nozzle flow fields are implemented. The Navier-Stokes equations with k-ω turbulence model were solved. Then, the effects of the injector diameters variations in the nozzle were evaluated. Numerical results compare with experimental results to validate the solution.

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