

Effects of Substantial Mass Loss on the Attitude Motions of a Rocket-Type Variable Mass System

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Abstract: This study uses a relatively complex model to analyze the influence of various system parameters on the attitude behavior of a rocket-type variable mass system moving in a torque-free environment. Some of the parameters studied include the system's size, the nozzle expansion ratio, and the location of the propellant within the system's casing. Results obtained indicate that the spin rate as well as the transverse rate can increase, decrease, or stay constant depending on the choice of system parameters. Dramatic changes in the character of these variables can result from relatively minor changes in a rocket's nozzle expansion ratio.

Keywords: *Variable mass processes; rockets.*

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