

NOZZLE OPTIMIZATION OF DUAL THRUST ROCKET MOTORS

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ABSTRACT:

Optimizing the nozzle of a solid propellant rocket motor plays an essential role in the overall performance of the motor. In this paper, the investigation of an optimization model of dual thrust propellant rocket motors will be presented. Due to having two phases of thrust in this type of rocket motors, determination of the rocket nozzle expansion ratio is a non-trivial problem. The idea is to use a simple, fixed length and expansion ratio, convergent-divergent nozzle, which provides the highest total impulse of the motor. Usual assumptions for an ideal rocket motor have been used. The optimization model was developed in MATLAB and calculations has been performed using previously obtained interior ballistic and other relevant data for a dual thrust solid propellant rocket motor.

Keywords: *optimization, convergent-divergent nozzle, rocket propulsion, dual thrust*
