

STUDY ON THE INFLUENCE OF DESIGN PARAMETERS ON DYNAMIC CHARACTERISTICS OF SERPENTINE NOZZLE

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The serpentine nozzle is one of the key components for achieving stealth in aircraft. As a large-size thin-walled thermal structure, it is necessary to study the dynamic characteristics of serpentine nozzle. The structural dynamic models of the axisymmetric nozzle and serpentine nozzle are developed and analyzed using the commercial finite element software ANSYS-Workbench. The finite element models for the dynamic analysis of axisymmetric nozzle with different length-diameter ratios was established to study the influence of length-diameter ratio and axis curvature on the low-order frequency of axisymmetric nozzle; the finite element model for the dynamic analysis of serpentine nozzle with different length-diameter ratios and different width-height ratios was established to study the influence of length-diameter ratio and exit width-height ratio on the low-order intrinsic frequency and vibration pattern of serpentine nozzle, and the influence of geometric parameters on the modal and frequency of serpentine nozzle was obtained. In order to provide a basis for the design of the dynamic characteristics of the serpentine nozzle, we propose a structural solution to suppress the local deformation of the structure and increase the first-order frequency.