

FREE VIBRATION ANALYSIS OF LAMINATED COMPOSITE SHALLOW SHELLS

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ABSTRACT

Shell structures constituted a major component of today's aerospace, submarine, automotive and other machine or structural elements. They were used in aircraft, spacecraft, rockets, cars, computers, submarines, boats, storage tanks and the roofs of buildings. With the progress of composite materials, shallow shells constructed by composite laminas were extensively used in many fields of modern engineering practices. If external vibrations coincided with natural frequency of the material, resonance and subsequent failure result. Therefore free vibrations leading to the notions of the natural vibration frequency was to be studied.

This thesis work focused on the free vibrations of shallow thin composite shells of various shapes, modulus ratios, span-to-thickness ratios, boundary conditions and lay-up sequences. Most of the previous studies on this subject were confined to the classical boundary conditions. So the effect of elastically restrained edges on various shell curvatures including spherical and cylindrical shell was also studied.

KEYWORDS: Spherical shell, Cylindrical shell, Normalised Frequency Parameter, Natural Frequency