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INVESTIGATION OF CABIN PRESSURE PREDICTION FOR INTAKE AND EXHAUST SYSTEM ON RE-ENTRY VEHICLES

Abstract

The cabin pressure of flight vehicles will increase gradually with the raise of environment pressure during re-entry process if there is intake and exhaust system on the vehicles. To predict the variation of cabin pressure along trajectory accurately, a cabin pressure prediction method was established on the base of one-dimensional isentropic flow assumption and numerical simulation modification. The reliability and veracity of the method was validated by typical example and unsteady numerical simulation. Afterward, for the intake and exhaust system of certain given vehicle, pressure prediction of the vehicle's each cabin was carried out, and the difference between cabin pressure and external environment were present. The results provided reference for the vehicle's intake and exhaust system design. And the use of present cabin pressure prediction method can be promoted to other re-entry vehicles.