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Thrust Vectoring Control of Supersonic Flow through an Orifice Injector

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Abstract : Traditional mechanical control systems in thrust vectoring are efficient in rocket thrust guidance but their costs and their weights are excessive. The fluidic injection in the nozzle divergent constitutes an alternative procedure to achieve the goal. In this paper, we present a 3D analytical model for fluidic injection in a supersonic nozzle integrating an orifice. The fluidic vectoring uses a sonic secondary injection in the divergent. As a result, the flow and interaction between the main and secondary jet has built in order to express the pressure fields from which the forces and thrust vectoring are deduced. Under various separation criteria, the present analytical model results are compared with the existing numerical and experimental data from the literature.

Keywords : flow separation, fluidic thrust vectoring, nozzle, secondary jet, shock wave
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