

SPACE PROPULSION SYMPOSIUM (C4)
New Missions Enabled by New Propulsion Technology and Systems (6)

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IMPACT OF STRUCTURAL PARAMETERS ON THE PERFORMANCE OF MONOPROPELLANT
HIGH CHAMBER PRESSURE IMPULSE THRUSTER

Abstract

Due to the use of removable injector, the high chamber pressure pulsed rocket motor can provide much higher chamber pressure than supply pressure. In order to analyze the operating characteristics, with HAN as the monopropellant, establish a lumped parameter model about monopropellant pulsed rocket engine in extrusion discharge process. And then use fourth-order Runge-Kutta method to solve the model. According to calculations, several aspects from the injector area, nozzle throat area, differential area ratio, injector journey, analyze and summarize the impact of the law and the level of structural parameters on the Performance of monopropellant high chamber pressure pulsed rocket motor. The results show that computational model can reflect the actual working process of the engine. Especially, injector stroke and nozzle throat area is the greatest influence on the thrust chamber, which is the primary consideration for optimizing engine performance; and other structural parameters have varying degrees of influence to engine, which can be served as a secondary factor to consider.