July 1971

Brief 71-10211

NASA TECH BRIEF

NASA Headquarters

Rotordynamic Response Analysis Program

The problem:

To determine the dynamic rotor displacements and bearing reactions of a real rotor, with mass eccentricities, as functions of rotor spin speeds.

The solution:

A computer routine similar to Holzer's method in torsional vibration treatment, and Prohl's and Myklestad's approach in computing rotor deflection. A matrix iteration technique is used to compute the rotordynamic response by a simulated discrete mass system.

How it's done:

This program is applicable to the synchronous and axisymmetric motion of a rotor up to 99 mass stations supported by up to ten linear stiffness and damping characteristic bearings. The program takes the following factors into consideration: flexible rotor couplings in shear and in bending; shear and bending elasticity of the rotor; rotor mass, and the magnitudes and orientations of mass eccentricities; rotor polar and transverse moments of inertia; and rotor axial loading effects.

The output of the program, in both printout and CRT, includes the absolute dynamic three-dimensional rotor mode shapes, the dynamic journal displacement, the bearing reactions, and the maximum rotor deflection, journal displacements and bearing reactions versus speed functions. Auxiliary outputs also available are the computed local and total rotor weight, computed local and total rotor polar mass moments of inertia, and the location of the center of gravity of the rotor.

Notes:

1. This program is written in FORTRAN IV for use on the IBM-ASP/360 system.
2. Inquiries may be directed to:
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   Barrow Hall
   University of Georgia
   Athens, Georgia 30601
   Reference: B71-10211

Patent status:

No patent action is contemplated by NASA.

Source: F. A. Shen of
North American Rockwell-Rocketdyne
under contract to
NASA Headquarters
(HQN-10579)

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