

SPACE PROPULSION SYMPOSIUM (C4)
Hypersonic and Combined Cycle Propulsion (5)

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ANALYSIS OF THE FIRST STAGE TRAJECTORY FOR A TSTO SPACE TRANSPORTATION
CONCEPT POWERED BY RBCC ENGINE

Abstract

Reusable hypersonic space transportation powered by RBCC engine was described. Taking one Two-Stage-To-Orbit(TSTO) concept flight vehicle and one national RBCC experimental engine as research object. Based on the equations of dynamics and kinematics, numerical integral was used to design the trajectory. The simulation of the trajectory of the first stage flight vehicle powered by RBCC engine in a TSTO hypersonic space transportation is made by MATLAB. The result of simulation experiment shows that the model and the calculation method are feasible, which can be applied as the evaluation of the feasibility of hypersonic space transportation conceptsthe mass flow rate of fuel needed in this climb trajectory can be solved. Through these results can evaluate the acceleration performance of the RBCC engine being developed in our country, and they can also provide a direction to the development of RBCC engine in our country.