November 1971

Brief 71-10441

NASA TECH BRIEF

Marshall Space Flight Center

Vibrational Transfer Functions for Base Excited Systems

The problem:

To compute the vibrational transfer functions for complex structures subjected to a specified base motion. In the design of a complex structure, the governing vibration environment is generally specified in terms of either a sinusoidal or random base.

The solution:

A computer program, GD203, which develops transfer functions for complex structures subjected to a base motion.

How it's done:

An analytical model of the structure is developed, and the analytical modal (natural frequencies and mode shapes) and model properties are used in a response analysis to determine system transfer functions. The analytical model consists of mass and stiffness matrices generally developed for lumped parameter systems using finite element techniques. For complex structures, the total system model properties are sometimes developed through modal coupling techniques.

The methodology and the computer program require external development of the system model properties, but have the flexibility to utilize modal properties developed from modal coupling techniques. The program is also capable of plotting the computed transfer functions.

This program has been successfully utilized to predict the response of complex aerospace structures to specified random and sinusoidal base excitation. It has also been applied to the problem of determining payload response to a test level payload/booster interface environment.

Notes:

1. The program considers base excitation only.
2. This program is written in FORTRAN V for use on the CDC-6000 series computers.
3. Requests for further information may be directed to:

   COSMIC
   112 Barrow Hall
   University of Georgia
   Athens, Georgia 30601
   Reference: B71-10441

Patent status:

No patent action is contemplated by NASA.

Source: P.J. Jones and C. Ernst of
Martin Marietta Corp.
under contract to
Marshall Space Flight Center
(MFS-21432)

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