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增强型双喉道射流推力矢量喷管的流动特性试验

Flow characteristic experiment on vector-enhanced dual-throat thrust-vectoring nozzle

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中文关键词： 射流 增强 推力矢量 双喉道喷管 矢量喷管 流动特性试验

英文关键词:fluidic enhanced thrust-vectoring dual-throat nozzle vector-nozzle flow characteristic experiment

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作者	单位
周辉华	中国航空工业集团公司 中国航空动力机械研究所, 湖南 株洲 412002
谭慧俊	南京航空航天大学 能源与动力学院 内流研究中心, 南京 210016
周慧晨	南京航空航天大学 能源与动力学院 内流研究中心, 南京 210016
蔡建刚	中国航空工业集团公司 中国航空动力机械研究所, 湖南 株洲 412002

中文摘要:

对一种增强型双喉道射流推力矢量喷管开展了内部流动特性的试验研究,获得了其在不同次流压比状态下的内流结构和沿程静压分布.试验结果显示:在基准双喉道矢量喷管尾部附加扩张段后,能够以2.8%的次流消耗率获得超过20° 的平均气流偏角,这表明通过附加扩张段来增加喷管矢量角的设计概念是可行的.在凹腔内,增强型双喉道射流推力矢量喷管的静压分布规律与基准双喉道矢量喷管一致,但在附加的扩张段内,下壁面的压强要明显高于上壁面,这正是其推力矢量角得到显著增大的原因.随着次流压比的增加,喷管获得的推力矢量角单调增加,但是喷管附加扩张段的矢量增强效果基本维持不变.

英文摘要:

Model tests of a vector-enhanced dual-throat thrust-vectoring nozzle were performed to obtain the internal flow characteristics, including the internal flow pattern and the static pressure distributions at different secondary flow pressure ratios. The test results indicate that after adding divergent part to the tail of traditional dual-throat vector-nozzle, the jet flow is deflected upwards beyond 20 degrees at a secondary flow ratio of 2.8%. Therefore the design concept of the vector-enhanced nozzle is feasible. In the concave cavity of the nozzle, the static pressure distribution of the vector-enhanced nozzle is basically the same as that of a traditional dual-throat nozzle. At the additional divergent part, the surface pressure of the bottom wall is obviously higher than that of the top wall, accounting for the vector angle augment. In addition, the vector angle increases monotonously with the pressure ratio of the secondary flow, but the vector enhancing effect of the divergent part remains basically unchanged.

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