December 1971

Brief 71-10535

NASA TECH BRIEF
Langley Research Center

Vibration Characteristics of Ring-Stiffened Orthotropic Shells of Revolution

The problem:

To determine the natural frequencies and mode shapes of thin shells of revolution in order to evaluate the dynamic behavior of structures in which thin shells are some of the components.

The solution:

A computer program which solves for all the vibration modes and frequencies of thin shells of revolution having general meridional curvature and orthotropic elastic properties.

How it's done:

The procedure is based on the finite-element method in which the direct stiffness approach is used. A geometrically exact finite-element (shell) is employed, and its geometric characteristics are used as program inputs in the form of functions of the meridional coordinate.

The program is applicable to any shell of revolution whose meridional shape is defined by the user. Calculations for shells of revolution with or without ring stiffeners are possible. Included with the program are two sample calculations.

Notes:

1. This program is written in FORTRAN IV for use on the CDC-6400 or CDC-6600 computers.
2. Requests for further information may be directed to:

   COSMIC
   112 Barrow Hall
   University of Georgia
   Athens, Georgia 30601
   Reference: B71-10535

Patent status:

No patent action is contemplated by NASA.

Source: H. M. Adelman, B. J. Durling,
D. S. Catherines,
E. C. Steeves, and
W. C. Walton, Jr.
Langley Research Center
(LAR-10989)

Category 09

NWSI-S
RM. 1313
KSC HQS.
-1-