Attachment 4

Presentation To

United States Nuclear Regulatory Commission and Brookhaven National Laboratory

For Duke Power Company

Ajaya Kumar Gupta
Professor and Director

Abhinav Gupta
Research Engineer

Pradeep Aradhya
Research Assistant

July 27, 1995

Center for Nuclear Power Plant
Structures, Equipment and Piping

North Carolina State University
Raleigh, NC 27695-7908

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Verification Problems

Response of Secondary Systems

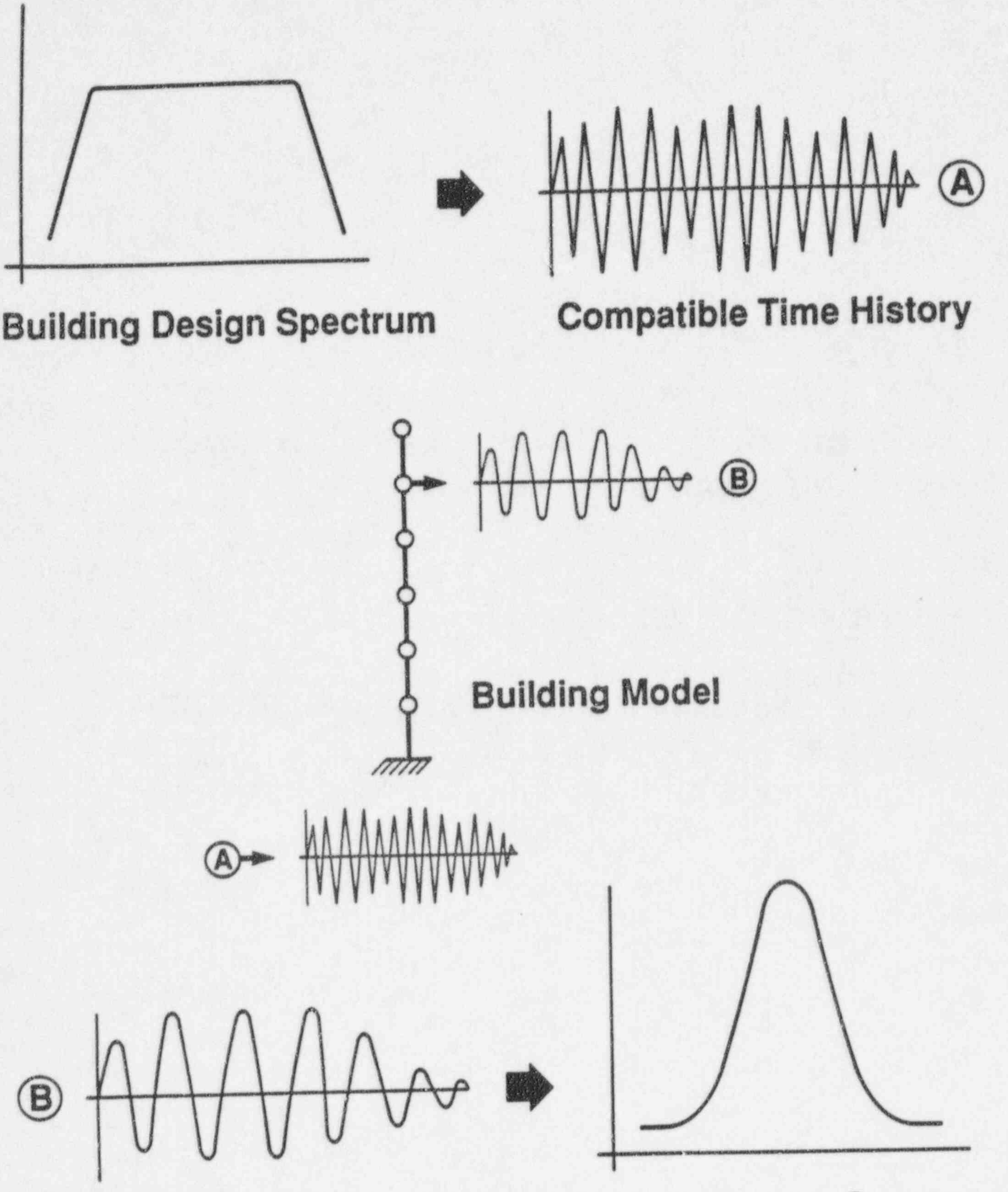
Primary Systems:

Building that receives the motion directly from the ground

Secondary Systems:

Piping systems and equipments that are attached to the building

Conventional Analysis Method



Building Design Spectrum

Compatible Time History

Building Model

Floor Time History

Floor Response Spectrum

Problems

1. Evaluation of the compatible time history is not unique. (Several time histories can be developed that are "compatible.")

2. The method does not account for mass-interaction between secondary and primary systems - response is overestimated.

Multiply Supported Secondary System (Piping Systems)

1. Floor spectra are enveloped - overestimation of response.

2. For relative displacements between the supports - worst case analysis is performed - overestimation of response.

Overall, calculated piping stresses may be an order of magnitude too high.

New Methods

1. Coupled Response Spectrum Analysis
2. Floor Response Spectrum Analysis - approximating the coupled analysis

These new methods are rational, rigorous and elegant.

In the overall scheme of things, the new methods do not significantly increase the cost of analysis.

New methods give significantly reduced seismic stresses. They are useful for:

1. **Requalification of existing systems for higher than the original design seismic forces.**
2. **Reduction of piping supports (snubbers).**
3. **Margin evaluation.**

Free Vibration Equation

$$[M]\{\ddot{U}\} + [C]\{\dot{U}\} + [K]\{U\} = \{0\}$$

$$\{U\} = [\phi]\{X\}\ ,\ \{X\}^T = \left[\{X_p\}^T\{X_s\}^T\right]$$

$$[\phi] = \begin{bmatrix} \phi_p & 0 \\ 0 & \phi_s \end{bmatrix} \qquad \begin{matrix} \{X_p\}^T = [X_{p1}\ X_{p2}\ldots] \\ \{X_s\}^T = [X_{s1}\ X_{s2}\ldots] \end{matrix}$$

$$[\phi_p] = [\phi_{p1}\ \phi_{p2}\ldots]$$

$$[\phi_s] = [\phi_{s1}\ \phi_{s2}\ldots]$$

$$r_{i\alpha}^{1/2} = [\gamma_{c\alpha}]\{\phi_{ci}\}$$

SDOF Secondary System

$$[\gamma_{c\alpha}] = \sqrt{m_s}$$

SDOF Primary System

$$\{\phi_{ci}\} = \frac{1}{\sqrt{m_p}}$$

$$r_{i\alpha}^{1/2} = \sqrt{\frac{m_s}{m_p}}$$

The definitions of $[\bar{K}]$ and $[\bar{C}]$ are as accurate as they can be.

For moderately light secondary systems, these expressions can be used to obtain **approximate but accurate** eigenvalues and eigenvectors.

Eigenvalue Problem

$$[K^*]\{X\} = \{0\}$$

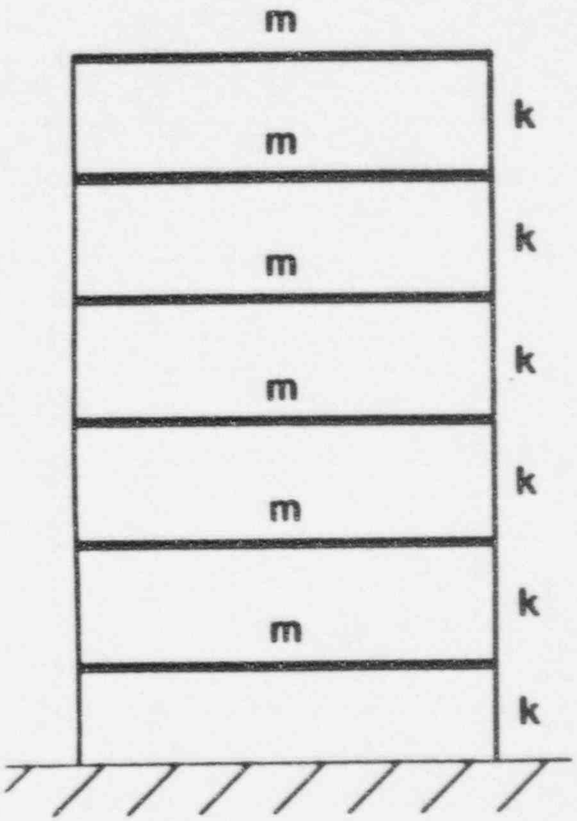
$$[K^*] = \lambda^2[1] + \lambda[\bar{C}] + [\bar{K}]$$

λ = coupled complex eigenvalue
$= -\zeta\omega + i\omega\sqrt{1-\zeta^2}$

ω = coupled frequency

ζ = coupled damping

Primary System


m
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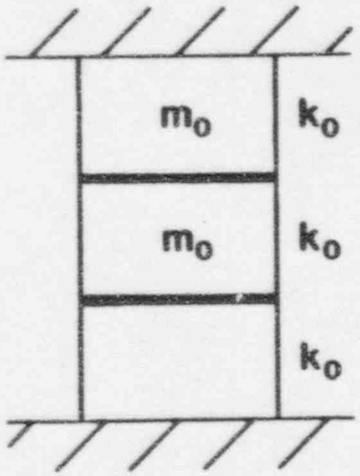
Secondary System


m_0
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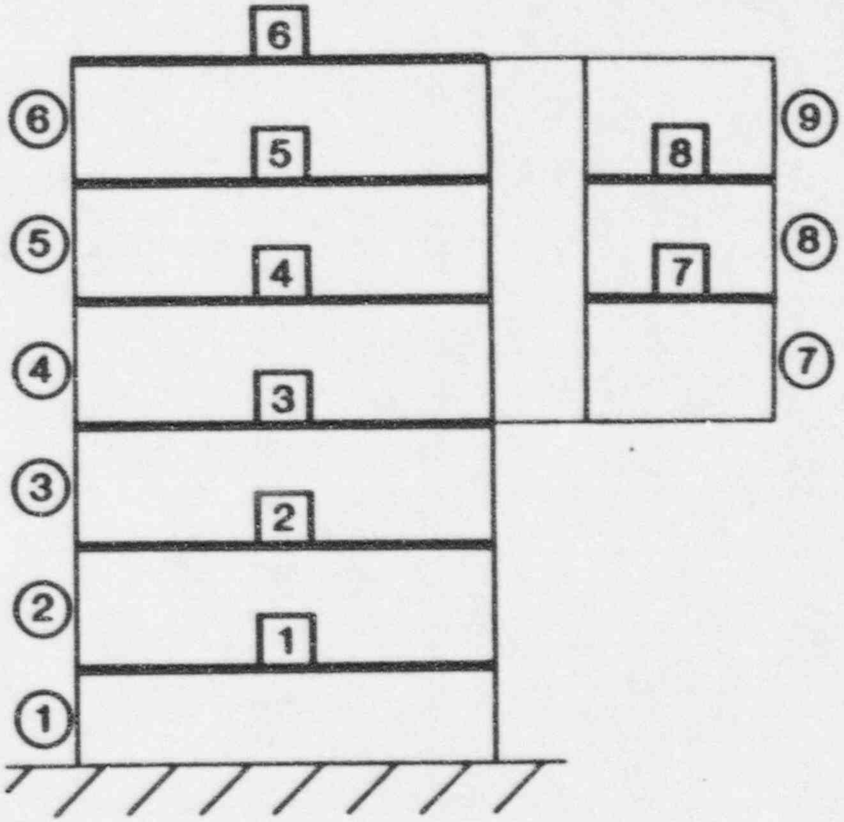
Coupled System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Each Story

Mass m = 1 Kip · s^2/in

Stiffness k = 5000 Kips/in

Mass (m_0) and stiffness (k_0) are varied to obtain a range of r_m and r_f values

m	Node Number m
ⓝ	Element Number n

Comparison of Coupled Frequencies, Damping Ratios
Case 2

	Frequency, (Hz)			**Damping Ratio (%)**		
		Percent Error			**Percent Error**	
Mode	Exact	Gupta-Jaw	IDK	Exact	Gupta-Jaw	IDK
1	2.5	0.05	10.21	5.7	0.19	22.38
2	4.2	0.17	-9.12	3.2	0.52	-37.49
3	6.5	0.02	1.61	2.2	0.25	-10.94
4	8.2	0.05	-2.48	6.7	-0.15	4.69
5	12.8	-0.01	-0.42	7.0	-0.35	0.25
6	16.9	-0.01	-0.33	7.0	-1.65	-0.50
7	19.9	0.00	-0.05	7.0	-0.28	-0.09
8	21.9	0.00	-0.16	7.0	-0.43	-0.06

Example: Case 9, El Centro (NS, 1940)
Damping 7 %, 2 %

	Forces in Kips		
	Element 1	**Element 2**	**Element 3**
Time History	88.6	6.18	89.4
Our Method	83.9	5.61	86.5
Conventional	243	16.8	243

High Frequency Mode Effect on Coupled Analysis

Equation of motion of the coupled system

$$[M]\left\{\ddot{U}\right\} + [C]\left\{\dot{U}\right\} + [K]\{U\} = -[M]\{U_b\}\ddot{u}_g$$

$$\{U\} = \left\{ \begin{array}{c} \{U_p\} \\ \{U_s\} \end{array} \right\}$$

$\{U_p\}, \{U_s\}$ are the primary and secondary system displacements, respectively, relative to the base of the primary system.

Secondary system displacement vector relative to the primary systems connecting DOF

$$\{\bar{U}_s\} = \{U_s\} - [U_{sc}]\,\{U_c\}$$

$[U_{sc}]$ contains one secondary system displacement vector for each connecting DOF.

Each such vector represents the displacement vector when the corresponding connecting DOF undergoes a unit displacement.

Transformation

$$\{U\} = \left\{ \begin{array}{c} \{U_p\} \\ \{U_s\} \end{array} \right\} = \left[\begin{array}{cc} [I] & [0] \\ [U_{sp}] & [I] \end{array} \right] \left\{ \begin{array}{c} \{\bar{U}_p\} \\ \{\bar{U}_s\} \end{array} \right\}$$

$$\{U_p\} \equiv \{\bar{U}_p\}$$

$[U_{sp}]$ is obtained from the matrix $[U_{sc}]$ by adding zeros for the non-connecting DOF of the primary system.

$$[\bar{M}] \left\{\ddot{\bar{U}}\right\} + [\bar{C}] \left\{\dot{\bar{U}}\right\} + [\bar{K}] \{\bar{U}\} = -[\bar{M}] \{\bar{U}_b\} \ddot{u}_g$$

Primary system residual mode vector

$$[K_p]\{U_o\} = -[M_p]\{U_{bo}\}\cancelto{\textit{Scaled Out}}{\ddot{y}_g}$$

$$\{U_{bo}\} = \{U_{bp}\} - \sum_{i=1}^{np}\{\phi_{pi}\}\gamma_{pi}$$

Normalize $\{U_o\}$ to get $\{\phi_o\}$ such that

$$\{\phi_o\}^T[M_p]\{\phi_o\} = 1$$

Define a fictitious frequency

$$\omega_o^2 = \{\phi_o\}^T [K_p] \{\phi_o\}$$

Treat $\{\phi_o\}$ as an extra uncoupled primary system mode just like any other mode.

Evaluation of Secondary System Residual Mode Vectors

$$[M_s]\left\{\ddot{\bar{U}}_s\right\} + [C_s]\left\{\dot{\bar{U}}_s\right\} + [K_s]\left\{\bar{U}_s\right\} = -[M_s][U_{sc}]\left\{\ddot{\bar{U}}_c^t\right\}$$

$\left\{\ddot{\bar{U}}_c^t\right\}$ = Total acceleration at the primary system connecting DOF.

$$[M_s]\left\{\ddot{\bar{U}}_s\right\}+[C_s]\left\{\dot{\bar{U}}_s\right\}+[K_s]\{\bar{U}_s\} = -\sum_{\alpha}[M_s]\{\phi_{s\alpha}\}\sum_{c}\gamma_{c\alpha}\ddot{u}_c^t$$

$\gamma_{c\alpha}$ = Participation factor for the secondary system mode α at connecting DOF c, an element of $[\Gamma_c]$

$$[\Gamma_c] = [\Phi_s][M_s][U_{sc}]$$

$$[K_s]\{\bar{U}_{so}\} = -[M_s]\sum_{c}\{U_{sco}\}\cancel{\ddot{\psi}_c} \quad \textit{Scaled Out}$$

$$\{U_{sco}\} = \{U_{sc}\} - \sum_{\alpha=1}^{ns}\{\phi_{s\alpha}\}\gamma_{c\alpha}$$

Calculate nc values of $\{U_{sco}\}$ vectors

$$[K_s]\{\bar{U}_{so}\} = -[M_s]\{U_{sco}\}$$

Normalize each $\{\bar{U}_{so}\}$ to give $\{\phi_R\}$ such that

$$\{\phi_R\}^T[M_s]\{\phi_R\} = 1$$

Each of the nc $\{\phi_R\}$ vectors is orthogonal to the given ns modal vectors $\{\phi_{s\alpha}\}$.

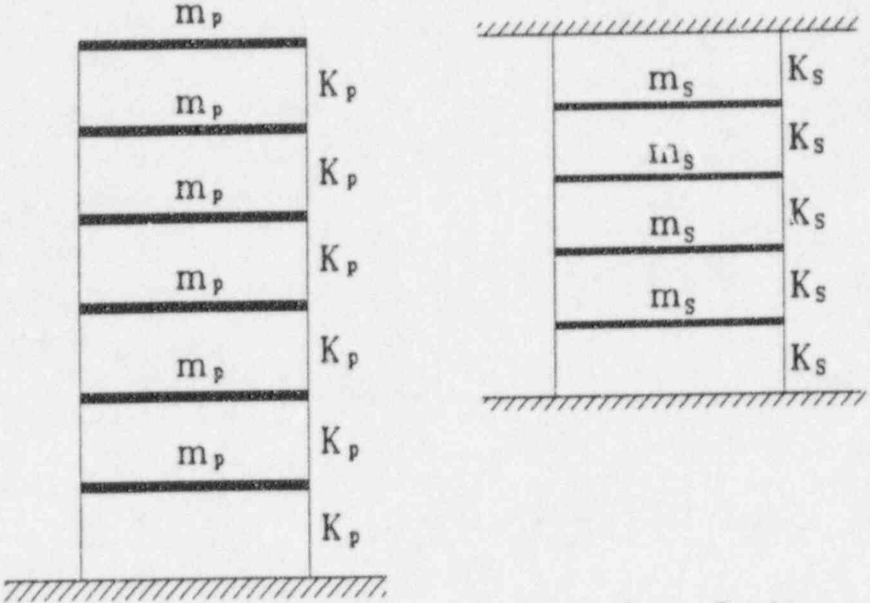
However, the $\{\phi_R\}$ vectors themselves are not orthogonal to each other.

Coupled eigenvalue problem

$$[M]\left\{\ddot{U}\right\}+[C]\left\{\dot{U}\right\}+[K]\{U\}=-[M]\{U_b\}\ddot{u}_g$$

$$\begin{aligned}\{U\} &= \left\{\begin{array}{c}\{U_p\}\\ \{U_s\}\end{array}\right\}=[\Phi]\{X\}\\ &= \left[\begin{array}{ccc}[\Phi_p] & [0] & [0]\\ [0] & [\Phi_s] & [\Phi_R]\end{array}\right]\left\{\begin{array}{c}\{X_p\}\\ \{X_s\}\\ \{X_R\}\end{array}\right\}\end{aligned}$$

$$[\tilde{M}]\left\{\ddot{X}\right\}+[\tilde{C}]\left\{\dot{X}\right\}+[\tilde{K}]\{X\}=-[\Phi]^T[M]\{U_b\}\ddot{u}_g$$


m_p
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Primary System

$m_p = 1.0$ Kip-s^2/in

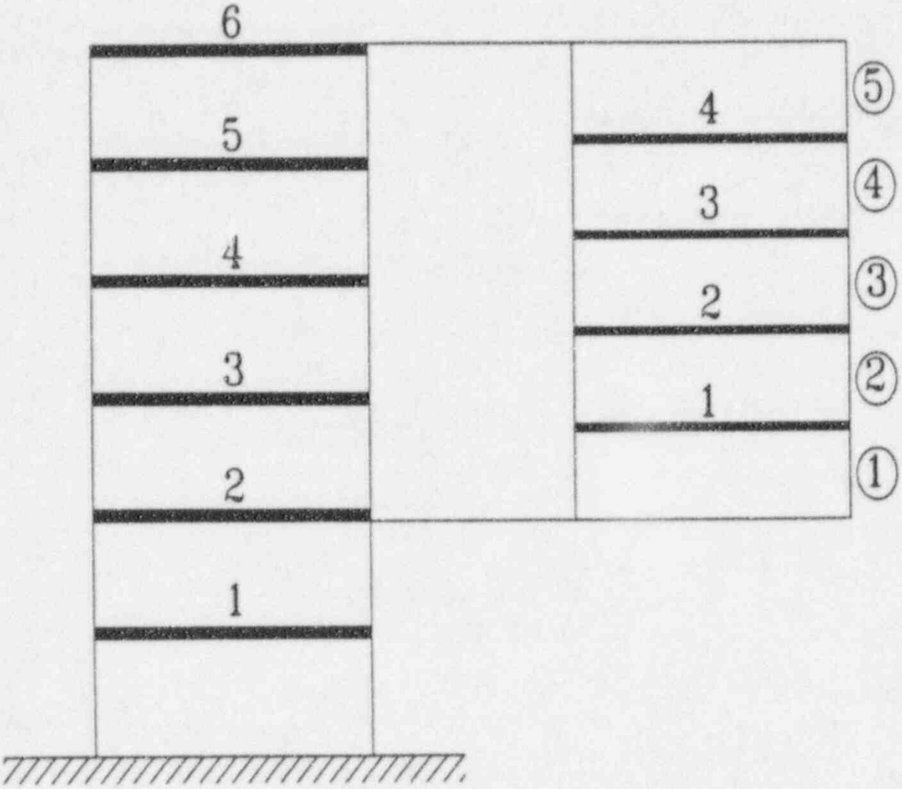
$K_p = 3000$ Kips/in

Secondary System

$m_s = 0.1$ Kip-s^2/in

$K_s = 1000$ Kips/in

Primary and Secondary Systems for Case 1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Coupled System for Case 1

Frequencies and Damping Ratios for Case 1

6-DOF Primary System			4-DOF Secondary System		
Mode No.	Freq. (Hz.)	Damping Ratio	Mode No.	Freq. (Hz.)	Damping Ratio
1	2.10148	0.07	1	9.83625	0.02
2	6.18237	0.07	2	18.71025	0.02
3	9.90389	0.07	3	25.75100	0.02
4	13.04991	0.07	4	30.27286	0.02
5	15.43755	0.07			
6	16.92772	0.07			

Comparison of Nodal Displacements (inch) for Secondary System DOF

Node no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	1.281	1.277	1.289
2	1.498	1.493	1.498
3	1.688	1.682	1.682
4	1.849	1.842	1.838

Comparison of Spring Forces (kip) for Secondary System Elements

Element no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	240.4	239.7	239.9
2	217.6	217.0	214.8
3	191.0	190.3	185.9
4	161.3	160.6	155.6
5	128.8	128.2	124.1

Description of Input Parameters

Description	Notation
I. ***Primary System***	
Modal frequencies	ω_{pi}
Modal dampings	ζ_{pi}
Modal participation factors	γ_{pi}
Modal vectors for connecting DOF	ϕ_{ci}

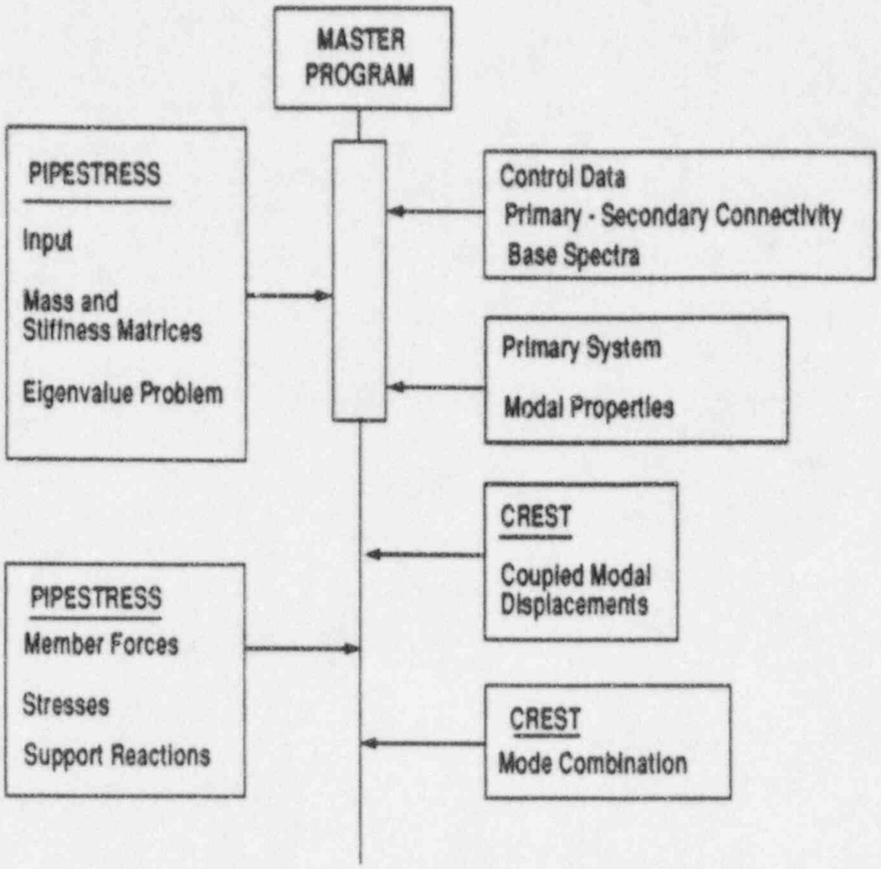
Description of Input Parameters

II. Secondary System

Modal frequencies	ω_{si}
Modal dampings	ζ_{si}
Modal vectors	ϕ_{si}
Mass matrix	M_s
Stiffness matrix	K_s
Connecting stiffness matrix	K_c^s
Support influence matrix	U_{sc}
Base influence vector	U_{bs}

III. Primary System Base Response Spectra

Spectral accelerations	$S_A^d(\omega^i, \zeta^i)$
Corresponding frequencies	ω^i
Corresponding dampings	ζ^i
Rigid frequency	ω^r


MASTER PROGRAM
PIPESTRESS
Input
Mass and Stiffness Matrices
Eigenvalue Problem
Control Data
Primary - Secondary Connectivity
Base Spectra
Primary System
Modal Properties
CREST
Coupled Modal Displacements
PIPESTRESS
Member Forces
Stresses
Support Reactions
CREST
Mode Combination

Generalized Flow Chart for Interaction of CREST and PIPESTRESS

REFERENCE PUBLICATION

Research on Coupled Seismic Response of Secondary Systems

by

Ajaya Kumar Gupta
Professor and Director

Hussien Ahmed Megahed
Graduate Student

Paper presented at the 4th Symposium on
Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping
Orlando, Florida, December 1992.

Research on Coupled Seismic Response of Secondary Systems

Ajaya Kumar Gupta[1]
Hussein Ahmad Megahed[2]

Abstract

Coupled seismic analysis of primary-secondary systems may reduce response of a secondary system by one or more orders of magnitude over that calculated from a conventional uncoupled secondary system analysis. When individually classically damped primary and secondary systems are coupled, the combined system becomes nonclassically damped if the modal damping values of the two systems are different. Various topics related to such systems have been studied to further the state of the art, and thereby improve the accuracy of the analysis. Two methods of analyzing nonclassically damped systems, an "original" and a new canonical, are shown to be mathematically identical. The former is preferred because it represents response in terms of physical quantities, relative displacements and velocities. The response spectrum method for nonclassically damped systems requires the conventional relative displacement-based response spectrum and a new relative velocity-based spectrum. For combination of modal responses, three sets of correlation coefficients are needed. Evaluation of the response of a single-degree-of-freedom (SDOF) system is studied to be able to evaluate the response spectra and correlation coefficients. It is shown that the commonly used time-domain analysis gives incorrect relative velocity values for high frequency SDOF systems. An alternative frequency-domain approach is proposed. New expressions for correlation coefficients showing better agreement with the numerical values than the existing expressions are developed. Impact of damping values on rigid response coefficients is studied and is incorporated in new equations. Empirical values for the key frequencies that define the rigid response coefficients are derived. To account for uncalculated high frequency modes of the uncoupled primary and secondary systems, a residual mode method is developed.

Introduction

Various topics related to analyzing nonclassically damped coupled primary-secondary systems have been investigated to further the state of the art, and thereby improve the accuracy of the analysis. Coupled response of a secondary system may be one or more orders of magnitude less than that calculated from the conventional uncoupled analysis. Dynamic analysis of multi-degree-of-freedom (MDOF) systems is often performed by the modal superposition-time history method, or the equivalent response spectrum method. Mode shapes and frequencies of the undamped system are calculated. It is assumed that when the equation of motion (including the damping term) is transformed using the mode shapes and normal coordinates, a set of uncoupled equations in terms of the normal coordinates are obtained. These equations are similar to the equations of motions of single-degree-of-freedom (SDOF) systems, thus greatly simplifying the solution process. In the above process, the off-diagonal terms in the modally transformed damping matrix are assumed to be zero. The systems, in which this assumption is valid, are called classically damped. MDOF systems in which the off-diagonal terms in the transformed damping matrix cannot be ignored are called nonclassically damped. A coupled primary-secondary system is an example of such a system. A detailed state of the art of analyzing nonclassically damped coupled systems is presented by Gupta (1992). A summary of recent research performed by us (Megahed and Gupta, 1992) at North Carolina State University to further the state of the art is presented here.

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[1] Professor and Director, Research Program on Nuclear Power Plant Structures, Equipment and Piping, Department of Civil Engineering, North Carolina State University, Raleigh, NC 27695-7908.

[2] Assistant Professor, Department of Civil Engineering, Cairo University, Cairo, Egypt. Former graduate student, Department of Civil Engineering, North Carolina State University, Raleigh, NC 27695-7908.

Methods of Analysis

The equation of motion of an N-DOF coupled nonclassically damped system is given by:

$$M\ddot{U} + C\dot{U} + KU = -MU_b\ddot{u}_g \tag{1}$$

where M, C and K denote mass, damping and stiffness matrices, respectively; U is the relative displacement vector; U_b is a displacement vector obtained by statistically displacing the support by unity in the direction of the input motion; u_g is the ground displacement; and the super dot $(\cdot)$ represents a derivative with respect to the time variable. In the Foss approach (Foss, 1958), Equation (1) is cast into a 2N-dimensional matrix equation, and a complex eigenvalue problem is solved. There are N-pairs of complex eigenvalues and eigenvectors. Each pair consists of eigenvalues and eigenvectors that are conjugates of each other. The complex eigenvalue pairs give the values of modal frequencies ω_i (rad/sec) and damping ratios ζ_i, in which (here and elsewhere in the paper) the subscript denotes the mode number. Each complex eigenvector pair gives two real vectors ψ_i^d and ψ_i^v of the rank Nx1. The modal superposition equation of the nonclassically damped system is given by:

$$U = \sum_{i=1}^{N} U_i = \sum_{i=1}^{N} U_i^d - U_i^v = \sum_{i=1}^{N} \psi_i^d x_i - \psi_i^v x_i \tag{2}$$

in which x_i is the relative displacement of an equivalent SDOF system and can be calculated from:

$$\ddot{x}_i + 2\omega_i\zeta_i x_i + \omega_i^2 x_i = -\ddot{u}_g \tag{3}$$

A new "canonical" method was recently proposed by Yang, Sarkani and Long (1987). They define *sine* and *cosine* responses of a SDOF system, denoted here by s_i and c_i, respectively. The modal superposition equation is written in terms of these responses and new modal vectors ψ_i^s and ψ_i^c as:

$$U_c = \sum_{i=1}^{N} U_i^s + U_i^c = \sum_{i=1}^{N} \psi_i^s s_i + \psi_i^c c_i \tag{4}$$

We have shown that:

$$\psi_i^s = -\frac{1}{\omega_{Di}}(\psi_i^d + \zeta_i \omega_i \psi_i^v), \quad \psi_i^c = \psi_i^v$$

$$s_i = -\omega_i x_i, \quad c_i = \dot{x}_i - \zeta_i \omega_i x_i \tag{5}$$

in which ω_{Di} is the damped frequency of the *i*th mode. Equations (4) and (5) give a vector U_c that is identical to the vector U of Equation (2). In the time domain, therefore, the new canonical method would give responses that are identical to those given by the "original" method. The corresponding response spectrum methods should give comparable results. The original method deals with physically meaningful quantities, relative displacement (x_i) and velocity ($\dot{x}$), and the *sine* and *cosine* responses (s_i and c_i) used in the canonical method are physically not as meaningful. Therefore, we propose to continue to use the original method.

In the response spectrum method of nonclassically damped systems, two response spectra need to be defined (Gupta, 1992; Gupta and Jaw, 1986).

$$S_A^d = \max|x(t)|, \quad S_V^v = \max|\dot{x}(t)| \tag{6}$$

Both the spectra can be defined in alternate units.

$$S_A^d = \omega S_V^d = \omega^2 S_D^d,$$

$$S_A^v = \omega S_V^v = \omega^2 S_D^v \tag{7}$$

in which the small letter superscripts *d* and *v* denote the source of the spectral value (relative displacement and velocity, respectively), and the capital letter subscripts *A*, *V* and *D* denote the units, acceleration, velocity, and displacement, respectively.

The maximum value of a response *R* in mode *i* obtained from the relative displacement spectra is denoted by R_i^d and that from the relative velocity spectra by R_i^v. Since these maximum values do not occur at the same time, the following modal combination equation is used:

$$R^2 = \sum_i \sum_j \left(\varepsilon_{ij}^d R_i^d R_j^d + \varepsilon_{ij}^v R_i^v R_j^v - 2\mu_{ij} R_i^d R_j^v \right) \tag{8}$$

in which ε_{ij}^d, ε_{ij}^v, and μ_{ij} are appropriate correlation coefficients.

In the analysis of classically damped systems, only relative displacement-based design spectra are needed and defined. Analysis of a system as nonclassically damped is uncommon, and therefore, relative velocity-based design spectra are not readily available. A method for estimating a velocity spectrum from the corresponding displacement spectrum is proposed by Gupta and Jaw (1986) that will be further investigated here. Analytical values of the correlation coefficients ε_{ij}^d, ε_{ij}^v, and μ_{ij} based on the assumption that the ground motion is a white noise are available in literature. Empirical studies based on real earthquake ground motions are also available in literature for ε_{ij}^d. No such studies have been performed, however, for ε_{ij}^v and μ_{ij}. It is proposed to empirically investigate all three coefficients in the present work. In all these numerical investigations on the response spectra and the correlation coefficients, we need to evaluate the response of SDOF systems subjected to earthquake motions in all frequency ranges. Problems with the calculations of the responses were investigated and are summarized (along with the solutions to the problems) in the next section.

Response of an SDOF System

Response of an SDOF system subjected to earthquake ground motions is usually calculated in time domain using an "exact" Nigam and Jennings method (1969). The processed earthquake data has nonzero initial values of the acceleration, velocity and displacement. That is due to the instrument triggering threshold and the process of data filtering. When these nonzero initial conditions are not explicitly accounted for, the calculated response becomes erroneous for the low-frequency SDOF oscillators. This problem has been long recognized and can be solved by introducing a fictitious, prefixed pulse proposed by Pecknold and Riddell (1978). The ground motion is defined in terms of acceleration values at discrete time intervals. In the response evaluation it is assumed that the ground acceleration varies linearly between the data points. The assumption of linear acceleration variation between the data points introduces a practically limitless frequency content in the ground motion that is well beyond the Nyquist frequency, f_c (Hz) = 1/2 Δt, the upper frequency limit of the accurate representation, in which Δt is the record interval in seconds. The spurious high frequency content of the motion does not significantly affect the calculation of the relative displacement values that have been calculated in the past for the classically damped systems. The same is, however, not true of the relative velocity calculations. For illustration, let us consider a 100 Hz oscillator with 2% damping subjected to the El Centro earthquake (SOOE, 1940). The earthquake record is digitized at 0.02 intervals, and is capable of representing a maximum frequency of 25 Hz. It is not expected to generate a significant 100 Hz response in the oscillator. Figure 1 shows a 0.5 second segment of the relative velocity history of the oscillator, that clearly shows a major 100 Hz content (for any 0.1 second duration in the figure, we can count approximately 10 sinusoidal waves). We were unable to develop a suitable time-domain technique to suppress this spurious response.

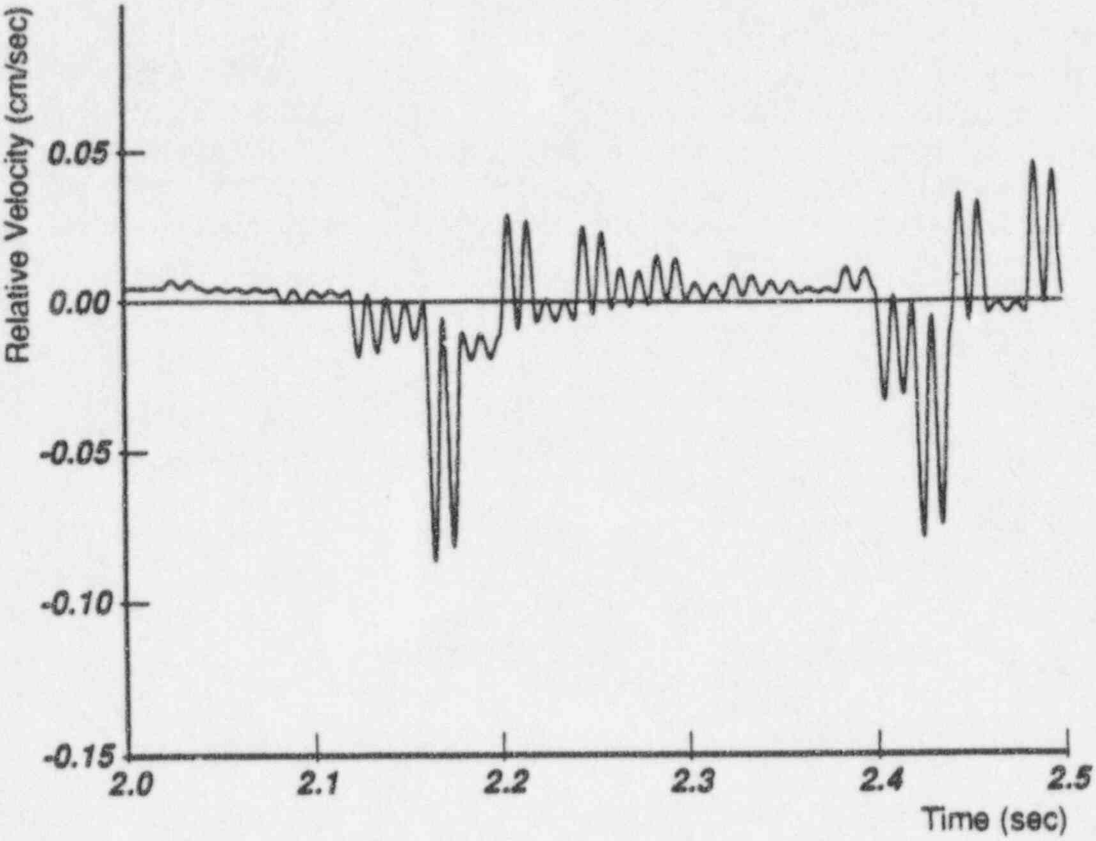

Figure 1 0.5 Second Segment of Relative Velocity History of an SDOF System, 100 Hz, Damping Ratio = 0.02, El Centro (SOOE, 1940)

To calculate the response of the oscillator accurately in all frequency ranges, therefore, we proceeded to perform a frequency-domain analysis. The method consists of obtaining the Fourier transform of both the input motion and the unit impulse function over an appropriate range of frequencies, multiplying the two transforms, and performing an inverse Fourier transform on the product resulting in the response time history. The nonzero initial conditions are handled the same way as in the time-domain analysis. When the unit impulse function is also discretized in the time domain (the input motion is already discretized), two new problems appear in the solution. The Fourier analysis implicitly introduces periodicity in the input and output, the period being equal to the length of the record being processed. This results in an "end effect," due to nonzero output at the end of any "period" interfering with the outputs of the subsequent periods. The error is cumulative from period to period and can give very erroneous results. The problem is solved by adding enough zeroes at the end of both the earthquake and the unit impulse data, assuring a zero output at the end of the period, thus avoiding the end effect. Another problem is "aliasing" that occurs in the high frequency range. When the oscillator frequency is beyond the earthquake record's Nyquist frequency, the true high frequency content of the unit impulse function cannot be accurately represented. The mathematical process interprets the unit impulse function records in terms of the lower "alias" frequencies within the Nyquist frequency, thus giving incorrect response values.

To avoid the aliasing problem, we used an alternate procedure in which the unit impulse function is not discretized to evaluate its Fourier transform. Instead, we use the analytical form of the Fourier transform of the unit impulse function, thus avoiding the aliasing problem. To overcome end effect problems in this case, a correction proposed by Veletsos et al (Veletsos and Ventura, 1985) is used. Figure 2 shows the velocity response of the 100 Hz oscillator (the same as the one used before) from the frequency-domain analysis along with that from the time-domain analysis. The frequency-domain analysis has clearly eliminated the spurious 100 Hz output.

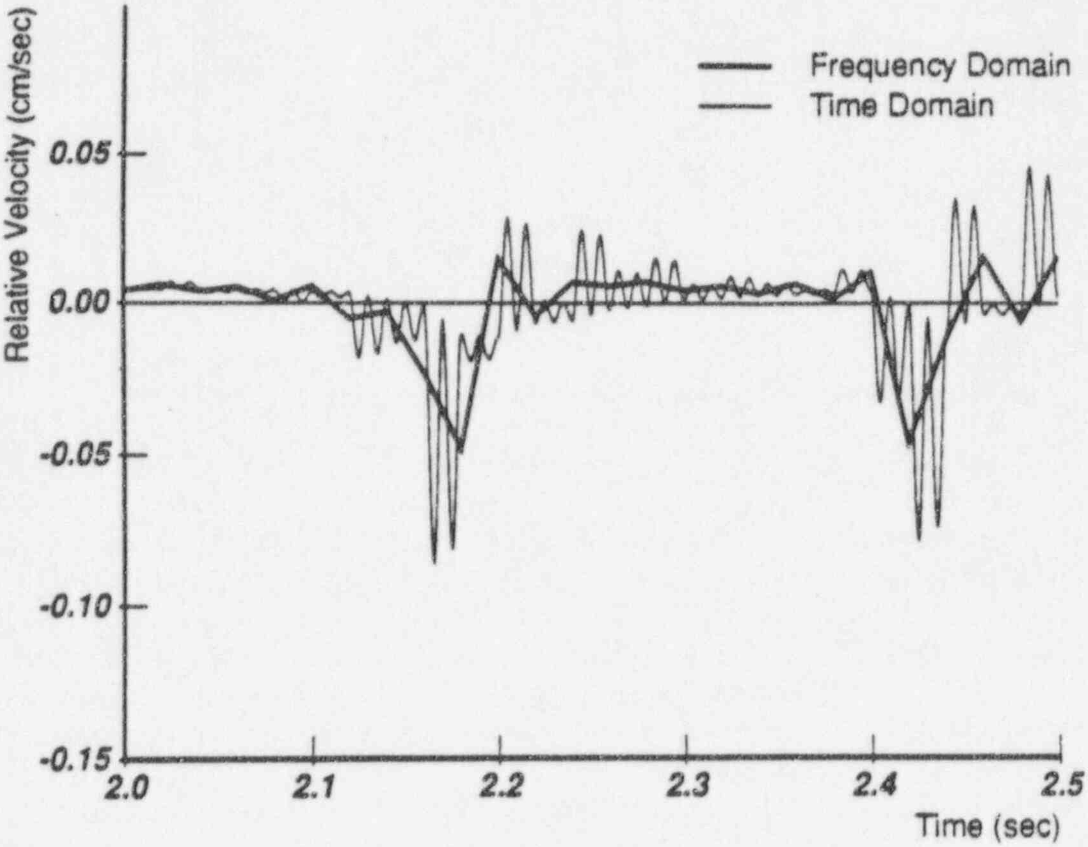

Figure 2 Comparison of 0.5 Second Segment of Relative Velocity History of an SDOF System from Time and Frequency Domain Analyses, 100 Hz, Damping Ratio = 0.02, El Centro (SOOE, 1940)

Correlation Coefficients

The correlation coefficients ε^d_{ij}, ε^v_{ij}, and μ_{ij} are used in Equation (8) to obtain the combined response R from the corresponding maximum modal responses R^d_i and R^v_i. These coefficients depend upon the closeness of the modal frequencies, except in the high frequency range, where the correlations ε^d_{ij} and ε^v_{ij} become practically equal to unity irrespective of the (lack of the) closeness of modal frequencies.

Rosenblueth and Elorduy (1969) have proposed an expression for ε^d_{ij} (called the Rosenblueth equation) assuming earthquake motion to be a finite segment of white noise, and Igusa, Der Kiureghian and Sackman (1984) have given expressions for ε^d_{ij}, ε^v_{ij}, and μ_{ij} (called the Der Kiureghian equation) for white noise input of infinite duration. Both sets of equations are applicable only when the high frequency effects are not present. We found that Rosenblueth and Der Kiureghian equations gave values of ε^d_{ij} that were numerically very close when the finite segment length (duration) of the earthquake is assumed to be infinity and the two modal damping values are identical. When a practical earthquake duration, 10 - 20 seconds, is substituted in the Rosenblueth equation, it gives correlation values that are too high. Also, the Rosenblueth equation gives ε^d_{ij} values that do not agree with the numerical results when the two modal damping values are significantly different. A modified Rosenblueth equation, given below, can be developed by setting the earthquake duration to infinity and by incorporating an expression to account for different modal damping values based on the Der Kiureghian equation:

$$\varepsilon^d_{ij} = b_{ij},\ \ b_{ij} = a_{ij}\left[1+\left(\frac{\omega_i-\omega_j}{\zeta_i\omega_i+\zeta_j\omega_j}\right)^2\right]^{-1},\ \ a_{ij} = \frac{2\sqrt{\zeta_i\zeta_j}}{\zeta_i+\zeta_j} \qquad (9)$$

According to Igusa and Der Kiureghian, $\varepsilon^v_{ij} \approx \varepsilon^d_{ij}$, and:

$$\mu_{ij} = \frac{2}{\zeta_i+\zeta_j}\cdot\frac{\omega_i-\omega_j}{\omega_i+\omega_j}\, b_{ij} \qquad (10)$$

Equations (9) and (10) are in reasonable agreement with the average numerical data from twelve earthquakes for low modal damping values. Further modification of the equations is needed for the modal damping values that are on the order of 10%. We propose to modify the above equations as follows:

$$\varepsilon_{ij}^{d} = \frac{a_{ij}}{a_{ij} - c_{ij}^{d}} (b_{ij} - c_{ij}^{d}), \quad \varepsilon_{ij}^{v} = \frac{a_{ij}}{a_{ij} - c_{ij}^{v}} (b_{ij} - c_{ij}^{v}),$$

$$\mu_{ij} = \frac{1}{c_{ij}^{\mu}} \left(\frac{\omega_i - \omega_j}{\zeta_i \omega_i + \zeta_j \omega_j} \right) b_{ij},$$

$$c_{ij}^{d} = 2.5 \left(\frac{\zeta_i + \zeta_j}{\omega_i + \omega_j} \right) \le \frac{\zeta_i + \zeta_j}{2}, \quad c_{ij}^{v} = 0.005 + 0.7 \frac{\zeta_i + \zeta_j}{2},$$

$$c_{ij}^{\mu} = 0.35 + 0.65 \frac{\omega_j}{\omega_i}, \quad \omega_j \ge \omega_i$$

$$= 0.35 + 0.65 \frac{\omega_i}{\omega_j}, \quad \omega_i \ge \omega_j; \quad 1 \le c_{ij}^{\mu} \le 3 \tag{11}$$

Figure 3 shows one set of comparisons between the average numerically obtained correlation coefficients and those predicted by Equation (11).

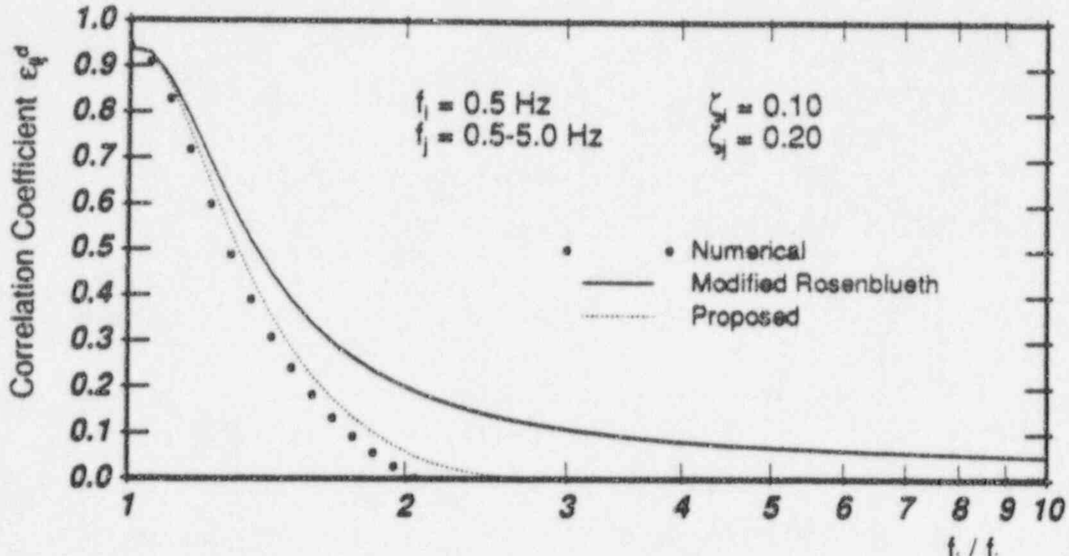

Figure 3a Comparison of Displacement Correlation Coefficients in the Frequency Range 0.5-5.0 Hz, Numerical, Modified Rosenblueth, Proposed, ζ_i=0.10, ζ_i=0.20

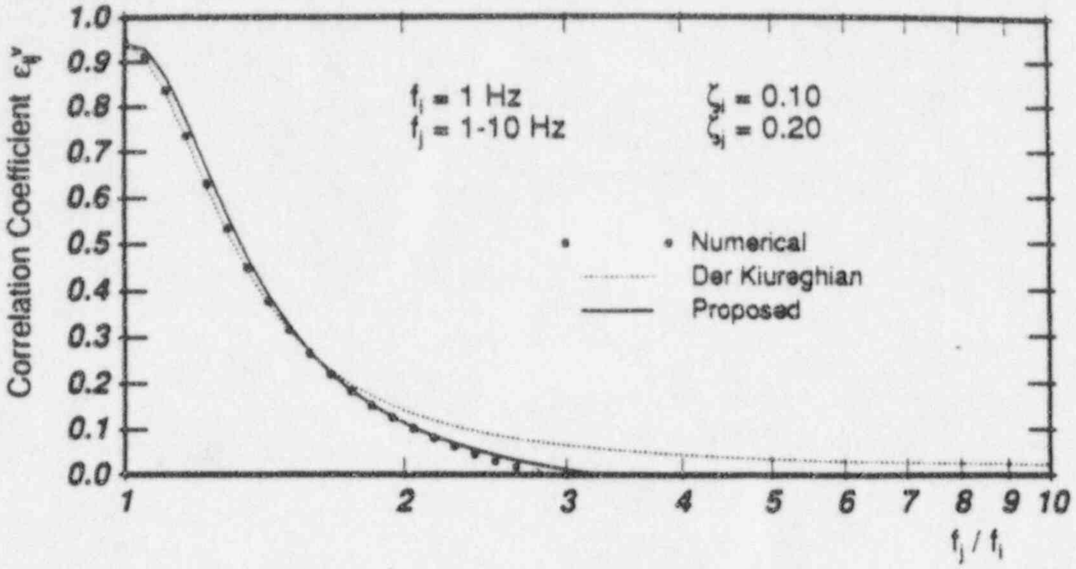

Figure 3b Comparison of Velocity Correlation Coefficients in the Frequency Range 1-10 Hz, Numerical, Der Kiureghian, Proposed, ζ_{si}=0.10, ζ_{si}=0.20

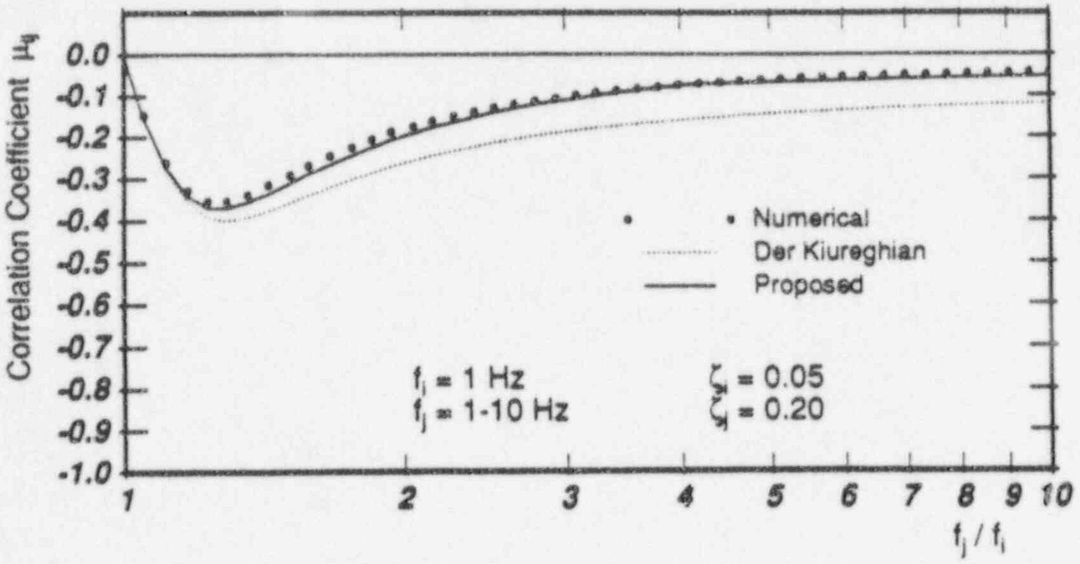

Figure 3c Comparison of Cross Correlation Coefficients in the Frequency Range 1-10 Hz, Numerical, Der Kiureghian, Proposed, ζ_{si}=0.05, ζ_{si}=0.20

High Frequency Effect - Rigid Response Coefficients

To account for the high frequency effect on correlation, modal responses, R_i^d and R_i^v, can be decomposed into two parts each: the rigid parts, R_i^{dr} and R_i^{vr}, and the damped periodic parts, R_i^{dp} and R_i^{vp}. The following relationships have been proposed by Gupta et al (Gupta, 1992; Gupta and Chen, 1984):

$$R_i^{dr} = \alpha_i^d R_i^d, \quad R_i^{dp} = \sqrt{1-(\alpha_i^d)^2}\ R_i^d$$

$$R_i^{vr} = \alpha_i^v R_i^v, \quad R_i^{vp} = \sqrt{1-(\alpha_i^v)^2}\ R_i^v \tag{12}$$

in which α_i^d and α_i^v are rigid response coefficients, both of which are assumed to vary between 0 and 1. The rigid parts from various modes are combined algebraically, and the damped periodic parts are combined in accordance with Equation (8).

$$R^{dr} = \sum_i R_i^{dr}, \; R^{vr} = \sum_i R_i^{vr}$$

$$(R^p)^2 = \sum_i \sum_j (\varepsilon_{ij}^d R_i^{dp} R_j^{dp} + \varepsilon_{ij}^v R_i^{vp} R_j^{vp} - 2\mu_{ij} R_i^{dp} R_j^{vp}) \tag{13}$$

Finally, the two rigid parts (R_i^{dr} and R_i^{vr}) and the combined damped periodic part (R^p) are assumed to be statistically independent. Therefore,

$$R^2 = (R^{dr})^2 + (R^{vr})^2 + (R^p)^2 \tag{14}$$

Equations (12) through (14) give:

$$R^2 = \sum_i \sum_j (\bar{\varepsilon}_{ij}^d R_i^d R_j^d + \bar{\varepsilon}_{ij}^v R_i^v R_j^v - 2\bar{\mu}_{ij} R_i^d R_j^v) \tag{15}$$

in which the modified correlation coefficients are defined as follows:

$$\bar{\varepsilon}_{ij}^d = \sqrt{\left[1-(\alpha_i^d)^2\right]\left[1-(\alpha_j^d)^2\right]}\ \varepsilon_{ij}^d + \alpha_i^d \alpha_j^d$$

$$\bar{\varepsilon}_{ij}^v = \sqrt{\left[1-(\alpha_i^v)^2\right]\left[1-(\alpha_j^v)^2\right]}\ \varepsilon_{ij}^v + \alpha_i^v \alpha_j^v$$

$$\bar{\mu}_{ij} = \sqrt{\left[1-(\alpha_i^d)^2\right]\left[1-(\alpha_j^v)^2\right]}\ \mu_{ij} \tag{16}$$

Note, in the high frequency range, α_i^d, α_j^d, α_i^v, $\alpha_j^v = 1$, and $\bar{\varepsilon}_{ij}^d$, $\bar{\varepsilon}_{ij}^v = 1$; and in the low frequency range α_i^d, α_j^d, α_i^v, $\alpha_j^v = 0$, and $\bar{\varepsilon}_{ij}^d = \varepsilon_{ij}^d$, $\bar{\varepsilon}_{ij}^v = \varepsilon_{ij}^v$, $\bar{\mu}_{ij} = \mu_{ij}$.

Gupta and Chen (1984) originally proposed an approximate equation for α_i^d that can be represented by a straight line on a semi-log chart. Such an equation did not account for the effect of damping on the coefficient. We have modified the original equation for α_i^d and proposed a similar equation for α_i^v. The two sets of modified equations are given below:

$$\alpha_i^d = \alpha_{oi}^d + \alpha_{oi}^d (1 - \alpha_{oi}^d)\, \Delta\alpha_i^d ,$$

$$\alpha_i^v = \alpha_{oi}^v + \alpha_{oi}^v (1 - \alpha_{oi}^v)\, \Delta\alpha_i^v ,$$

$$\alpha_{oi}^d = \frac{\ln(f_i / f_1^d)}{\ln(f_2^d / f_1^d)}, \; f_1^d \le f_i \le f_2^d$$

$$\alpha_{oi}^v = \frac{\ln(f_i / f_1^v)}{\ln(f_2^v / f_1^v)}, \; f_1^v \le f_i \le f_2^v \tag{17}$$

in which f_i is the modal frequency, and $f_1^d, f_2^d, f_1^v, f_2^v$ are key frequencies (all in Hz) yet to be defined. The expressions for α_{oi}^d and α_{oi}^v define the coefficients without taking into account the effect of damping that is introduced in Equation (17) by including $\Delta\alpha_i^d$ and $\Delta\alpha_i^v$. The key frequencies, $f_1^d, f_2^d, f_1^v, f_2^v$ were studied by performing numerical analysis on twelve earthquake ground motions. Empirical expressions of these frequencies, and $\Delta\alpha_i^d$ and $\Delta\alpha_i^v$ based on the averages of the twelve earthquakes are given below:

$$f_1^d = 0.86 f_{AV}^{dd} , \; f_2^d = 0.84 f_r^d ,$$

$$f_1^v = 1.86 f_{AV}^{dd} , \; f_2^d = 1.20 f_r^d ,$$

$$f_{AV}^{dd} = \frac{S_{A\max}^d}{2\pi S_{V\max}^d}$$

$$\Delta\alpha_i^d = 2.1 + 0.6\zeta_i ,$$

$$\Delta\alpha_i^v = 1.2 + 0.5\zeta_i \tag{18}$$

in which f_r^d is the rigid or the ZPA frequency defined as the lowest frequency at which the (relative displacement-based) spectral acceleration becomes almost equal to the zero period acceleration (ASCE, 1986). We found that the definition is not very precise since it can lead to the use of different f_r^d values by different engineers for the same earthquake motion. Therefore, we propose to add the requirement that the spectral acceleration become practically independent of the damping values at the rigid frequency. Figure 4 shows a comparison of the numerically calculated α_i^d and α_i^v values with those predicted by Equations (14) and (15) for three damping values. Figure 5 shows a comparison of numerically calculated correlation coefficients with those calculated using Equation (16) in the high frequency range.

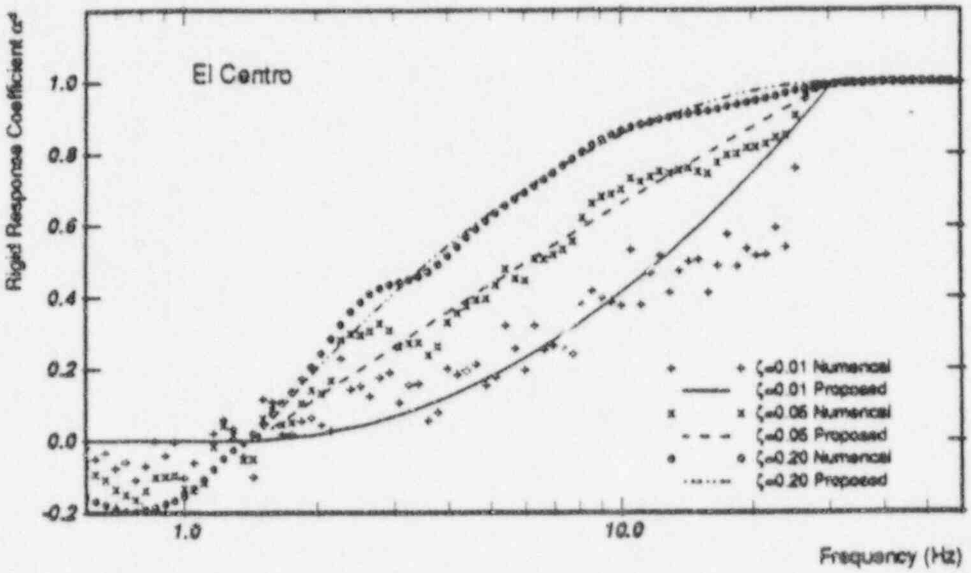

Figure 4a Comparison Between the Numerical α^d Values with those from the Proposed Model, El Centro (SOOE, 1940)

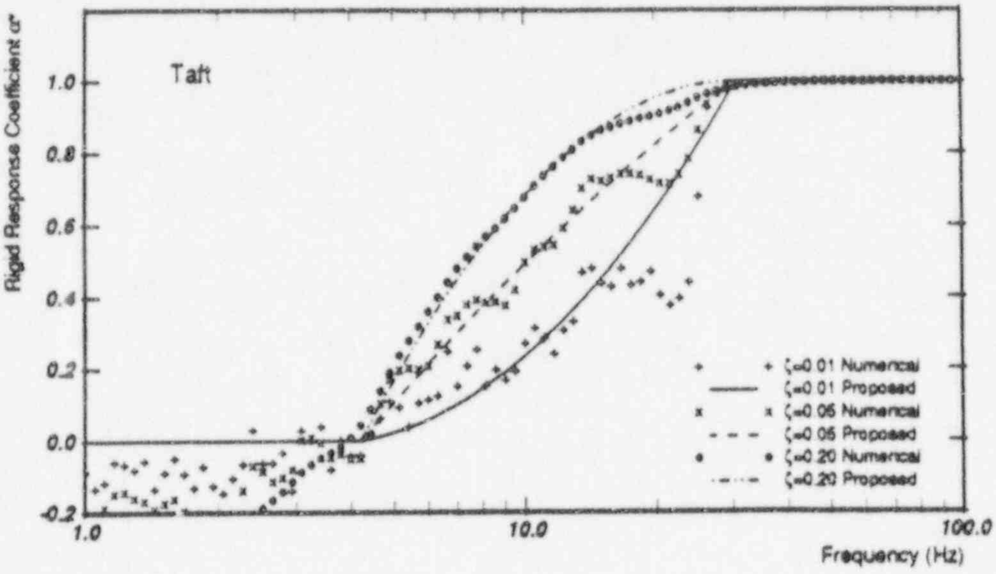

Figure 4b Comparison Between the Numerical α^v Values with those from the Proposed Model, Taft (S69E, 1952)

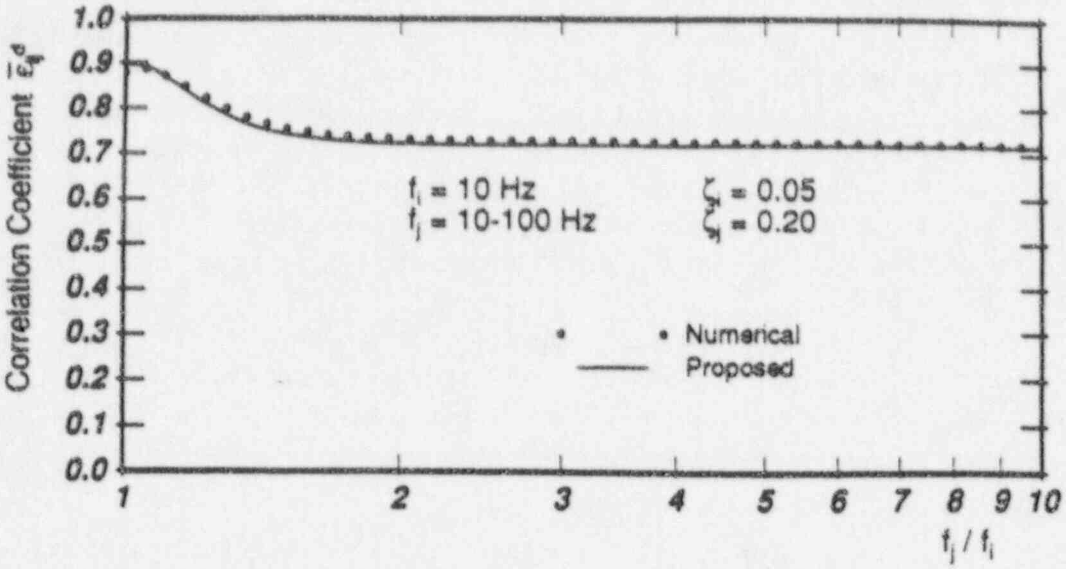

Figure 5a Comparison of Displacement Correlation Coefficients including the Effect of α^d in the Frequency Range 10-100 Hz, Numerical, Proposed, ζ_i=0.05, ζ_i=0.20

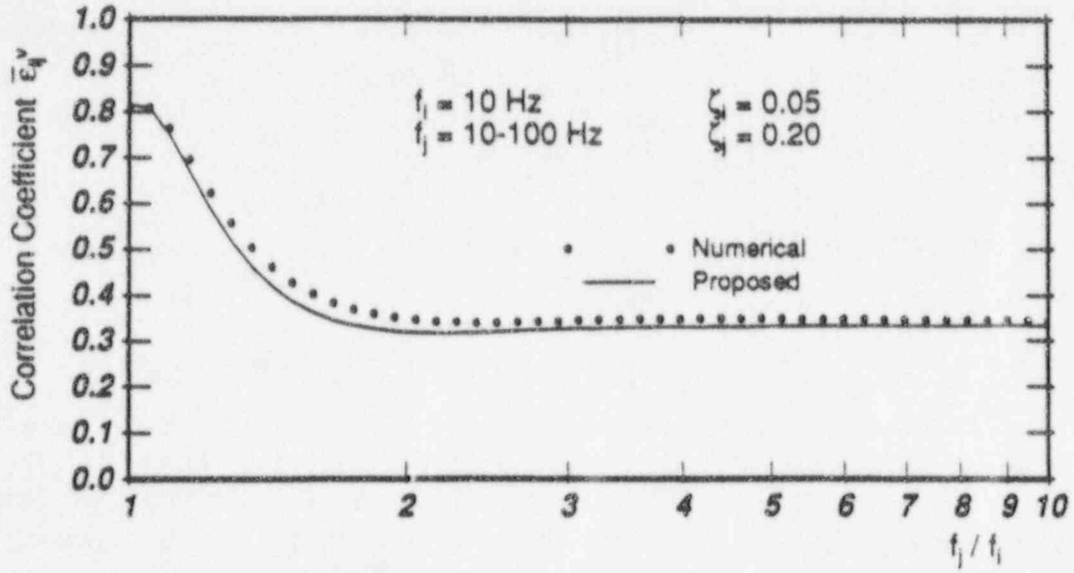

Figure 5b Comparison of Velocity Correlation Coefficients including the Effect of α^v in the Frequency Range 10-100 Hz, Numerical, Proposed, ζ_i=0.05, ζ_i=0.20

Velocity Response Spectrum

As was discussed earlier, two types of response spectra are needed in the analysis of nonclassically damped systems: the relative displacement spectrum, S^d, and the relative velocity spectrum, S^v. Conventionally, most structures and equipments are assumed to be classically damped for which only the relative displacement spectrum is needed. Therefore, as a rule, only relative displacement-based design spectra are available. To analyze nonclassically damped systems, we need to be able to estimate a relative velocity spectrum from a relative displacement spectrum. A method proposed by Gupta and Jaw (1986) is investigated here.

In the intermediate frequency range, it can be shown that the relative displacement and velocity-based spectra are almost equal when represented in the same units. In the low and high frequency ranges, the following relationships hold:

$$f_L = \frac{S_A^v}{2\pi S_A^d} = \frac{\dot{u}_{g\max}}{2\pi\omega u_{g\max}}, \quad f_H = \frac{S_A^v}{2\pi S_A^d} = \frac{\dddot{u}_{g\max}}{2\pi\omega \ddot{u}_{g\max}} \tag{19}$$

If the key frequencies (Hz) f_L and f_H are known, the relative velocity-based spectrum can be calculated from a relative displacement spectrum in the low and high frequency ranges using Equation (19). Gupta and Jaw had given empirical values of these frequencies based on twelve earthquake ground motions. They used time-domain analysis that does not give accurate relative velocity values in the high frequency ranges. Therefore, we repeated their work with our frequency-domain analysis. The new relationships for f_L and f_H are:

$$\begin{aligned} f_L &= f_{VD}^{dd}, \quad f_{VD}^{dd} = \frac{S_{V\max}^d}{2\pi S_{D\max}^d} \\ f_H &= 2.68 f_{AV}^{dd} = 0.22 f_r^d, \\ f_{AV}^{dd} &= \frac{S_{A\max}^d}{2\pi S_{V\max}^d} \end{aligned} \tag{20}$$

There is a small transition zone between the intermediate and the high frequency ranges, the relative velocity spectrum for which can be evaluated using the procedure presented in the references (Gupta, 1992; Megahed and Gupta, 1992; Gupta and Jaw, 1986). Figure 6 shows a comparison between the estimated and the directly calculated velocity spectrum for the El Centro earthquake (1940, SOOE), which is one of the twelve given in the original report (Megahed and Gupta, 1992). In the estimation of the velocity spectrum in Figure 6, actual values of f_L and f_H for the earthquake were used.

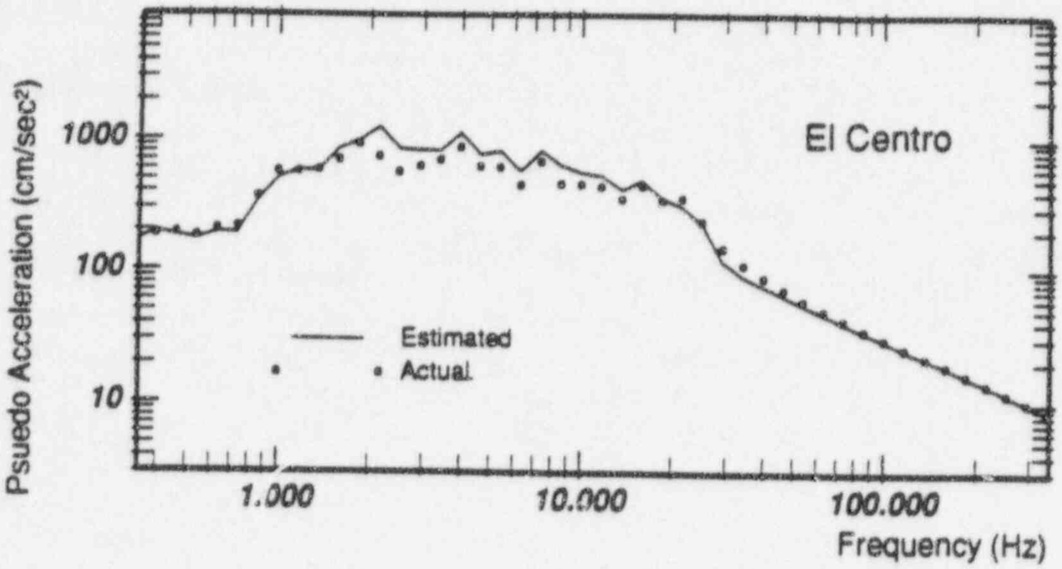

Figure 6 Comparison of Estimated and Actual Velocity Spectra, Damping Ratio = 0.05, El Centro (SOOE, 1940)

Secondary Systems with High Frequency Modes

In recent years, several modal synthesis methods have been developed to perform coupled analysis of primary and secondary systems. In these methods, it is assumed that all uncoupled modal properties of the primary and secondary systems are known, which is not practical for systems with large degrees of freedom. Typically, several (often, much less than all) modes each of both the primary and the secondary systems are calculated. It is well known that in certain complex problems, the effect of higher uncalculated modes can be quite significant. In the analysis of (uncoupled) single systems, this effect is represented in terms of a residual response vector obtained through a pseudo-static analysis of the system subjected to the missing mass inertia forces. We have developed a method in which we use this type of residual response vector as a fictitious mode, called the residual mode, to represent the response of all the uncalculated higher modes both for primary and secondary systems.

In the existing coupled analysis methods, both the primary and secondary degree of freedom are represented relative to the fixed base of the primary system. Thus, the secondary system degrees of freedom include a rigid body motion component that the residual mode vector cannot model - since, by definition, it represents a deformed shape. Therefore, we reformulated the coupled problem such that the secondary system degrees of freedom are defined relative to the primary system degrees of freedom at which the secondary system is connected to the primary system.

The new formulation, that at the present is applicable to only singly connected primary-secondary systems, has been implemented in a new version of the CREST program originally developed by Gupta and Jaw (1985). The modified program was used to analyze five primary-secondary coupled systems of the type shown in Figure 7. The five coupled systems have identical primary systems, and have secondary systems with identical story masses and with five different story stiffnesses. The frequencies (Hz) of the uncoupled primary system modes are: 8.139, 23.944, 38.358, 50.542, 59.789 and 65.561. Uncoupled secondary system frequencies (Hz) are: Case 1, 8.155, 22.849, 33.018; Case 2, 12.495, 35.009, 50.589; Case 3, 13.690, 38.358, 55.429; Case 4, 23.398, 65.562, 94.758; Case 5, 38.328, 107.392, 155.186. The uncoupled primary system modal damping is 2%, and all the uncoupled secondary systems have 7% modal damping. The frequencies and damping ratios for the five coupled system are given in Table 1. All the coupled systems were subjected to the El Centro earthquake (1940, SOOE). The coupled analysis was performed two ways: considering all the uncoupled modes, and considering only the uncoupled modes up to the rigid frequency and accounting for the remaining modes with the residual mode vector. The two sets of nodal displacements and spring forces given in Table 2 are practically the same.

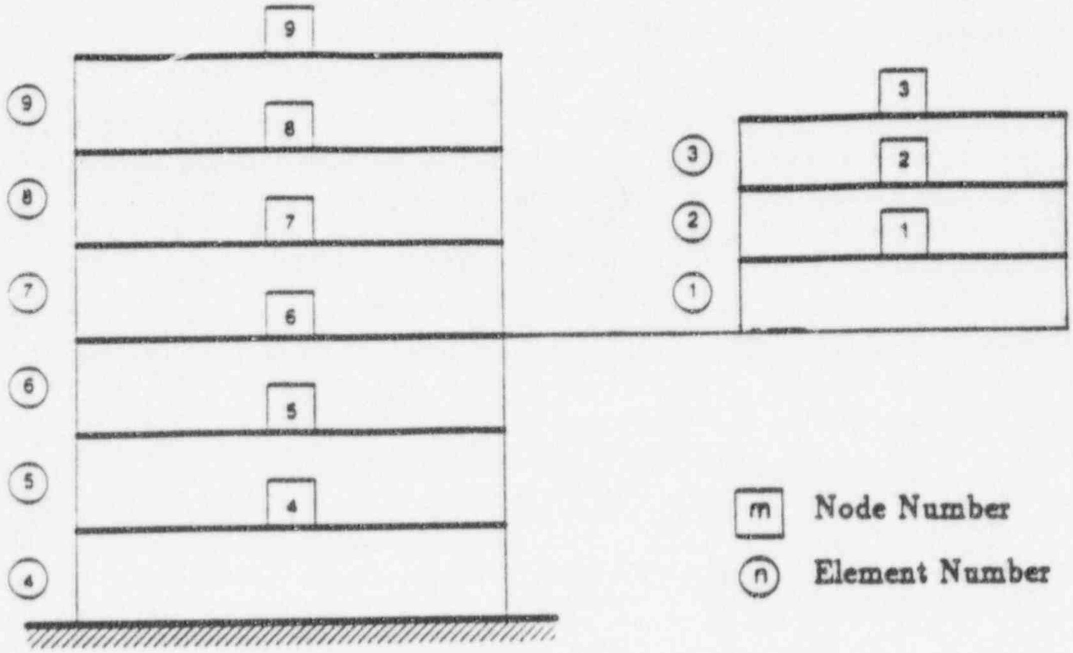

Figure 7 Example Coupled System

Table 1 Coupled Frequencies and Damping Ratios for Various Cases

Case	Frequencies (Hz) / Damping Ratios (%)								
	1	2	3	4	5	6	7	8	9
1	8.132	8.155	22.833	23.966	33.019	38.360	50.548	59.790	65.567
	5.338	3.663	2.071	6.932	2.002	6.999	6.997	7.000	6.998
2	8.123	12.506	23.953	35.006	38.367	50.558	50.590	59.790	65.576
	6.970	2.029	6.994	2.015	6.991	6.973	2.028	7.000	6.996
3	8.124	13.696	23.958	38.356	38.361	50.557	55.434	59.791	65.580
	6.976	2.024	6.994	2.053	6.955	6.991	2.010	7.000	6.997
4	8.122	23.133	24.210	38.367	50.547	59.787	65.587	65.618	94.771
	6.993	3.179	5.827	6.998	6.990	6.997	6.788	2.229	2.002
5	8.129	23.874	38.292	38.371	50.676	59.794	65.562	107.480	155.200
	6.990	6.959	2.707	6.378	6.959	6.999	6.990	2.008	2.000

Table 2 Comparison of Nodal Displacements and Spring Forces from the Present Method

Case	Node	Nodal Displacements (inch)		Element	Spring Forces (kips)	
		All Modes	Residual Modes		All Modes	Residual Modes
1	1	0.4328	0.4322	1	30.180	30.270
	2	0.7296	0.7299	2	23.850	23.940
	3	0.8936	0.8948	3	13.140	13.200
2	1	0.1113	0.1112	1	5.812	5.809
	2	0.1322	0.1321	2	4.230	4.120
	3	0.1431	0.1431	3	2.141	2.144
3	1	0.1051	0.1051	1	5.323	5.322
	2	0.1231	0.1212	2	3.702	3.699
	3	0.1295	0.1295	3	1.898	1.900
4	1	0.0912	0.0912	1	6.546	6.559
	2	0.0977	0.0977	2	4.673	4.703
	3	0.1010	0.1011	3	2.437	2.461
5	1	0.0843	0.0843	1	4.360	4.353
	2	0.0860	0.0860	2	2.932	2.922
	3	0.0868	0.0868	3	1.474	1.468

Summary and Conclusions

The conventional uncoupled analysis of secondary system gives resonse values that may be one or more orders of magnitude higher than the actual coupled resonse. In recent years, several efficient methods have been developed that treat the primary and secondary systems as a single coupled mutli-degree-of-freedom (MDOF) system. It is shown that the original method of analysis in which the modal responses are represented in terms of the relative displacements and velocities of the equivalent SDOF oscillators is mathematically identical to a newly proposed canonical method in which the *sine* and *cosine* responses are used. Since the relative displacements and velocities are physical quantities, it is proposed to continue to use the original method of analysis. The corresponding response spectrum method requires definition of relative displacement-based response spectrum, which is also used in the conventionally performed analysis of the classically damped systems and is commonly available, and of a new relative velocity-based spectrum. The modal responses are calculated in terms of these two spectral values. Combination of modal responses requires definition of correlation coefficients ε_{ij}^{d}, ε_{ij}^{v}, and μ_{ij}. Investigations related to the new relative velocity spectrum and the correlation coefficients are reported in the paper.

To numerically evaluate the spectrum and the correlation coefficients for a given earthquake, we need to calculate the response of SDOF systems subjected to ground motion. It is shown that the time-domain analysis introduces spurious inputs in the calculation of the relative velocity of an SDOF system having frequencies beyond the Nyquist frequency of the earthquake record. An appropriate frequency-domain analysis eliminates the problem.

The Rosenblueth equation for ε_{ij}^{d} is first modified to be in better agreement with the Der Kiureghian equation by eliminating the earthquake duration term and by including a term to account for different modal damping values, thus obtaining a better agreement with the average numerical values from the twelve actual earthquakes. These equations are further modified to improve agreement between the equation and numerical values, especially for systems with relatively higher damping values, in the order of 10%. New equations are also proposed for ε_{ij}^{v} and μ_{ij}.

The high frequency effects in modal combination are incorporated using the rigid response coefficients α_i^d and α_i^v. A previously proposed equation for α_i^d, that gives a straight line variation with respect to the modal frequency f_i on a semi-log chart and is independent of the modal damping value, has been modified to include a damping dependent term introducing a parabolic representation of the coefficient. A similar equation is proposed for α_i^v. Empirical equations are obtained for the key frequencies $f_1{}^d$, $f_2{}^d$, $f_1{}^v$ and $f_2{}^v$ that are needed in the evaluation of the rigid response coefficients.

In the present seismic analysis practice, only relative displacement-based design spectra are given. For the analysis of the nonclassically damped systems, therefore, one needs to estimate the relative velocity spectrum from a given relative displacement spectrum. An existing method of making such estimations that is based on two key frequencies f_L and f_H is reviewed. The method gives estimates of the relative velocity spectra that are in good agreement with the actual spectra, provided that the key frequency, f_H, is recalculated based on the new frequency-domain analysis.

Finally, results of the coupled analysis from a new formulation are presented. It is shown that the effect of uncalculated uncoupled primary and secondary system modes having frequencies beyond the rigid frequency can be accounted for by introducing residual mode vectors both for primary and secondary systems.

Acknowledgments

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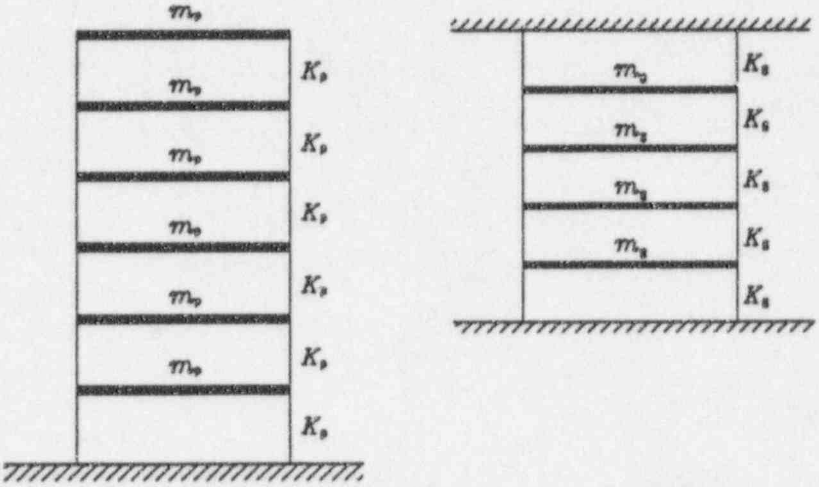
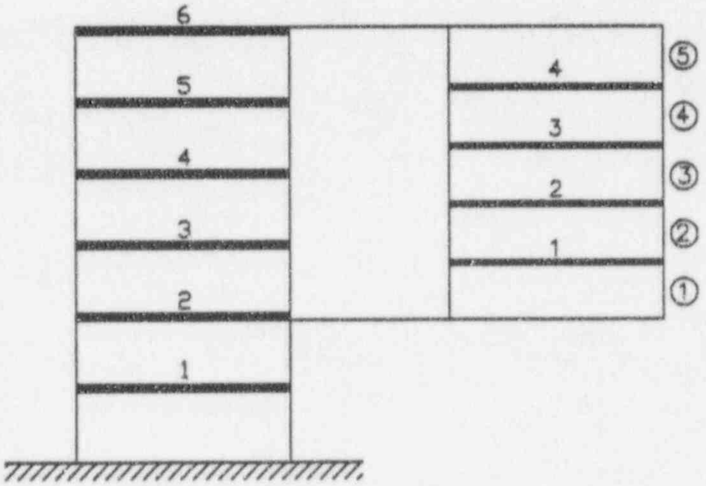
VERIFICATION PROBLEMS



Primary System
$m_p = 1.0$ Kip-s^2/in
$K_p = 3000$ Kips/in

Secondary System
$m_s = 0.1$ Kip-s^2/in
$K_s = 1000$ Kips/in


6
5
4
3
2
1
4
3
2
1
⑤
④
③
②
①

Coupled System

Figure 1: Primary, Secondary and Coupled Systems, Case 1

Table 1: Frequencies and Damping Ratios - Case 1

6-DOF Primary System			4-DOF Secondary System		
Mode No.	Freq. (Hz.)	Damping Ratio	Mode No.	Freq. (Hz.)	Damping Ratio
1	2.10148	0.07	1	9.83625	0.02
2	6.18237	0.07	2	18.71025	0.02
3	9.90389	0.07	3	25.75100	0.02
4	13.04991	0.07	4	30.27286	0.02
5	15.43755	0.07			
6	16.92772	0.07			

Table 2: Comparison of Nodal Displacements (inches) for Secondary System - Case 1

Node no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	1.281	1.277	1.289
2	1.498	1.493	1.498
3	1.688	1.682	1.682
4	1.849	1.842	1.838

Table 3: Comparison of Spring Forces (kips) for Secondary System - Case 1

Element no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	240.4	239.7	239.9
2	217.6	217.0	214.8
3	191.0	190.3	185.9
4	161.3	160.6	155.6
5	128.8	128.2	124.1

```
IDEN JB=1111 IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL SU=1 CV=2 T1=/CASE-1, 4-DOF PROBLEM/
FREQ FR=33 LO=1 MX=4 TI=/INCLUDING ALL MODES /
RCAS CA=1 EV=1 TY=1 SU=3 LO=1 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 SU=1 FX=1 FY=1 FZ=1
SPEC EV=1 ME=1 FP=0 SH=0
     LV=1 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=2 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=3 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=4 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=5 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=6 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
MATL CD=3 EC=28.0 SC=75 SH=75 KL=1
ANCH PT=1 LV=1
SPRS PT=2 DX=1.0 AZ=1000.0
LUMP PT=2 MA=38.64
RSUP PT=2 DY=1 LV=2
RSUP PT=2 DZ=1 LV=2
ROTR PT=2 RX=1
ROTR PT=2 RY=1
ROTR PT=2 RZ=1
SPRS PT=3 DX=1.0 AZ=1000.0
LUMP PT=3 MA=38.64
RSUP PT=3 DY=1 LV=3
RSUP PT=3 DZ=1 LV=3
ROTR PT=3 RX=1
ROTR PT=3 RY=1
ROTR PT=3 RZ=1
SPRS PT=4 DX=1.0 AZ=1000.0
LUMP PT=4 MA=38.64
RSUP PT=4 DY=1 LV=4
RSUP PT=4 DZ=1 LV=4
ROTR PT=4 RX=1
ROTR PT=4 RY=1
ROTR PT=4 RZ=1
SPRS PT=5 DX=1.0 AZ=1000.0
LUMP PT=5 MA=38.64
RSUP PT=5 DY=1 LV=5
RSUP PT=5 DZ=1 LV=5
ROTR PT=5 RX=1
ROTR PT=5 RY=1
ROTR PT=5 RZ=1
SPRS PT=6 DX=1.0 AZ=1000.0
ANCH PT=6 LV=6
ENDP
```

```
CREST/ PIPESTRESS RUN FOR CASE-1, WITH ALL THE S.S. MODES
    6     2     2     6     4     1     0  11  1     1     0     0    1
  900    10    10     1.0E-6        20.5        386.4 0.10
      0.07        0.07        0.07        0.07        0.07       0.07
      0.02        0.02        0.02        0.02
    2     6
    1    16
100000000. 0.0
0.0       100000000.
1 6
2.10148200 6.18237000 9.9038940 13.0499100 15.4375500 16.9277200
 -0.25778    -0.55066     0.36783     0.13275      0.51865  0.45651
-0.55066   0.51865      0.45651     0.36783    -0.25778  0.13275
 -0.2284E+01 -0.7313E+00  0.4018E+00 -0.2457E+00 -0.1456E+00  0.6836E-01
   10  0.020089
 2.1291.2220 6.5500.8379 8.9410.718911.1560.715613.2270.534515.3120.6440
16.9800.514619.3090.515525.9200.439530.3200.4303
   10  0.020570
 2.1291.2127 6.5500.8284 8.9410.715011.1560.711113.2270.533415.3120.6403
16.9800.513619.3090.513825.9200.437630.3200.4285
   10  0.025668
 2.1291.1228 6.5500.7413 8.9410.678211.1560.668913.2270.520215.3120.6033
16.9800.503619.3090.497425.9200.418530.3200.4137
   10  0.038864
 2.1290.9478 6.5500.6178 8.9410.608711.1560.591713.2270.483915.3120.5476
16.9800.484919.3090.467825.9200.380330.3200.387
   10  0.047920
 2.1290.8611 6.5500.5556 8.9410.578511.1560.559513.2270.463315.3120.5251
16.9800.471719.3090.452325.9200.364630.3200.3754
   10  0.064194
 2.1290.7464 6.5500.4921 8.9410.537511.1560.519413.2270.457315.3120.4935
16.9800.458219.3090.431625.9200.358930.3200.3621
   10  0.064384
 2.1290.7453 6.5500.4918 8.9410.537111.1560.519113.2270.457315.3120.4932
16.9800.458019.3090.431425.9200.358930.3200.3620
   10  0.065102
 2.1290.7412 6.5500.4907 8.9410.535611.1560.517613.2270.457015.3120.4920
16.9800.457419.3090.430625.9200.358730.3200.3615
   10  0.067043
 2.1290.7302 6.5500.4876 8.9410.531511.1560.513713.2270.456115.3120.4889
16.9800.455819.3090.428725.9200.358130.3200.3604
   10  0.068084
 2.1290.7245 6.5500.4862 8.9410.529411.1560.511713.2270.455615.3120.4872
16.9800.454919.3090.427625.9200.357830.3200.3598
```

```
CREST/ PIPESTRESS RUN FOR CASE-1, WITH ALL THE S.S. MODES

  NUMBER OF PRIMARY DOF              NP=    6

  NUMBER OF CONNECTING DOF           NC=    3

  NUMBER OF PIPING ANCHORS           NA=    2

  NUMBER OF PRIMARY MODES           NPM=    6

  NUMBER OF SECONDARY MODES         NSM=    4

  NORMALIZATION INDEX FOR P.S.    NORMP=    1

  NORMALIZATION INDEX FOR S.S.    NORMS=    0

  OUTPUT TYPE INDICATOR          IPRINT=    1

  OUTPUT TYPE INDICATOR         IPRINTS=    1

  PRIMARY RESIDUAL MODE KEY       KRESP=    0

  SECONDARY RESIDUAL MODE KEY     KRESS=    0

  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX       NONZP=   11

  GLOBAL EARTHQUAKE DIRECTION  X=1  Y=2(VERTICAL)  Z=3       KFLD=    1

  NUMBER OF ITERATIONS           NITER=  900

  NUMBER OF SPECTRA CURVES      NCURVE=   10

  NUMBER OF SPECTRUM POINTS       NXLP=   10

  ITERATION TOLERANCE              TOL=  0.1000E-05

  RIGID FREQUENCY                   FR=  26.500

  SPECTRUM FACTOR                 SFTR= 386.400

  CORRELATION TOLERANCE             ET=   0.100


  TOTAL STORAGE REQUIRED   =      27023
  ACTUAL PROVIDED STORAGE  = 550000000

  PRIMARY DAMPING RATIOS

  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01

  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01

  CONNECTING DOF # OF PRIMARY SYSTEM

    2    6

  CONNECTING DOF # OF PIPING SUPPORTS

    1   16

  STIFFNESS OF CONNECTING DOF OF S.S.

  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09

  NODE # OF PIPING ANCHORS

    1    6

  MASS OF EACH SECONDARY DOF

  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00

  ADDRESS OF DIAGONAL ELEMENTS IN S.S. STIFFNESS MATRIX (JDG MATRIX)

    1    3    6   10   15   21   28   36   45   55   66   78   85   93  102  112
  123  135  142  150  159  169  180  192  199  207  216  226  237  249  256  264
  273  283  294  306

  LOWER TRIANGULAR STIFFNESS MATRIX OF SECONDARY SYSTEM

  0.1000E+09  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.2000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.1000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
```

```
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.2000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.1000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10

  SECONDARY FREQUENCIES (HZ)

   9.8362888  18.7097518  25.7517959  30.2730820

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF       2

  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF       6

  0.2000E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  UNNORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.6180E-05  0.1000E-04  0.1000E-04 -0.6180E-05
 -0.8759E-31  0.7474E-24  0.1115E-26  0.1288E-20
 -0.4080E-31  0.4754E-24 -0.7232E-27 -0.1860E-21
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4899E-32 -0.5707E-25  0.8682E-28  0.2233E-22
 -0.1051E-31  0.8972E-25  0.1339E-27  0.1547E-21
  0.6180E+00  0.1000E+01  0.1000E+01 -0.6180E+00
 -0.8759E-19  0.7474E-12  0.1115E-14  0.1288E-08
 -0.4080E-19  0.4754E-12 -0.7232E-15 -0.1860E-09
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5770E-31  0.1577E-20 -0.1458E-23  0.2630E-21
 -0.4160E-37 -0.1577E-20  0.2921E-23  0.1822E-20
  0.1000E+01  0.6181E+00 -0.6180E+00  0.1000E+01
 -0.1254E-18  0.1070E-11 -0.7769E-15 -0.1420E-08
 -0.6100E-19 -0.2997E-13 -0.8044E-15  0.2692E-08
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4159E-27 -0.9855E-22 -0.2919E-23 -0.3454E-21
 -0.5198E-28 -0.3156E-20  0.4378E-23  0.4230E-17
  0.1000E+01 -0.6179E+00 -0.6180E+00 -0.1000E+01
 -0.5963E-19  0.5151E-12  0.9987E-15  0.2244E-08
  0.1023E-19 -0.3489E-12 -0.8497E-15  0.3299E-08
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.8548E-32 -0.1578E-20 -0.2919E-23 -0.1692E-16
  0.2079E-27 -0.1578E-20  0.2131E-27 -0.4230E-17
  0.6180E+00 -0.9999E+00  0.1000E+01 -0.6180E+00
  0.6302E-19 -0.7852E-12  0.5194E-15 -0.1254E-08
 -0.9885E-19 -0.7367E-14  0.5795E-16 -0.4316E-09
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1309E-31  0.2461E-22  0.1823E-24  0.1058E-17
  0.1472E-31  0.4733E-20 -0.1460E-23 -0.4230E-17
  0.6180E-05 -0.9999E-05  0.1000E-04 -0.6180E-05
  0.6303E-31 -0.7851E-24  0.5184E-27 -0.1254E-20
 -0.9885E-31 -0.7366E-26  0.5794E-28 -0.4315E-21
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2999E-37 -0.8723E-30  0.1576E-31  0.1796E-25
 -0.3032E-35  0.7951E-28 -0.1160E-31 -0.2750E-24

  NORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.1176E-04  0.1902E-04  0.1902E-04 -0.1176E-04
 -0.1666E-30  0.1422E-23  0.2121E-26  0.2451E-20
 -0.7762E-31  0.9042E-24 -0.1376E-26 -0.3538E-21
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9318E-32 -0.1086E-24  0.1651E-27  0.4247E-22
 -0.2000E-31  0.1707E-24  0.2547E-27  0.2942E-21
  0.1176E+01  0.1902E+01  0.1902E+01 -0.1176E+01
 -0.1666E-18  0.1422E-11  0.2121E-14  0.2451E-08
 -0.7762E-19  0.9042E-12 -0.1376E-14 -0.3538E-09
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1098E-30  0.3000E-20 -0.2774E-23  0.5002E-21
-0.7911E-27 -0.2999E-20  0.5555E-23  0.3466E-30
 0.1902E+01  0.1176E+01 -0.1176E+01  0.1902E+01
-0.2384E-19  0.2036E-11 -0.1478E-14 -0.2702E-08
-0.1160E-18 -0.5700E-13 -0.1530E-14  0.5121E-08
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.7911E-27 -0.1875E-21 -0.5552E-23 -0.6569E-21
-0.9887E-20 -0.4002E-20  0.8328E-23  0.8045E-17
 0.1902E+01 -0.1175E+01 -0.1176E+01 -0.1902E+01
-0.1134E-18  0.9798E-12  0.1900E-14  0.4268E-08
 0.1946E-19 -0.4637E-12 -0.1616E-14  0.6275E-08
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.1626E-31 -0.3001E-20 -0.5552E-23 -0.3218E-16
 0.3955E-27 -0.3001E-20  0.4053E-27 -0.8045E-17
 0.1176E+01 -0.1902E+01  0.1902E+01  0.1176E+01
 0.1199E-18 -0.1493E-11  0.9861E-15 -0.2385E-08
-0.1880E-18 -0.1401E-13  0.1102E-15 -0.8210E-09
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.2490E-31  0.4682E-22  0.3460E-24  0.2012E-17
 0.2800E-31  0.9003E-20 -0.2776E-23 -0.8047E-17
 0.1176E-04 -0.1902E-04  0.1902E-04  0.1176E-04
 0.1199E-30 -0.1493E-23  0.9861E-27 -0.2385E-20
-0.1880E-30 -0.1401E-25  0.1102E-27 -0.8208E-21
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.5704E-37 -0.1659E-29  0.2998E-31  0.3416E-25
-0.3865E-35  0.1512E-27 -0.2207E-31 -0.5231E-24


PRIMARY FREQUENCIES (HZ)

 2.1014820   6.1823700   9.9038940  13.0499100  15.4375500  16.9277200


MODE SHAPE OF P.S. AT CONNECTING DOF        2

-0.2578E+00 -0.5507E+00  0.3678E+00  0.1328E+00  0.5187E+00  0.4565E+00


MODE SHAPE OF P.S. AT CONNECTING DOF        6

-0.5507E+00  0.5187E+00  0.4565E+00  0.3678E+00 -0.2578E+00  0.1328E+00


BASE INFLUENCE VECTOR FOR S.S ---UBS

0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


PARTICIPATION FACTOR FOR P.S ---GAMAP

-0.2284E+01 -0.7313E+00  0.4018E+00 -0.2457E+00 -0.1456E+00  0.6836E-01


INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20089E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
         1     0.2129E+01     0.1222E+01
         2     0.6550E+01     0.8379E+00
         3     0.8941E+01     0.7189E+00
         4     0.1116E+02     0.7156E+00
         5     0.1323E+02     0.5345E+00
         6     0.1531E+02     0.6440E+00
         7     0.1698E+02     0.5146E+00
         8     0.1931E+02     0.5155E+00
         9     0.2592E+02     0.4395E+00
        10     0.3032E+02     0.4303E+00


INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20570E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
         1     0.2129E+01     0.1213E+01
         2     0.6550E+01     0.8284E+00
         3     0.8941E+01     0.7150E+00
         4     0.1116E+02     0.7111E+00
         5     0.1323E+02     0.5334E+00
         6     0.1531E+02     0.6403E+00
         7     0.1698E+02     0.5136E+00
         8     0.1931E+02     0.5138E+00
         9     0.2592E+02     0.4376E+00
        10     0.3032E+02     0.4285E+00


INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.25668E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
         1     0.2129E+01     0.1123E+01
         2     0.6550E+01     0.7413E+00
         3     0.8941E+01     0.6782E+00
         4     0.1116E+02     0.6689E+00
         5     0.1323E+02     0.5202E+00
         6     0.1531E+02     0.6033E+00
         7     0.1698E+02     0.5036E+00
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         8     0.1931E+02     0.4974E+00
         9     0.2592E+02     0.4185E+00
        10     0.3032E+02     0.4137E+00


INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.38864E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
         1     0.2129E+01     0.9478E+00
         2     0.6550E+01     0.5178E+00
         3     0.8941E+01     0.6087E+00
         4     0.1116E+02     0.5917E+00
         5     0.1323E+02     0.4839E+00
         6     0.1531E+02     0.5476E+00
         7     0.1698E+02     0.4849E+00
         8     0.1931E+02     0.4678E+00
         9     0.2592E+02     0.3863E+00
        10     0.3032E+02     0.3870E+00


INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.47920E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
         1     0.2129E+01     0.8611E+00
         2     0.6550E+01     0.5556E+00
         3     0.8941E+01     0.5785E+00
         4     0.1116E+02     0.5595E+00
         5     0.1323E+02     0.4633E+00
         6     0.1531E+02     0.5251E+00
         7     0.1698E+02     0.4717E+00
         8     0.1931E+02     0.4573E+00
         9     0.2592E+02     0.3646E+00
        10     0.3032E+02     0.3754E+00


INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.64194E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
         1     0.2129E+01     0.7464E+00
         2     0.6550E+01     0.4921E+00
         3     0.8941E+01     0.5375E+00
         4     0.1116E+02     0.5194E+00
         5     0.1323E+02     0.4571E+00
         6     0.1531E+02     0.4935E+00
         7     0.1698E+02     0.4582E+00
         8     0.1931E+02     0.4316E+00
         9     0.2592E+02     0.3589E+00
        10     0.3032E+02     0.3621E+00


INPUT SPECTRUM CURVE NUMBER =  7

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.64384E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
         1     0.2129E+01     0.7453E+00
         2     0.6550E+01     0.4918E+00
         3     0.8941E+01     0.5371E+00
         4     0.1116E+02     0.5191E+00
         5     0.1323E+02     0.4573E+00
         6     0.1531E+02     0.4932E+00
         7     0.1698E+02     0.4580E+00
         8     0.1931E+02     0.4314E+00
         9     0.2592E+02     0.3589E+00
        10     0.3032E+02     0.3620E+00


INPUT SPECTRUM CURVE NUMBER =  8

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.65102E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
         1     0.2129E+01     0.7412E+00
         2     0.6550E+01     0.4907E+00
         3     0.8941E+01     0.5356E+00
         4     0.1116E+02     0.5176E+00
         5     0.1323E+02     0.4570E+00
         6     0.1531E+02     0.4920E+00
         7     0.1698E+02     0.4574E+00
         8     0.1931E+02     0.4306E+00
         9     0.2592E+02     0.3587E+00
        10     0.3032E+02     0.3615E+00


INPUT SPECTRUM CURVE NUMBER =  9

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.67043E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
         1     0.2129E+01     0.7302E+00
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          2     0.6550E+01     0.4876E+00
          3     0.8941E+01     0.5315E+00
          4     0.1116E+02     0.5137E+00
          5     0.1323E+02     0.4561E+00
          6     0.1531E+02     0.4889E+00
          7     0.1698E+02     0.4558E+00
          8     0.1931E+02     0.4287E+00
          9     0.2592E+02     0.3581E+00
         10     0.3032E+02     0.3654E+00

  INPUT SPECTRUM CURVE NUMBER = 10

  NUMBER OF DEFINITION POINTS = 10

  DAMPING RATIO FOR THIS CURVE =     0.68054E-01

        INPUT     FREQUENCY   INPUT SPECTRAL
        POINT       (HZ)       ACCELERATION
          1     0.2129E+01     0.7245E+00
          2     0.6550E+01     0.4862E+00
          3     0.8941E+01     0.5294E+00
          4     0.1116E+02     0.5117E+00
          5     0.1323E+02     0.4556E+00
          6     0.1531E+02     0.4872E+00
          7     0.1698E+02     0.4549E+00
          8     0.1931E+02     0.4276E+00
          9     0.2592E+02     0.3570E+00
         10     0.3032E+02     0.3598E+00



        ****************************************************************
        *                                                              *
        *                                                              *
        *                                                              *
        *                 A COMPUTER PROGRAM FOR                       *
        *                                                              *
        *                                                              *
        *    COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS   *
        *                                                              *
        *                      " C R E S T "                           *
        *                                                              *
        *                                                              *
        *                      DEVELOPED BY                            *
        *                                                              *
        *                   AJAYA KUMAR GUPTA                          *
        *              JING-WEN JAW   ABHINAV GUPTA              *
        *                                                              *
        *              NORTH CAROLINA STATE UNIVERSITY                 *
        *                 RALEIGH, NORTH CAROLINA                      *
        *                                                              *
        *                     REVISION-1.0                            *
        *                                                              *
        *                                                              *
        ****************************************************************


 PARTICIPATION FACTOR FOR S.S ---GAMAS
 0.6155E+00  0.5509E-04  0.1453E+00 -0.3661E-08

 MASS RATIOS

   PRIMARY SYSTEM MODE     1
 0.6191E-01  0.1623E-02  0.3650E-02  0.9056E-04

   PRIMARY SYSTEM MODE     2
 0.9706E-04  0.2164E-01  0.5409E-05  0.1207E-02

   PRIMARY SYSTEM MODE     3
 0.6437E-01  0.1684E-03  0.3587E-02  0.8302E-05

   PRIMARY SYSTEM MODE     4
 0.2374E-01  0.1046E-02  0.1323E-02  0.5834E-04

   PRIMARY SYSTEM MODE     5
 0.6446E-02  0.1142E-01  0.3592E-03  0.6364E-03

   PRIMARY SYSTEM MODE     6
 0.3289E-01  0.1987E-02  0.1833E-02  0.1107E-03

 C O U P L E D   F R E Q U E N C I E S   A N D   M O D E   S H A P E S   E X T R A C T I O N

 NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION   NITER =  900

 CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                          TOL = 0.10000E-05

 COUPLED  FREQUENCY  DAMPING RATIO
  MODE       (HZ)        (%)

   1     0.21291E+01    0.64384E+01
   2     0.65495E+01    0.64194E+01
   3     0.89327E+01    0.42667E+01
   4     0.11156E+02    0.47920E+01
   5     0.13227E+02    0.67975E+01
   6     0.15312E+02    0.65101E+01
   7     0.16980E+02    0.67040E+01
   8     0.19309E+02    0.25670E+01
   9     0.25920E+02    0.20570E+01
  10     0.30310E+02    0.20089E+01

 UNIT DISPLACEMENT & UNIT VELOCITY*W RESPONSE


 COUPLED MODE NO.    1
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     1     0.64571E+00     0.10810E-02
     2     0.12297E+01    -0.11230E-02
     3     0.33033E-06    -0.41562E-07
     4     0.22961E-24    -0.29932E-25
     5    -0.34315E-25     0.44735E-26
     6     0.00000E+00     0.00000E+00
     7     0.41195E-26    -0.53692E-27
     8     0.27565E-25    -0.35933E-26
     9     0.33033E-01    -0.41563E-02
    10     0.22961E-12    -0.29932E-13
    11    -0.34315E-13     0.44725E-14
    12     0.00000E+00     0.00000E+00
    13    -0.31166E-23     0.40393E-24
    14     0.34924E-23    -0.45291E-24
    15     0.51822E-01    -0.65274E-02
    16    -0.25691E-12     0.33488E-13
    17     0.48235E-12    -0.62955E-13
    18     0.00000E+00     0.00000E+00
    19     0.13040E-24    -0.16876E-25
    20     0.76500E-21    -0.99718E-22
    21     0.53941E-01    -0.68618E-02
    22     0.40148E-12    -0.52335E-13
    23     0.59240E-12    -0.77222E-13
    24     0.00000E+00     0.00000E+00
    25    -0.30310E-20     0.39531E-21
    26    -0.75548E-21     0.98484E-22
    27     0.37264E-01    -0.47048E-02
    28    -0.22330E-12     0.29120E-13
    29    -0.77404E-13     0.10690E-13
    30     0.00000E+00     0.00000E+00
    31     0.18971E-21    -0.24730E-22
    32    -0.76829E-21     0.10014E-21
    33     0.37263E-06    -0.47047E-07
    34    -0.22337E-26     0.29118E-25
    35    -0.77385E-25     0.10088E-25
    36     0.00000E+00     0.00000E+00
    37     0.32231E-29    -0.42014E-30
    38    -0.49485E-28     0.64505E-29

 COUPLED MODE NO.    2

     1     0.31888E+00    -0.92882E-02
     2    -0.32116E+00     0.62400E-02
     3     0.23670E-06    -0.45415E-07
     4    -0.24783E-23     0.37152E-24
     5     0.37135E-24    -0.55734E-25
     6     0.00000E+00     0.00000E+00
     7    -0.44580E-25     0.66908E-26
     8    -0.29751E-24     0.44600E-25
     9     0.23671E-01    -0.45415E-02
    10    -0.24783E-11     0.37152E-12
    11     0.37135E-12    -0.55734E-13
    12     0.00000E+00     0.00000E+00
    13     0.36269E-22    -0.56135E-33
    14    -0.40299E-22     0.62176E-23
    15     0.11164E-01    -0.31019E-02
    16     0.27761E-11    -0.41638E-12
    17    -0.52154E-11     0.78202E-12
    18     0.00000E+00     0.00000E+00
    19    -0.16291E-23     0.25532E-24
    20    -0.82664E-20     0.12398E-20
    21    -0.13786E-01     0.77654E-03
    22    -0.43346E-11     0.64989E-12
    23    -0.63979E-11     0.95936E-12
    24     0.00000E+00     0.00000E+00
    25     0.32737E-19    -0.49085E-20
    26     0.81558E-20    -0.12227E-20
    27    -0.25362E-01     0.30329E-02
    28     0.24109E-11    -0.36142E-12
    29     0.83586E-12    -0.12533E-12
    30     0.00000E+00     0.00000E+00
    31    -0.20486E-20     0.30710E-21
    32     0.83046E-20    -0.12457E-20
    33    -0.25362E-06     0.30328E-07
    34     0.24108E-23    -0.36140E-24
    35     0.83566E-24    -0.12530E-24
    36     0.00000E+00     0.00000E+00
    37    -0.34807E-28     0.52191E-29
    38     0.53451E-27    -0.80155E-28

 COUPLED MODE NO.    3

     1     0.46321E-02     0.65865E-02
     2     0.43029E-02     0.48884E-02
     3     0.19227E-06     0.14911E-06
     4    -0.25415E-26    -0.53430E-27
     5     0.38208E-27     0.80223E-28
     6     0.00000E+00     0.00000E+00
     7    -0.45867E-28    -0.96306E-29
     8    -0.30510E-27    -0.64141E-28
     9     0.19227E-01     0.14911E-01
    10    -0.25415E-14    -0.53430E-15
    11     0.38208E-15     0.80223E-16
    12     0.00000E+00     0.00000E+00
    13     0.40608E-25     0.82775E-26
    14    -0.44479E-25    -0.88181E-26
    15     0.30657E-01     0.23602E-01
    16     0.28514E-14     0.59956E-15
    17    -0.53527E-14    -0.11259E-14
    18     0.00000E+00     0.00000E+00
    19    -0.24398E-26    -0.10676E-26
    20    -0.84901E-23    -0.17848E-23
    21     0.30628E-01     0.23596E-01
    22    -0.44471E-14    -0.93512E-15
    23    -0.65670E-14    -0.13813E-14
    24     0.00000E+00     0.00000E+00
    25     0.33593E-22     0.70646E-23
    26     0.83664E-23     0.17596E-23
    27     0.19172E-01     0.14900E-01
 28     0.24726E-14    0.52012E-15
 29     0.85782E-15    0.18042E-15
 30     0.00000E+00    0.00000E+00
 31    -0.21024E-23   -0.44113E-24
 32     0.85336E-23    0.17945E-23
 33     0.19172E-06    0.14899E-06
 34     0.24725E-26    0.52009E-27
 35     0.85762E-27    0.18038E-27
 36     0.00000E+00    0.00000E+00
 37    -0.35720E-31   -0.75096E-32
 38     0.54874E-30    0.11541E-30

COUPLED MODE NO.    4

  1     0.91637E-01   -0.15338E-01
  2     0.13897E+00   -0.17405E-01
  3    -0.36640E-05   -0.12053E-06
  4     0.58485E-24   -0.80437E-25
  5    -0.88386E-25    0.12228E-25
  6     0.00000E+00    0.00000E+00
  7     0.10611E-25   -0.14679E-26
  8     0.70210E-25   -0.96564E-26
  9    -0.36640E+00   -0.12053E-01
 10     0.58485E-12   -0.86437E-13
 11    -0.88386E-13    0.12228E-13
 12     0.00000E+00    0.00000E+00
 13    -0.10589E-22    0.16505E-23
 14     0.11552E-22   -0.17840E-23
 15    -0.60139E+00   -0.16777E-01
 16    -0.65756E-12    0.90668E-13
 17     0.12328E-11   -0.16974E-12
 18     0.00000E+00    0.00000E+00
 19     0.48900E-24   -0.77146E-25
 20     0.19580E-20   -0.26998E-21
 21    -0.59392E+00   -0.17955E-01
 22     0.10239E-11   -0.14092E-12
 23     0.15127E-11   -0.20832E-12
 24     0.00000E+00    0.00000E+00
 25    -0.77360E-20    0.10650E-20
 26    -0.19258E-20    0.26496E-21
 27    -0.35227E+00   -0.14242E-01
 28    -0.56887E-12    0.78231E-13
 29    -0.19756E-12    0.27201E-13
 30     0.00000E+00    0.00000E+00
 31     0.48421E-21   -0.66667E-22
 32    -0.19690E-20    0.27168E-21
 33    -0.35227E-05   -0.14242E-06
 34    -0.56884E-24    0.78228E-25
 35    -0.19752E-24    0.27195E-25
 36     0.00000E+00    0.00000E+00
 37     0.82285E-29   -0.11331E-29
 38    -0.12644E-27    0.17420E-28

COUPLED MODE NO.    5

  1    -0.29279E-01   -0.66334E-03
  2    -0.88352E-01   -0.21329E-02
  3     0.10272E-05    0.95018E-07
  4    -0.11007E-23    0.13307E-24
  5     0.16780E-24   -0.20902E-25
  6     0.00000E+00    0.00000E+00
  7    -0.20144E-25    0.25092E-26
  8    -0.13214E-24    0.15974E-25
  9     0.10272E+00    0.95019E-02
 10    -0.11007E-11    0.13307E-12
 11     0.16780E-12   -0.20902E-13
 12     0.00000E+00    0.00000E+00
 13     0.23859E-22   -0.45501E-23
 14    -0.25662E-22    0.47690E-23
 15     0.16225E+00    0.16753E-01
 16     0.12423E-11   -0.15218E-12
 17    -0.23262E-11    0.28265E-12
 18     0.00000E+00    0.00000E+00
 19    -0.11894E-23    0.24748E-24
 20    -0.36990E-20    0.45310E-21
 21     0.14511E+00    0.20130E-01
 22    -0.19290E-11    0.23404E-12
 23    -0.28527E-11    0.34725E-12
 24     0.00000E+00    0.00000E+00
 25     0.14580E-19   -0.17713E-20
 26     0.36266E-20   -0.43935E-21
 27     0.71125E-01    0.15475E-01
 28     0.10705E-11   -0.12935E-12
 29     0.37263E-12   -0.45281E-13
 30     0.00000E+00    0.00000E+00
 31    -0.91278E-21    0.11097E-21
 32     0.37237E-20   -0.45775E-21
 33     0.71124E-06    0.15435E-06
 34     0.10705E-23   -0.12935E-24
 35     0.37234E-24   -0.45270E-25
 36     0.00000E+00    0.00000E+00
 37    -0.15514E-28    0.18875E-29
 38     0.23857E-27   -0.29094E-28

COUPLED MODE NO.    6

  1    -0.78160E-01    0.78314E-03
  2     0.29161E-01    0.21743E-02
  3    -0.29584E-06    0.15984E-06
  4     0.28949E-23   -0.38425E-24
  5    -0.44970E-24    0.64426E-25
  6     0.00000E+00    0.00000E+00
  7     0.53986E-25   -0.77343E-26
  8     0.34753E-24   -0.46129E-25
  9    -0.29584E-01    0.15984E-01
 10     0.28949E-11   -0.38425E-12
 11    -0.44970E-12    0.64426E-13
 12     0.00000E+00    0.00000E+00
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 13    -0.85422E-22    0.24141E-22
 14     0.90146E-22   -0.24775E-22
 15     0.19385E-01    0.80482E-03
 16    -0.32945E-11    0.45265E-12
 17     0.61356E-11   -0.82733E-12
 18     0.00000E+00    0.00000E+00
 19     0.45994E-23   -0.14100E-23
 20     0.98091E-20   -0.13476E-20
 21     0.82249E-01   -0.10322E-01
 22     0.50848E-11   -0.68151E-12
 23     0.75352E-11   -0.10186E-11
 24     0.00000E+00    0.00000E+00
 25    -0.38465E-19    0.51726E-20
 26    -0.95507E-20    0.12749E-20
 27     0.82322E-01   -0.15113E-01
 28    -0.28147E-11    0.37314E-12
 29    -0.98301E-12    0.13245E-12
 30     0.00000E+00    0.00000E+00
 31     0.24091E-20   -0.32456E-21
 32    -0.98959E-20    0.13720E-20
 33     0.82321E-06   -0.15113E-06
 34    -0.28145E-23    0.37312E-24
 35    -0.98278E-24    0.13242E-24
 36     0.00000E+00    0.00000E+00
 37     0.40966E-28   -0.55293E-29
 38    -0.63089E-27    0.85682E-28

COUPLED MODE NO.    7

  1     0.30069E-01    0.  568E-03
  2     0.14861E-01   -0.42199E-02
  3    -0.18697E-07   -0.41178E-07
  4    -0.56722E-24   -0.76161E-25
  5     0.92146E-25    0.85716E-26
  6     0.00000E+00    0.00000E+00
  7    -0.11062E-25   -0.10290E-26
  8    -0.68093E-25   -0.91430E-26
  9    -0.18697E-02   -0.41178E-02
 10    -0.56722E-12   -0.76161E-13
 11     0.92146E-13    0.85716E-14
 12     0.00000E+00    0.00000E+00
 13     0.27642E-22   -0.65656E-23
 14    -0.28567E-22    0.64439E-23
 15    -0.31924E-01    0.27472E-02
 16     0.65862E-12    0.76085E-13
 17    -0.12132E-11   -0.15252E-12
 18     0.00000E+00    0.00000E+00
 19    -0.15931E-23    0.43293E-24
 20    -0.19608E-20   -0.22671E-21
 21    -0.52784E-01    0.55236E-02
 22    -0.10017E-11   -0.12938E-12
 23    -0.14921E-11   -0.18550E-12
 24     0.00000E+00    0.00000E+00
 25     0.75937E-20    0.96591E-21
 26     0.18774E-20    0.24637E-21
 27    -0.37637E-01    0.41214E-02
 28     0.55110E-12    0.74370E-13
 29     0.19429E-12    0.24503E-13
 30     0.00000E+00    0.00000E+00
 31    -0.47611E-21   -0.60087E-22
 32     0.19085E-20    0.23020E-21
 33    -0.37637E-06    0.41214E-07
 34     0.55107E-24    0.74367E-25
 35     0.19424E-24    0.24457E-25
 36     0.00000E+00    0.00000E+00
 37    -0.81048E-29   -0.10147E-29
 38     0.12527E-27    0.15262E-28

COUPLED MODE NO.    8

  1    -0.31799E-03    0.96043E-03
  2     0.27843E-03   -0.57860E-03
  3     0.35029E-07   -0.62604E-07
  4     0.31538E-25   -0.89924E-25
  5    -0.25095E-26    0.93748E-26
  6     0.00000E+00    0.00000E+00
  7     0.30126E-27   -0.11254E-26
  8     0.37861E-26   -0.10795E-25
  9     0.35030E-02   -0.62605E-02
 10     0.31538E-13   -0.89924E-13
 11    -0.25095E-14    0.93748E-14
 12     0.00000E+00    0.00000E+00
 13     0.55304E-23   -0.97680E-23
 14    -0.54823E-23    0.96277E-23
 15     0.22163E-02   -0.42317E-02
 16    -0.28130E-13    0.87416E-13
 17     0.60322E-13   -0.17805E-12
 18     0.00000E+00    0.00000E+00
 19    -0.35296E-24    0.63196E-24
 20     0.85083E-22   -0.26052E-21
 21    -0.21563E-02    0.35424E-02
 22     0.52172E-13   -0.15175E-12
 23     0.72821E-13   -0.21624E-12
 24     0.00000E+00    0.00000E+00
 25    -0.38530E-21    0.11300E-20
 26    -0.10046E-21    0.28978E-21
 27    -0.34749E-02    0.60222E-02
 28    -0.30900E-13    0.87006E-13
 29    -0.97136E-14    0.28621E-13
 30     0.00000E+00    0.00000E+00
 31     0.23832E-22   -0.70194E-22
 32    -0.78373E-22    0.25081E-21
 33    -0.34749E-07    0.60222E-07
 34    -0.30899E-25    0.87881E-25
 35    -0.97113E-26    0.28614E-25
 36     0.00000E+00    0.00000E+00
 37     0.40004E-30   -0.11836E-29
 38    -0.58938E-29    0.17715E-28
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COUPLED MODE NO    9


   1     0.37019E-03    -0.20025E-03
   2     0.32005E-03    -0.15851E-03
   3    -0.78335E-07     0.34653E-07
   4    -0.10763E-25     0.94276E-26
   5     0.15421E-26    -0.13492E-26
   6     0.00000E+00     0.00000E+00
   7    -0.18512E-27     0.16197E-27
   8    -0.12921E-26     0.11318E-26
   9    -0.78335E-02     0.34654E-02
  10    -0.10763E-13     0.94276E-14
  11     0.15421E-14    -0.13492E-14
  12     0.00000E+00     0.00000E+00
  13    -0.34016E-25     0.33826E-25
  14     0.56387E-26    -0.13783E-25
  15     0.41538E-02    -0.17624E-02
  16     0.11810E-13    -0.10347E-13
  17    -0.22422E-13     0.19651E-13
  18     0.00000E+00     0.00000E+00
  19     0.27506E-25    -0.14424E-25
  20    -0.35185E-22     0.30820E-22
  21     0.42040E-02    -0.18057E-02
  22    -0.18717E-13     0.16398E-13
  23    -0.27467E-13     0.24072E-13
  24     0.00000E+00     0.00000E+00
  25     0.14103E-21    -0.12357E-21
  26     0.35280E-22    -0.30915E-22
  27    -0.77896E-02     0.34278E-02
  28     0.10466E-13    -0.91725E-14
  29     0.35956E-14    -0.31520E-14
  30     0.00000E+00     0.00000E+00
  31    -0.88159E-23     0.77248E-23
  32     0.35127E-22    -0.30779E-22
  33    -0.77895E-07     0.34278E-07
  34     0.10465E-25    -0.91721E-26
  35     0.35948E-26    -0.31503E-26
  36     0.00000E+00     0.00000E+00
  37    -0.14971E-30     0.13114E-30
  38     0.22889E-29    -0.20058E-29

COUPLED MODE NO   10


   1     0.73800E-04    -0.16243E-04
   2    -0.66584E-04     0.12914E-04
   3    -0.22315E-07     0.34730E-08
   4     0.45151E-23    -0.69001E-24
   5    -0.65181E-24     0.99612E-25
   6     0.00000E+00     0.00000E+00
   7     0.78248E-25    -0.11958E-25
   8     0.54203E-24    -0.82834E-25
   9    -0.22315E-02     0.34730E-03
  10     0.45151E-11    -0.69001E-12
  11    -0.65181E-12     0.99612E-13
  12     0.00000E+00     0.00000E+00
  13     0.82819E-24    -0.11997E-24
  14     0.64782E-23    -0.99660E-24
  15     0.34653E-02    -0.52620E-03
  16    -0.49773E-11     0.76065E-12
  17     0.94743E-11    -0.14418E-11
  18     0.00000E+00     0.00000E+00
  19    -0.12045E-23     0.18365E-24
  20     0.14822E-19    -0.22652E-20
  21    -0.34703E-02     0.52853E-03
  22     0.78638E-11    -0.12017E-11
  23     0.11560E-10    -0.17666E-11
  24     0.00000E+00     0.00000E+00
  25    -0.59293E-19     0.90613E-20
  26    -0.14822E-19     0.22651E-20
  27     0.22186E-02    -0.34112E-03
  28    -0.43949E-11     0.67163E-12
  29    -0.15125E-11     0.23115E-12
  30     0.00000E+00     0.00000E+00
  31     0.37074E-20    -0.56657E-21
  32    -0.14825E-19     0.22656E-20
  33     0.22185E-07    -0.34111E-08
  34    -0.43947E-23     0.67159E-24
  35    -0.15122E-23     0.23109E-24
  36     0.00000E+00     0.00000E+00
  37     0.62934E-28    -0.96177E-29
  38    -0.96367E-27     0.14727E-27

B A S E   R E S P O N S E   S P E C T R A   D A T A

TOTAL NUMBER OF INPUT SPECTRUM CURVE = 10

MAXIMUM NUMBER OF DEFINITION POINTS IN INPUT SPECTRUM CURVES = 10

SPECTRUM SCALE FACTOR = 0.38640E+03

RIGID FREQUENCY = 0.20500E+02



  SPECTRUM PARAMETERS

  CURVE NO   1  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20089E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION
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         1    0.2129E+01    0.1223E+01            0.1222E+01
         2    0.6550E+01    0.8379E+00            0.7534E+00
         3    0.8941E+01    0.7189E+00            0.6039E+00
         4    0.1116E+02    0.7156E+00            0.5209E+00
         5    0.1323E+02    0.5345E+00            0.3261E+00
         6    0.1531E+02    0.6440E+00            0.3025E+00
         7    0.1699E+02    0.5146E+00            0.1662E+00
         8    0.1931E+02    0.5155E+00            0.1344E+00
         9    0.2592E+02    0.4395E+00            0.8661E-01
        10    0.3032E+02    0.4303E+00            0.7249E-01

  SPECTRUM PARAMETERS

  CURVE NO   2  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20570E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

         1    0.2129E+01    0.1213E+01            0.1213E+01
         2    0.6550E+01    0.8284E+00            0.7838E+00
         3    0.8941E+01    0.7150E+00            0.5995E+00
         4    0.1116E+02    0.7111E+00            0.5163E+00
         5    0.1323E+02    0.5334E+00            0.3245E+00
         6    0.1531E+02    0.6403E+00            0.3000E+00
         7    0.1698E+02    0.5136E+00            0.1658E+00
         8    0.1931E+02    0.5138E+00            0.1359E+00
         9    0.2592E+02    0.4376E+00            0.8623E-01
        10    0.3032E+02    0.4285E+00            0.7219E-01

  SPECTRUM PARAMETERS

  CURVE NO   3  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.25668E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

         1    0.2129E+01    0.1123E+01            0.1123E+01
         2    0.6550E+01    0.7413E+00            0.6960E+00
         3    0.8941E+01    0.6782E+00            0.5594E+00
         4    0.1116E+02    0.6680E+00            0.4737E+00
         5    0.1323E+02    0.5202E+00            0.3076E+00
         6    0.1531E+02    0.6033E+00            0.2754E+00
         7    0.1698E+02    0.5036E+00            0.1614E+00
         8    0.1931E+02    0.4974E+00            0.1316E+00
         9    0.2592E+02    0.4185E+00            0.8247E-01
        10    0.3032E+02    0.4137E+00            0.6969E-01

  SPECTRUM PARAMETERS

  CURVE NO   4  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.38964E-01

     INPCT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

         1    0.2129E+01    0.9478E+00            0.9478E+00
         2    0.6550E+01    0.6178E+00            0.5709E+00
         3    0.8941E+01    0.6087E+00            0.4824E+00
         4    0.1116E+02    0.5917E+00            0.3976E+00
         5    0.1323E+02    0.4839E+00            0.2697E+00
         6    0.1531E+02    0.5476E+00            0.2372E+00
         7    0.1698E+02    0.4849E+00            0.1533E+00
         8    0.1931E+02    0.4678E+00            0.1237E+00
         9    0.2592E+02    0.3803E+00            0.7494E-01
        10    0.3032E+02    0.3870E+00            0.6520E-01

  SPECTRUM PARAMETERS

  CURVE NO   5  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.47920E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

         1    0.2129E+01    0.8611E+00            0.8611E+00
         2    0.6550E+01    0.5556E+00            0.5098E+00
         3    0.8941E+01    0.5785E+00            0.4497E+00
         4    0.1116E+02    0.5595E+00            0.3649E+00
         5    0.1323E+02    0.4633E+00            0.2497E+00
         6    0.1531E+02    0.5251E+00            0.2209E+00
         7    0.1698E+02    0.4717E+00            0.1480E+00
         8    0.1931E+02    0.4523E+00            0.1196E+00
         9    0.2592E+02    0.3646E+00            0.7185E-01
        10    0.3032E+02    0.3754E+00            0.6324E-01
  SPECTRUM PARAMETERS

  CURVE NO   6  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

 INPUT SPECTRUM CURVE NUMBER =  6

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.64194E-01

      INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
      POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

          1     0.2129E+01     0.7464E+00             0.7464E+00
          2     0.6550E+01     0.4921E+00             0.4646E+00
          3     0.8941E+01     0.5375E+00             0.4033E+00
          4     0.1116E+02     0.5194E+00             0.3234E+00
          5     0.1323E+02     0.4573E+00             0.2340E+00
          6     0.1531E+02     0.4935E+00             0.1986E+00
          7     0.1698E+02     0.4582E+00             0.1424E+00
          8     0.1931E+02     0.4316E+00             0.1142E+00
          9     0.2592E+02     0.3589E+00             0.7073E-01
         10     0.3032E+02     0.3621E+00             0.6100E-01

  SPECTRUM PARAMETERS

  CURVE NO   7  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

 INPUT SPECTRUM CURVE NUMBER =  7

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.64384E-01

      INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
      POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

          1     0.2129E+01     0.7453E+00             0.7453E+00
          2     0.6550E+01     0.4918E+00             0.4443E+00
          3     0.8941E+01     0.5371E+00             0.4029E+00
          4     0.1116E+02     0.5191E+00             0.3231E+00
          5     0.1323E+02     0.4573E+00             0.2339E+00
          6     0.1531E+02     0.4932E+00             0.1984E+00
          7     0.1698E+02     0.4580E+00             0.1423E+00
          8     0.1931E+02     0.4314E+00             0.1141E+00
          9     0.2592E+02     0.3589E+00             0.7073E-01
         10     0.3032E+02     0.3620E+00             0.6090E-01

  SPECTRUM PARAMETERS

  CURVE NO   8  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

 INPUT SPECTRUM CURVE NUMBER =  8

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.65102E-01

      INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
      POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

          1     0.2129E+01     0.7412E+00             0.7412E+00
          2     0.6550E+01     0.4907E+00             0.4431E+00
          3     0.8941E+01     0.5356E+00             0.4012E+00
          4     0.1116E+02     0.5176E+00             0.3216E+00
          5     0.1323E+02     0.4570E+00             0.2333E+00
          6     0.1531E+02     0.4920E+00             0.1976E+00
          7     0.1698E+02     0.4574E+00             0.1420E+00
          8     0.1931E+02     0.4306E+00             0.1139E+00
          9     0.2592E+02     0.3587E+00             0.7069E-01
         10     0.3032E+02     0.3615E+00             0.6090E-01

  SPECTRUM PARAMETERS

  CURVE NO   9  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

 INPUT SPECTRUM CURVE NUMBER =  9

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.67043E-01

      INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
      POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

          1     0.2129E+01     0.7302E+00             0.7469E+00
          2     0.6550E+01     0.4876E+00             0.4396E+00
          3     0.8941E+01     0.5315E+00             0.3968E+00
          4     0.1116E+02     0.5137E+00             0.3175E+00
          5     0.1323E+02     0.4561E+00             0.2315E+00
          6     0.1531E+02     0.4889E+00             0.1954E+00
          7     0.1698E+02     0.4558E+00             0.1414E+00
          8     0.1931E+02     0.4287E+00             0.1134E+00
          9     0.2592E+02     0.3581E+00             0.7057E-01
         10     0.3032E+02     0.3604E+00             0.6071E-01

  SPECTRUM PARAMETERS

  CURVE NO  10  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

 INPUT SPECTRUM CURVE NUMBER = 10

 NUMBER OF DEFINITION POINTS = 10
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 DAMPING RATIO FOR THIS CURVE =    0.68084E-01

      INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
      POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

          1     0.2129E+01     0.7245E+00             0.7245E+00
          2     0.6550E+01     0.4862E+00             0.4380E+00
          3     0.8941E+01     0.5294E+00             0.3944E+00
          4     0.1116E+02     0.5117E+00             0.3155E+00
          5     0.1323E+02     0.4556E+00             0.2306E+00
          6     0.1531E+02     0.4872E+00             0.1942E+00
          7     0.1698E+02     0.4549E+00             0.1410E+00
          8     0.1931E+02     0.4276E+00             0.1131E+00
          9     0.2592E+02     0.3578E+00             0.7051E-01
         10     0.3032E+02     0.3598E+00             0.6061E-01

 INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS


      FREQUENCY    DAMPING RATIO           SPECTRAL ACCELERATIONS
        (HZ)            (%)                  SAD            SAV

    0.21291E+01     0.64384E+01          0.7453E+00     0.7453E+00
    0.65495E+01     0.64194E+01          0.4921E+00     0.4446E+00
    0.89327E+01     0.42667E+01          0.5960E+00     0.4685E+00
    0.11156E+02     0.47920E+01          0.5595E+00     0.3649E+00
    0.13227E+02     0.47975E+01          0.4557E+00     0.2307E+00
    0.15312E+02     0.65101E+01          0.4920E+00     0.1976E+00
    0.16980E+02     0.67040E+01          0.4558E+00     0.1414E+00
    0.19309E+02     0.25670E+01          0.4974E+00     0.1316E+00
    0.25920E+02     0.20570E+01          0.4376E+00     0.8623E-01
    0.30310E+02     0.20089E+01          0.4303E+00     0.7252E-01

 DISPLACEMENT RESPONSE UD (FROM SD)

   MODE NO.    1
 0.1039E+01  0.1979E+01  0.1039E+01  0.3695E-24 -0.5522E-25  0.0000E+00
 0.6629E-26  0.4436E-25  0.1280E+01  0.3695E-12 -0.5522E-13  0.0000E+00
-0.5015E-23  0.5620E-23  0.1498E+01 -0.4134E-12  0.7772E-12  0.0000E+00
 0.2098E-24  0.1231E-20  0.1690E+01  0.6461E-12  0.9533E-12  0.0000E+00
-0.4879E-20 -0.1216E-20  0.1851E+01 -0.3595E-12 -0.1246E-12  0.0000E+00
 0.2053E-21 -0.1236E-20  0.1979E+01 -0.3595E-24 -0.1245E-24  0.0000E+00
 0.5187E-29 -0.7963E-28
   MODE NO.    2
 0.3580E-01 -0.3606E-01  0.3580E-01 -0.2783E-24  0.4170E-25  0.0000E+00
-0.5006E-26 -0.3341E-25  0.2409E-01 -0.2783E-12  0.4170E-13  0.0000E+00
 0.4073E-23 -0.4525E-23  0.8310E-02  0.3117E-12 -0.5656E-12  0.0000E+00
-0.1829E-24 -0.9282E-21 -0.8865E-02 -0.6867E-12 -0.7184E-12  0.0000E+00
 0.3676E-20  0.9158E-21 -0.2454E-01  0.2707E-12  0.9386E-13  0.0000E+00
-0.2300E-21  0.9325E-21 -0.3606E-01  0.2707E-24  0.9383E-25  0.0000E+00
-0.3908E-29  0.6002E-28
   MODE NO.    3
 0.3386E-03  0.3146E-03  0.3387E-03 -0.1058E-27  0.2793E-28  0.0000E+00
-0.3353E-29 -0.2230E-28  0.1739E-02 -0.1058E-15  0.2793E-16  0.0000E+00
 0.2969E-26 -0.3252E-26  0.2570E-02  0.2085E-15 -0.3913E-15  0.0000E+00
-0.1784E-27 -0.6207E-24  0.2543E-02 -0.3251E-15 -0.4801E-15  0.0000E+00
 0.2456E-23  0.6116E-24  0.1721E-02  0.1808E-15  0.6271E-16  0.0000E+00
-0.1537E-24  0.6239E-24  0.3146E-03  0.1808E-27  0.6270E-28  0.0000E+00
-0.2611E-32  0.4012E-31
   MODE NO.    4
 0.4032E-02  0.6115E-02  0.4032E-02  0.2573E-25 -0.3089E-26  0.0000E+00
 0.4669E-27  0.3089E-26 -0.1167E-01  0.2573E-13 -0.3089E-14  0.0000E+00
-0.4659E-24  0.5083E-24 -0.2160E-01 -0.2893E-13  0.5424E-13  0.0000E+00
 0.2152E-25  0.8615E-22 -0.2085E-01  0.4505E-13  0.6656E-13  0.0000E+00
-0.3404E-21 -0.8473E-22 -0.9852E-02 -0.2503E-13 -0.8693E-14  0.0000E+00
 0.2131E-22 -0.8664E-22  0.6114E-02 -0.2503E-25 -0.8691E-26  0.0000E+00
 0.3621E-30 -0.5564E-29
   MODE NO.    5
-0.7464E-03 -0.2252E-02 -0.7464E-03 -0.2806E-25  0.4278E-26  0.0000E+00
-0.5135E-27 -0.3369E-26  0.1571E-02 -0.2806E-13  0.4278E-14  0.0000E+00
 0.6083E-24 -0.6542E-24  0.2787E-02  0.3167E-13 -0.5925E-13  0.0000E+00
-0.3032E-25 -0.9430E-22  0.2049E-02 -0.4918E-13 -0.7272E-13  0.0000E+00
 0.3717E-21  0.9245E-22 -0.1380E-03  0.2729E-13  0.9495E-14  0.0000E+00
-0.2327E-22  0.5893E-22 -0.2252E-02  0.2729E-25  0.9492E-26  0.0000E+00
-0.3955E-30  0.6082E-29
   MODE NO.    6
-0.1605E-02  0.5990E-03 -0.1605E-02  0.5946E-25 -0.9237E-26  0.0000E+00
 0.1109E-26  0.7138E-26 -0.1773E-02  0.5946E-13 -0.9237E-14  0.0000E+00
-0.1755E-23  0.1852E-23 -0.3255E-03 -0.6767E-13  0.1260E-12  0.0000E+00
 0.9447E-25  0.2015E-21  0.1407E-02  0.1044E-12  0.1540E-12  0.0000E+00
-0.7901E-21 -0.1962E-21  0.1849E-02 -0.5781E-13 -0.2019E-13  0.0000E+00
 0.4948E-22 -0.2033E-21  0.5990E-03 -0.5781E-25 -0.2019E-25  0.0000E+00
 0.8414E-30 -0.1296E-28
   MODE NO.    7
 0.4653E-03  0.2300E-03  0.4653E-03 -0.8777E-26  0.1426E-26  0.0000E+00
-0.1712E-27 -0.1054E-26  0.3893E-03 -0.8777E-14  0.1426E-14  0.0000E+00
 0.4277E-24 -0.4421E-24 -0.1220E-03  0.1019E-13 -0.1877E-13  0.0000E+00
-0.2465E-25 -0.3034E-22 -0.4927E-03 -0.1550E-13 -0.2309E-13  0.0000E+00
 0.1175E-21  0.2905E-23 -0.3054E-03  0.8528E-14  0.3006E-14  0.0000E+00
-0.7367E-23  0.3078E-22  0.2300E-03  0.8527E-26  0.3006E-26  0.0000E+00
-0.1254E-30  0.1938E-29
   MODE NO.    8
-0.4152E-05  0.3636E-05 -0.4152E-05  0.4118E-27 -0.3277E-28  0.0000E+00
 0.3934E-29  0.4944E-29  0.4315E-04  0.4118E-15 -0.3277E-16  0.0000E+00
 0.7222E-25 -0.7159E-25  0.2793E-04 -0.3673E-15  0.7877E-15  0.0000E+00
-0.4609E-26  0.1095E-23 -0.2764E-04  0.6813E-15  0.9509E-15  0.0000E+00
-0.5031E-23 -0.1312E-23 -0.4330E-04 -0.4035E-15 -0.1268E-15  0.0000E+00
 0.3112E-24 -0.1023E-23  0.3635E-05 -0.4035E-27 -0.1268E-27  0.0000E+00
 0.5224E-32 -0.7696E-31
   MODE NO.    9
 0.2360E-05  0.2040E-05  0.2359E-05 -0.6861E-28  0.9831E-29  0.0000E+00
-0.1180E-29 -0.8237E-29 -0.4764E-04 -0.6861E-16  0.9831E-17  0.0000E+00
-0.2169E-27  0.3595E-28  0.2871E-04  0.7529E-16 -0.1429E-15  0.0000E+00
 0.1754E-27 -0.2243E-24  0.2897E-04 -0.1193E-15 -0.1751E-15  0.0000E+00
 0.8990E-24  0.2249E-24 -0.4755E-04  0.6672E-16  0.2292E-16  0.0000E+00
-0.5620E-25  0.2239E-24  0.3040E-05  0.6672E-28  0.2292E-28  0.0000E+00
-0.9544E-33  0.1459E-31
   MODE NO.   10
 0.3383E-06 -0.3052E-06  0.3382E-06  0.2070E-25 -0.2988E-26  0.0000E+00
 0.3587E-27  0.2485E-26 -0.1002E-04  0.2070E-13 -0.2988E-14  0.0000E+00
 0.3797E-26  0.2970E-25  0.1597E-04 -0.2282E-13  0.4325E-13  0.0000E+00
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-0.5522E-36  0.6795E-22 -0.1596E-04  0.3605E-13  0.5300E-13  0.0000E+00
-0.2718E-21 -0.6795E-22  0.9994E-05 -0.2015E-13 -0.6926E-14  0.0000E+00
 0.1700E-22 -0.6796E-22 -0.3051E-06 -0.2015E-25 -0.6932E-26  0.0000E+00
 0.2885E-30 -0.4418E-29


 DISPLACEMENT RESPONSE UV (FROM SV)

   MODE NO.    1
 0.1740E-02 -0.1807E-02  0.1740E-02 -0.4817E-25  0.7197E-26  0.0000E+00
-0.8640E-27 -0.5782E-26 -0.5658E-02 -0.4817E-13  0.7197E-14  0.0000E+00
 0.6500E-24 -0.7288E-24 -0.1018E-01  0.5389E-13 -0.1013E-12  0.0000E+00
-0.2715E-25 -0.1605E-21 -0.1133E-01 -0.8422E-13 -0.1243E-12  0.0000E+00
 0.6360E-21  0.1505E-21 -0.8669E-02  0.4656E-13  0.1624E-13  0.0000E+00
-0.3980E-22  0.1612E-21 -0.1807E-02  0.4686E-25  0.1623E-25  0.0000E+00
-0.6761E-30  0.1038E-28
   MODE NO.    2
-0.9423E-03  0.6331E-03 -0.9423E-03  0.3769E-25 -0.5654E-26  0.0000E+00
 0.6788E-27  0.4525E-26 -0.1088E-02  0.3769E-13 -0.5654E-14  0.0000E+00
-0.5695E-24  0.6308E-24 -0.6269E-03 -0.4224E-13  0.7934E-13  0.0000E+00
 0.2590E-25  0.1258E-21  0.8170E-04  0.6593E-13  0.9733E-13  0.0000E+00
-0.4980E-21 -0.1240E-21  0.6257E-03 -0.3667E-13 -0.1272E-13  0.0000E+00
 0.3116E-22 -0.1264E-21  0.6331E-03 -0.3667E-25 -0.1271E-25  0.0000E+00
 0.5295E-30 -0.8132E-29
   MODE NO.    3
 0.3785E-03  0.3728E-03  0.3785E-03 -0.3070E-28  0.4610E-29  0.0000E+00
-0.5534E-30 -0.3666E-29  0.1234E-02 -0.3070E-16  0.4610E-17  0.0000E+00
 0.4756E-27 -0.5067E-27  0.1732E-02  0.3445E-16 -0.6470E-16  0.0000E+00
-0.6135E-28 -0.1026E-24  0.1731E-02 -0.5373E-16 -0.7937E-16  0.0000E+00
 0.4060E-24  0.1011E-24  0.1230E-02  0.2989E-16  0.1037E-16  0.0000E+00
-0.2541E-25  0.1031E-24  0.3729E-03  0.2989E-28  0.1037E-28  0.0000E+00
-0.4315E-33  0.6632E-32
   MODE NO.    4
-0.4401E-03 -0.4994E-03 -0.4401E-03 -0.2308E-26  0.3509E-27  0.0000E+00
-0.4212E-28 -0.2771E-27 -0.7978E-03 -0.2308E-14  0.3509E-15  0.0000E+00
 0.4736E-25 -0.5119E-25 -0.9453E-03  0.2602E-14 -0.4871E-14  0.0000E+00
-0.2214E-26 -0.7747E-23 -0.9909E-03 -0.4044E-14 -0.5970E-14  0.0000E+00
 0.3056E-22  0.7603E-23 -0.8962E-03  0.2245E-14  0.7805E-15  0.0000E+00
-0.1913E-23  0.7796E-23 -0.4994E-03  0.2245E-26  0.7804E-27  0.0000E+00
-0.3251E-31  0.4999E-30
   MODE NO.    5
-0.8561E-05 -0.2753E-04 -0.8560E-05  0.1717E-26 -0.2698E-27  0.0000E+00
 0.3238E-28  0.2062E-27  0.1103E-03  0.1717E-14 -0.2698E-15  0.0000E+00
-0.5872E-25  0.6155E-25  0.2001E-03 -0.1964E-14  0.3648E-14  0.0000E+00
 0.3194E-26  0.5849E-23  0.2398E-03  0.3020E-14  0.4482E-14  0.0000E+00
-0.2286E-22 -0.5670E-23  0.1755E-03 -0.1669E-14 -0.5844E-15  0.0000E+00
 0.1432E-23 -0.5909E-23 -0.2752E-04 -0.1669E-26 -0.5842E-27  0.0000E+00
 0.2436E-31 -0.3755E-30
   MODE NO.    6
 0.6450E-05  0.1793E-04  0.6461E-05 -0.3169E-26  0.5314E-27  0.0000E+00
-0.6380E-28 -0.3805E-27  0.1406E-03 -0.3169E-14  0.5314E-15  0.0000E+00
 0.1991E-24 -0.2044E-24  0.7743E-04  0.3734E-14 -0.6824E-14  0.0000E+00
-0.1163E-25 -0.1112E-22 -0.7180E-04 -0.5629E-14 -0.8401E-14  0.0000E+00
 0.4267E-22  0.1052E-22 -0.1090E-03  0.3076E-14  0.1093E-14  0.0000E+00
-0.2677E-23  0.1132E-22  0.1793E-04  0.3078E-26  0.1092E-26  0.0000E+00
-0.4561E-31  0.7067E-30
   MODE NO.    7
 0.1755E-05 -0.2026E-04  0.1755E-05 -0.3656E-27  0.4115E-28  0.0000E+00
-0.4940E-29 -0.4389E-28 -0.2242E-04 -0.3656E-15  0.4115E-16  0.0000E+00
-0.3152E-25  0.3093E-25 -0.5731E-05  0.3653E-15 -0.7322E-15  0.0000E+00
 0.2078E-26 -0.1088E-23  0.1506E-04 -0.6211E-15 -0.8909E-15  0.0000E+00
 0.4637E-23  0.1183E-23  0.3930E-05  0.3570E-15  0.1176E-15  0.0000E+00
-0.2885E-24  0.1057E-23 -0.2026E-04  0.3570E-27  0.1176E-27  0.0000E+00
-0.4871E-32  0.7326E-31
   MODE NO.    8
 0.3318E-05 -0.1999E-05  0.3317E-05 -0.3106E-27  0.3238E-28  0.0000E+00
-0.3888E-29 -0.3729E-28 -0.1937E-04 -0.3106E-15  0.3238E-16  0.0000E+00
-0.3374E-25  0.3326E-25 -0.1343E-04  0.3020E-15 -0.6151E-15  0.0000E+00
 0.2183E-26 -0.8999E-24  0.1236E-04 -0.5242E-15 -0.7470E-15  0.0000E+00
 0.3903E-23  0.1001E-23  0.1987E-04  0.3036E-15  0.9887E-16  0.0000E+00
-0.2425E-24  0.8644E-24 -0.1999E-05  0.3036E-27  0.9885E-28  0.0000E+00
-0.4089E-32  0.6119E-31
   MODE NO.    9
-0.2516E-06 -0.1991E-06 -0.2515E-06  0.1184E-28 -0.1695E-29  0.0000E+00
 0.2035E-30  0.1422E-29  0.4112E-05  0.1184E-16 -0.1695E-17  0.0000E+00
 0.4249E-28 -0.1731E-28 -0.2445E-05 -0.1300E-16  0.2469E-16  0.0000E+00
-0.1812E-28  0.3872E-25 -0.2489E-05  0.2060E-16  0.3024E-16  0.0000E+00
-0.1552E-24 -0.3884E-25  0.4097E-05 -0.1152E-16 -0.3958E-17  0.0000E+00
 0.9704E-26 -0.3867E-25 -0.1991E-06 -0.1152E-28 -0.3958E-29  0.0000E+00
 0.1647E-33 -0.2520E-32
   MODE NO.   10
-0.1255E-07  0.9977E-08 -0.1255E-07 -0.5331E-27  0.7696E-28  0.0000E+00
-0.9238E-29 -0.6399E-28  0.2603E-06 -0.5331E-15  0.7656E-16  0.0000E+00
-0.9269E-28 -0.7699E-27 -0.4101E-06  0.5876E-15 -0.1114E-14  0.0000E+00
 0.1419E-37 -0.1750E-23  0.4593E-06 -0.9284E-15 -0.1365E-14  0.0000E+00
 0.7000E-23  0.1750E-23 -0.2581E-06  0.5189E-15  0.1786E-15  0.0000E+00
-0.4377E-24  0.1750E-23  0.9974E-08  0.5188E-27  0.1785E-27  0.0000E+00
-0.7430E-32  0.1118E-30


 CORRELATION EPSD

   MODE NO.    1
 0.1000E+01  0.6964E-01  0.7323E-01  0.8279E-01  0.9150E-01  0.9471E-01
 0.9694E-01  0.9709E-01  0.9709E-01  0.9709E-01
   MODE NO.    2
 0.6964E-01  0.1000E+01  0.5615E+00  0.5975E+00  0.6485E+00  0.6687E+00
 0.6834E+00  0.6846E+00  0.6846E+00  0.6846E+00
   MODE NO.    3
 0.7323E-01  0.5615E+00  0.1000E+01  0.6920E+00  0.7230E+00  0.7391E+00
 0.7535E+00  0.7542E+00  0.7542E+00  0.7542E+00
   MODE NO.    4
 0.8279E-01  0.5975E+00  0.6920E+00  0.1000E+01  0.8566E+00  0.8428E+00
 0.8530E+00  0.8527E+00  0.8527E+00  0.8527E+00
   MODE NO.    5
 0.9150E-01  0.6485E+00  0.7230E+00  0.8566E+00  0.1000E+01  0.9462E+00
 0.9383E+00  0.9349E+00  0.9349E+00  0.9349E+00
   MODE NO.    6
 0.9471E-01  0.6687E+00  0.7391E+00  0.8428E+00  0.9462E+00  0.1000E+01
 0.9801E+00  0.9715E+00  0.9715E+00  0.9715E+00
   MODE NO.    7
 0.9694E-01  0.6834E+00  0.7535E+00  0.8530E+00  0.9383E+00  0.9801E+00
 0.1000E+01  0.9968E+00  0.9968E+00  0.9968E+00
   MODE NO.    8
```

```
 0.9709E-01  0.6846E+00  0.7542E+00  0.8527E+00  0.9349E+00  0.9715E+00
 0.9968E+00  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    9
 0.9709E-01  0.6846E+00  0.7542E+00  0.8527E+00  0.9349E+00  0.9715E+00
 0.9968E+00  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.   10
 0.9709E-01  0.6846E+00  0.7542E+00  0.8527E+00  0.9349E+00  0.9715E+00
 0.9968E+00  0.1000E+01  0.1000E+01  0.1000E+01


 CORRELATION EPSV

   MODE NO.    1
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    2
 0.0000E+00  0.1000E+01  0.1361E+00  0.1135E+00  0.1469E+00  0.1661E+00
 0.1814E+00  0.1864E+00  0.2360E+00  0.2360E+00
   MODE NO.    3
 0.0000E+00  0.1361E+00  0.1000E+01  0.2589E+00  0.2429E+00  0.3436E+00
 0.2645E+00  0.2717E+00  0.3440E+00  0.3440E+00
   MODE NO.    4
 0.0000E+00  0.1135E+00  0.2589E+00  0.1000E+01  0.4995E+00  0.3878E+00
 0.3883E+00  0.3800E+00  0.4812E+00  0.4812E+00
   MODE NO.    5
 0.0000E+00  0.1469E+00  0.2429E+00  0.4995E+00  0.1000E+01  0.6738E+00
 0.5720E+00  0.4953E+00  0.6226E+00  0.6226E+00
   MODE NO.    6
 0.0000E+00  0.1661E+00  0.2436E+00  0.3878E+00  0.6738E+00  0.1000E+01
 0.8148E+00  0.5890E+00  0.7038E+00  0.7038E+00
   MODE NO.    7
 0.0000E+00  0.1814E+00  0.2645E+00  0.3883E+00  0.5720E+00  0.8148E+00
 0.1000E+01  0.7107E+00  0.7687E+00  0.7687E+00
   MODE NO.    8
 0.0000E+00  0.1864E+00  0.2717E+00  0.3800E+00  0.4953E+00  0.5890E+00
 0.7107E+00  0.1000E+01  0.7898E+00  0.7898E+00
   MODE NO.    9
 0.0000E+00  0.2360E+00  0.3440E+00  0.4812E+00  0.6226E+00  0.7038E+00
 0.7687E+00  0.7898E+00  0.1000E+01  0.1000E+01
   MODE NO.   10
 0.0000E+00  0.2360E+00  0.3440E+00  0.4812E+00  0.6236E+00  0.7038E+00
 0.7687E+00  0.7898E+00  0.1000E+01  0.1000E+01


 CORRELATION MU (FOR CROSS TERM OF RD AND RV)

   MODE NO.    1
 0.0000E+00  0.5255E-01  0.2312E-01  0.2133E-01  0.2414E-01  0.2021E-01
 0.1817E-01  0.6759E-02  0.0000E+00  0.0000E+00
   MODE NO.    2
-0.5255E-01  0.0000E+00  0.1662E+00  0.8799E-01  0.6697E-01  0.4404E-01
 0.3442E-01  0.1302E-01  0.0000E+00  0.0000E+00
   MODE NO.    3
-0.2312E-01 -0.1662E+00  0.0000E+00  0.1780E+00  0.1074E+00  0.6612E-01
 0.4844E-01  0.1905E-01  0.0000E+00  0.0000E+00
   MODE NO.    4
-0.2133E-01 -0.8799E-01 -0.1780E+00  0.0000E+00  0.1731E+00  0.9844E-01
 0.6711E-01  0.2625E-01  0.0000E+00  0.0000E+00
   MODE NO.    5
-0.2414E-01 -0.6697E-01 -0.1074E+00 -0.1731E+00  0.0000E+00  0.1159E+00
 0.8209E-01  0.3295E-01  0.0000E+00  0.0000E+00
   MODE NO.    6
-0.2021E-01 -0.4404E-01 -0.6612E-01 -0.9844E-01 -0.1159E+00  0.0000E+00
 0.7008E-01  0.3695E-01  0.0000E+00  0.0000E+00
   MODE NO.    7
-0.1817E-01 -0.3442E-01 -0.4844E-01 -0.6711E-01 -0.8209E-01 -0.7008E-01
 0.0000E+00  0.1882E-01  0.0000E+00  0.0000E+00
   MODE NO.    8
-0.6759E-02 -0.1302E-01 -0.1905E-01 -0.2625E-01 -0.3295E-01 -0.3695E-01
-0.1882E-01  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    9
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.   10
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


 COMBINED VALUES OF COUPLED MODAL DISPLACEMENTS

 DISPLACEMENTS AT PRIMARY SYSTEM CONNETING DOF

 DOF #      DISPLACEMENT


  2         0.1042E+01

  6         0.1977E+01

 DISPLACEMENTS AT SECONDARY SYSTEM DOF

 NODE      DX           DY           DZ          ROT-X        ROT-Y        ROT-Z


  1     0.1042E+01  0.4361E-24  0.6523E-25  0.0000E+00  0.7831E-26  0.5236E-25

  2     0.1201E+01  0.4361E-12  0.6523E-13  0.0000E+00  0.6059E-23  0.6770E-23

  3     0.1498E+01  0.4082E-12  0.9175E-12  0.0000E+00  0.2599E-24  0.1454E-20

  4     0.1688E+01  0.7627E-12  0.1125E-11  0.0000E+00  0.5760E-20  0.1435E-20

  5     0.1849E+01  0.4243E-12  0.1470E-12  0.0000E+00  0.3604E-21  0.1460E-20

  6     0.1977E+01  0.4243E-24  0.1470E-24  0.0000E+00  0.6123E-29  0.9402E-28

 COMBINED VALUES OF COUPLED MEMBER FORCES


 NODE      FX           FY           FZ          MX           MY           MZ
```

```
  1    0.2404E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  2    0.2404E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  2    0.2176E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  3    0.2176E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  3    0.1910E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  4    0.1910E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  4    0.1613E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  5    0.1613E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  5    0.1288E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  6    0.1288E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

COMBINED VALUES OF COUPLED SUPPORT REACTIONS

TYPE     NODE      SUPPORT REACTION

FX        1         0.2404E+03
FY        2         0.2195E-08
FZ        2         0.3169E-09
FY        3         0.2420E-08
FZ        3         0.4587E-08
FY        4         0.3823E-08
FZ        4         0.5620E-08
FY        5         0.2137E-08
FZ        5         0.7354E-09
FX        6         0.1288E+03
```

c1r.dat

```
IDEN JB=1111 IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL SU=1 CV=2 TI=/CASE-1, 4-DOF PROBLEM/
FREQ FR=33 LO=1 MX=2 TI=/TRUNCATED MODES /
RCAS CA=1 EV=1 TY=1 SU=3 LO=0 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 SU=1 FX=1 FY=1 FZ=1
SPEC EV=1 ME=1 FP=0 SH=0
     LV=1 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=2 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=3 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=4 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=5 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=6 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
MATL CD=3 EC=28.0 SC=75 SH=75 KL=1
ANCH PT=1 LV=1
SPRS PT=2 DX=1.0 AZ=1000.0
LUMP PT=2 MA=38.64
RSUP PT=2 DY=1 LV=2
RSUP PT=2 DZ=1 LV=2
ROTR PT=2 RX=1
ROTR PT=2 RY=1
ROTR PT=2 RZ=1
SPRS PT=3 DX=1.0 AZ=1000.0
LUMP PT=3 MA=38.64
RSUP PT=3 DY=1 LV=3
RSUP PT=3 DZ=1 LV=3
ROTR PT=3 RX=1
ROTR PT=3 RY=1
ROTR PT=3 RZ=1
SPRS PT=4 DX=1.0 AZ=1000.0
LUMP PT=4 MA=38.64
RSUP PT=4 DY=1 LV=4
RSUP PT=4 DZ=1 LV=4
ROTR PT=4 RX=1
ROTR PT=4 RY=1
ROTR PT=4 RZ=1
SPRS PT=5 DX=1.0 AZ=1000.0
LUMP PT=5 MA=38.64
RSUP PT=5 DY=1 LV=5
RSUP PT=5 DZ=1 LV=5
ROTR PT=5 RX=1
ROTR PT=5 RY=1
ROTR PT=5 RZ=1
SPRS PT=6 DX=1.0 AZ=1000.0
ANCH PT=6 LV=6
ENDP
```

cc1r.dat

```
CREST/ PIPESTRESS RUN FOR CASE-1, TRUNCATED MODES OF S.S.
    6     2     2     6     2     1     0  11  1     1     0     1    1
  900    10    10     1.0E-6       20.5       386.4 0.10
      0.07         0.07         0.07         0.07         0.07       0.07
      0.02         0.02
    2     6
    1    16
100000000. 0.0
0.0      100000000.
1 6
2.10148200 6.18237000 9.9038940 13.0499100 15.4375500 16.9277200
 -0.25778    -0.55066    0.36783     0.13275      0.51865  0.45651
-0.55066   0.51865     0.45651     0.36783    -0.25778  0.13275
 -0.2284E+01 -0.7313E+00  0.4018E+00 -0.2457E+00 -0.1456E+00  0.6836E-01
   10  0.020089
 2.1291.2220 6.5500.8379 8.9410.718911.1560.715613.2270.534515.3120.6440
16.9800.514619.3090.515525.9200.439530.3200.4303
   10  0.020570
 2.1291.2127 6.5500.8284 8.9410.715011.1560.711113.2270.533415.3120.6403
16.9800.513619.3090.513825.9200.437630.3200.4285
   10  0.025668
 2.1291.1228 6.5500.7413 8.9410.678211.1560.668913.2270.520215.3120.6033
16.9800.503619.3090.497425.9200.418530.3200.4137
   10  0.038864
 2.1290.9478 6.5500.6178 8.9410.608711.1560.591713.2270.483915.3120.5476
16.9800.484919.3090.467825.9200.380330.3200.387
   10  0.047920
 2.1290.8611 6.5500.5556 8.9410.578511.1560.559513.2270.463315.3120.5251
16.9800.471719.3090.452325.9200.364630.3200.3754
   10  0.064194
 2.1290.7464 6.5500.4921 8.9410.537511.1560.519413.2270.457315.3120.4935
16.9800.458219.3090.431625.9200.358930.3200.3621
   10  0.064384
 2.1290.7453 6.5500.4918 8.9410.537111.1560.519113.2270.457315.3120.4932
16.9800.458019.3090.431425.9200.358930.3200.3620
   10  0.065102
 2.1290.7412 6.5500.4907 8.9410.535611.1560.517613.2270.457015.3120.4920
16.9800.457419.3090.430625.9200.358730.3200.3615
   10  0.067043
 2.1290.7302 6.5500.4876 8.9410.531511.1560.513713.2270.456115.3120.4889
16.9800.455819.3090.428725.9200.358130.3200.3604
   10  0.068084
 2.1290.7245 6.5500.4862 8.9410.529411.1560.511713.2270.455615.3120.4872
16.9800.454919.3090.427625.9200.357830.3200.3598
```

```
CREST/ PIPESTRESS RUN FOR CASE-1. TRUNCATED MODES OF S.S.

  NUMBER OF PRIMARY DOF              NP=    6

  NUMBER OF CONNECTING DOF           NC=    2

  NUMBER OF PIPING ANCHORS           NA=    2

  NUMBER OF PRIMARY MODES           NPM=    6

  NUMBER OF SECONDARY MODES         NSM=    2

  NORMALIZATION INDEX FOR P.S.    NORMP=    1

  NORMALIZATION INDEX FOR S.S.    NORMS=    0

  OUTPUT TYPE INDICATOR          IPRINT=    1

  OUTPUT TYPE INDICATOR         IPRINTS=    1

  PRIMARY RESIDUAL MODE KEY       KRESP=    0

  SECONDARY RESIDUAL MODE KEY     KRESS=    1

  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX       NONZP=   11

  GLOBAL EARTHQUAKE DIRECTION  X=1  Y=2(VERTICAL)  Z=3       KFLG=    1

  NUMBER OF ITERATIONS            NITER=  900

  NUMBER OF SPECTRA CURVES       NCURVE=   10

  NUMBER OF SPECTRUM POINTS        MXLP=   10

  ITERATION TOLERANCE               TOL=  0.1000E-05

  RIGID FREQUENCY                    FR=  20.500

  SPECTRUM FACTOR                  SFTR= 386.400

  CORRELATION TOLERANCE              ET=   0.100


  TOTAL STORAGE REQUIRED  =      22269
  ACTUAL PROVIDED STORAGE  = 550000000

  PRIMARY DAMPING RATIOS

  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01

  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01

  CONECTING DOF # OF PRIMARY SYSTEM

    2    6

  CONECTING DOF # OF PIPING SUPPORTS

    1   16

  STIFFNESS OF CONNECTING DOF OF S.S

  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09

  NODE # OF PIPING ANCHORS

    1    6

  MASS OF EACH SECONDARY DOF

  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00


  ADDRESS OF DIAGONAL ELEMENTS IN S.S. STIFFNESS MATRIX (JDG MATRIX)

    1    3    6   10   15   21   28   36   45   55   66   78   85   93  102  112
  123  135  142  150  159  169  180  192  199  207  216  226  237  249  256  264
  273  283  294  306


  LOWER TRIANGULAR STIFFNESS MATRIX OF SECONDARY SYSTEM

  0.1000E+09  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.2000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.1000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
```

```
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.2000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.1000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10

  SECONDARY FREQUENCIES (HZ)

   9.8362888  18.7097518

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        2

  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        6

  0.2000E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  UNNORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.6180E-05  0.1000E-04
 -0.8759E-31  0.7474E-24
 -0.4080E-31  0.4754E-24
  0.0000E+00  0.0000E+00
  0.4899E-32 -0.5707E-25
 -0.1051E-31  0.8972E-25
  0.6180E+00  0.1000E+01
 -0.8759E-19  0.7474E-12
 -0.4080E-19  0.4754E-12
  0.0000E+00  0.0000E+00
  0.5770E-31  0.1577E-20
 -0.4160E-27 -0.1577E-20
  0.1000E+01  0.6181E+00
 -0.1254E-19  0.1070E-11
 -0.6100E-19 -0.2997E-13
  0.0000E+00  0.0000E+00
  0.4159E-27 -0.9855E-22
 -0.5198E-28 -0.3156E-20
  0.1000E+01 -0.6179E+00
 -0.5963E-19  0.5151E-12
  0.1023E-19 -0.3489E-12
  0.0000E+00  0.0000E+00
 -0.9548E-32 -0.1578E-20
  0.2079E-27 -0.1578E-20
  0.6180E+00 -0.9999E+00
  0.6302E-19 -0.7852E-12
 -0.9885E-19 -0.7367E-14
  0.0000E+00  0.0000E+00
  0.1309E-31  0.2461E-22
  0.1472E-31  0.4733E-20
  0.6180E-05 -0.9999E-05
  0.6303E-31 -0.7851E-24
 -0.9885E-31 -0.7366E-26
  0.0000E+00  0.0000E+00
  0.2999E-37 -0.8723E-30
 -0.2032E-35  0.7951E-28


  NORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.1176E-04  0.1902E-04
 -0.1666E-30  0.1422E-23
 -0.7762E-31  0.9042E-24
  0.0000E+00  0.0000E+00
  0.9318E-32 -0.1086E-26
 -0.2000E-31  0.1707E-24
  0.1176E+01  0.1902E+01
 -0.1666E-18  0.1422E-11
 -0.7742E-19  0.9042E-12
 0.0000E+00  0.0000E+00
 0.1098E-30  0.3000E-20
-0.7913E-27 -0.2999E-20
 0.1902E+01  0.1176E+01
-0.2386E-19  0.2036E-11
-0.1160E-18 -0.5700E-13
 0.0000E+00  0.0000E+00
 0.7911E-27 -0.1875E-21
-0.9887E-28 -0.6002E-20
 0.1902E+01 -0.1175E+01
-0.1134E-18  0.9798E-12
 0.1946E-19 -0.6637E-12
 0.0000E+00  0.0000E+00
-0.1626E-31 -0.3001E-20
 0.3955E-27 -0.3001E-20
 0.1176E+01 -0.1902E+01
 0.1199E-18 -0.1493E-11
-0.1880E-18 -0.1401E-13
 0.0000E+00  0.0000E+00
 0.2490E-31  0.4682E-22
 0.2800E-31  0.9003E-20
 0.1176E-04 -0.1902E-04
 0.1199E-30 -0.1493E-23
-0.1880E-30 -0.1401E-25
 0.0000E+00  0.0000E+00
 0.5704E-37 -0.1659E-29
-0.3865E-35  0.1512E-27

PRIMARY FREQUENCIES (HZ)

 2.1014820   6.1823700   9.9038940  13.0499100  15.4375500  16.9277200

MODE SHAPE OF P.S. AT CONNECTING DOF       2

-0.2578E+00 -0.5507E+00  0.3678E+00  0.1328E+00  0.5187E+00  0.4565E+00

MODE SHAPE OF P.S. AT CONNECTING DOF       6

-0.5507E+00  0.5187E+00  0.4565E+00  0.3678E+00 -0.2578E+00  0.1328E+00

BASE INFLUENCE VECTOR FOR S.S ---UBS

 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

PARTICIPATION FACTOR FOR P.S ---GAMAP

-0.2284E-01 -0.7313E+00  0.4018E+00 -0.2457E+00 -0.1456E+00  0.6836E-01

INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20089E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
        1      0.2129E+01      0.1222E+01
        2      0.6550E+01      0.8379E+00
        3      0.8941E+01      0.7189E+00
        4      0.1116E+02      0.7156E+00
        5      0.1323E+02      0.5345E+00
        6      0.1531E+02      0.6440E+00
        7      0.1698E+02      0.5146E+00
        8      0.1931E+02      0.5155E+00
        9      0.2592E+02      0.4395E+00
       10      0.3032E+02      0.4303E+00

INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20570E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
        1      0.2129E+01      0.1213E+01
        2      0.6550E+01      0.8284E+00
        3      0.8941E+01      0.7150E+00
        4      0.1116E+02      0.7111E+00
        5      0.1323E+02      0.5334E+00
        6      0.1531E+02      0.6403E+00
        7      0.1698E+02      0.5136E+00
        8      0.1931E+02      0.5138E+00
        9      0.2592E+02      0.4376E+00
       10      0.3032E+02      0.4285E+00

INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.25668E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
        1      0.2129E+01      0.1123E+01
        2      0.6550E+01      0.7413E+00
        3      0.8941E+01      0.6782E+00
        4      0.1116E+02      0.6689E+00
        5      0.1323E+02      0.5202E+00
        6      0.1531E+02      0.6033E+00
        7      0.1698E+02      0.5036E+00
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        8      0.1931E+02      0.4974E+00
        9      0.2592E+02      0.4185E+00
       10      0.3032E+02      0.4137E+00

INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.38864E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
        1      0.2129E+01      0.9478E+00
        2      0.6550E+01      0.6178E+00
        3      0.8941E+01      0.6007E+00
        4      0.1116E+02      0.5917E+00
        5      0.1323E+02      0.4839E+00
        6      0.1531E+02      0.5476E+00
        7      0.1698E+02      0.4849E+00
        8      0.1931E+02      0.4678E+00
        9      0.2592E+02      0.3803E+00
       10      0.3032E+02      0.3870E+00

INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.47920E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
        1      0.2129E+01      0.8611E+00
        2      0.6550E+01      0.5556E+00
        3      0.8941E+01      0.5785E+00
        4      0.1116E+02      0.5595E+00
        5      0.1323E+02      0.4633E+00
        6      0.1531E+02      0.5251E+00
        7      0.1698E+02      0.4717E+00
        8      0.1931E+02      0.4523E+00
        9      0.2592E+02      0.3646E+00
       10      0.3032E+02      0.3754E+00

INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.64194E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
        1      0.2129E+01      0.7464E+00
        2      0.6550E+01      0.4921E+00
        3      0.8941E+01      0.5375E+00
        4      0.1116E+02      0.5194E+00
        5      0.1323E+02      0.4573E+00
        6      0.1531E+02      0.4935E+00
        7      0.1698E+02      0.4582E+00
        8      0.1931E+02      0.4316E+00
        9      0.2592E+02      0.3589E+00
       10      0.3032E+02      0.3621E+00

INPUT SPECTRUM CURVE NUMBER =  7

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.64384E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
        1      0.2129E+01      0.7453E+00
        2      0.6550E+01      0.4918E+00
        3      0.8941E+01      0.5371E+00
        4      0.1116E+02      0.5191E+00
        5      0.1323E+02      0.4573E+00
        6      0.1531E+02      0.4932E+00
        7      0.1698E+02      0.4580E+00
        8      0.1931E+02      0.4314E+00
        9      0.2592E+02      0.3589E+00
       10      0.3032E+02      0.3620E+00

INPUT SPECTRUM CURVE NUMBER =  8

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.65102E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
        1      0.2129E+01      0.7412E+00
        2      0.6550E+01      0.4907E+00
        3      0.8941E+01      0.5356E+00
        4      0.1116E+02      0.5176E+00
        5      0.1323E+02      0.4570E+00
        6      0.1531E+02      0.4920E+00
        7      0.1698E+02      0.4574E+00
        8      0.1931E+02      0.4306E+00
        9      0.2592E+02      0.3587E+00
       10      0.3032E+02      0.3615E+00

INPUT SPECTRUM CURVE NUMBER =  9

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.67043E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
        1      0.2129E+01      0.7302E+00
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         2     0.6550E+01     0.4876E+00
         3     0.8941E+01     0.5315E+00
         4     0.1116E+02     0.5117E+00
         5     0.1323E+02     0.4561E+00
         6     0.1531E+02     0.4889E+00
         7     0.1698E+02     0.4558E+00
         8     0.1931E+02     0.4287E+00
         9     0.2592E+02     0.3581E+00
        10     0.3032E+02     0.3604E+00

 INPUT SPECTRUM CURVE NUMBER = 10

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =     0.68084E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
         1     0.2129E+01     0.7245E+00
         2     0.6550E+01     0.4862E+00
         3     0.8941E+01     0.5294E+00
         4     0.1116E+02     0.5117E+00
         5     0.1323E+02     0.4556E+00
         6     0.1531E+02     0.4872E+00
         7     0.1698E+02     0.4549E+00
         8     0.1931E+02     0.4276E+00
         9     0.2592E+02     0.3578E+00
        10     0.3032E+02     0.3598E+00


        ******************************************************************
        *                                                                *
        *                                                                *
        *                   A COMPUTER PROGRAM FOR                       *
        *                                                                *
        *                                                                *
        *     COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS    *
        *                                                                *
        *                        " C R E S T "                           *
        *                                                                *
        *                                                                *
        *                        DEVELOPED BY                            *
        *                                                                *
        *                     AJAYA KUMAR GUPTA                          *
        *               JING-WEN JAW    ABHINAV GUPTA           *        *
        *                                                                *
        *              NORTH CAROLINA STATE UNIVERSITY                   *
        *                 RALEIGH, NORTH CAROLINA                        *
        *                                                                *
        *                       REVISION-1.0                         *   *
        *                                                                *
        *                                                                *
        ******************************************************************


 PARTICIPATION FACTOR FOR X 3.---GAMAS
 0.6155E+00  0.5509E-04

 MASS RATIOS

   PRIMARY SYSTEM MODE    1
 0.6191E-01  0.1623E-02

   PRIMARY SYSTEM MODE    2
 0.9706E-04  0.2166E-01

   PRIMARY SYSTEM MODE    3
 0.6437E-01  0.1494E-03

   PRIMARY SYSTEM MODE    4
 0.2374E-01  0.1046E-02

   PRIMARY SYSTEM MODE    5
 0.6446E-02  0.1142E-01

   PRIMARY SYSTEM MODE    6
 0.3289E-01  0.1987E-02

 C O U P L E D   F R E Q U E N C I E S   A N D   M O D E   S H A P E S   E X T R A C T I O N

 NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION   NITER =  900

 CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                          TOL = 0.10000E-05

 COUPLED   FREQUENCY   DAMPING RATIO
  MODE       (HZ)          (%)

   1     0.21326E+01    0.64491E+01
   2     0.65535E+01    0.64237E+01
   3     0.89326E+01    0.42568E+01
   4     0.11170E+02    0.48247E+01
   5     0.13238E+02    0.68083E+01
   6     0.15321E+02    0.65151E+01
   7     0.17007E+02    0.67222E+01
   8     0.19309E+02    0.25664E+01

 UNIT DISPLACEMENT & UNIT VELOCITY*W RESPONSE


 COUPLED MODE NO.    1


   1     0.64640E+00     0.11702E-02
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   2     0.12311E+01    -0.94790E-03
   3     0.33169E-06    -0.39657E-07
   4     0.26323E-28     0.18976E-27
   5     0.16742E-28     0.12071E-27
   6     0.00000E+00     0.00000E+00
   7    -0.20098E-29    -0.14490E-28
   8     0.31599E-29     0.22782E-28
   9     0.33170E-01    -0.39658E-02
  10     0.26322E-16     0.18978E-15
  11     0.16742E-16     0.12071E-15
  12     0.00000E+00     0.00000E+00
  13    -0.62636E-21     0.42266E-24
  14     0.95313E-23    -0.41657E-24
  15     0.52073E-01    -0.66796E-03
  16     0.37699E-16     0.27180E-15
  17    -0.10555E-17    -0.76082E-17
  18     0.00000E+00     0.00000E+00
  19     0.59573E-24    -0.26040E-25
  20    -0.18105E-24    -0.83595E-24
  21     0.54193E-01    -0.70010E-02
  22     0.18142E-16     0.13080E-15
  23    -0.12289E-16    -0.88599E-16
  24     0.00000E+00     0.00000E+00
  25     0.12708E-22    -0.41926E-24
  26    -0.64454E-23    -0.41316E-24
  27     0.37425E-01    -0.44888E-02
  28    -0.27652E-16    -0.19936E-15
  29    -0.25970E-18    -0.18699E-17
  30     0.00000E+00     0.00000E+00
  31    -0.25104E-24     0.63155E-26
  32    -0.12798E-22     0.32299E-23
  33     0.37425E-06    -0.44887E-07
  34    -0.27146E-28    -0.19936E-27
  35    -0.26268E-30    -0.18690E-29
  36     0.00000E+00     0.00000E+00
  37     0.54538E-32    -0.22205E-33
  38     0.55278E-31     0.21014E-31


 COUPLED MODE NO.    2


   1     0.31748E+00    -0.91006E-02
   2    -0.31973E+00     0.60447E-02
   3     0.23569E-06    -0.43784E-07
   4     0.20803E-26    -0.23190E-26
   5     0.13231E-26    -0.14750E-26
   6     0.00000E+00     0.00000E+00
   7    -0.15884E-27     0.17707E-27
   8     0.24973E-27    -0.27839E-27
   9     0.23569E-01    -0.43784E-02
  10     0.20803E-14    -0.23190E-14
  11     0.13231E-14    -0.14750E-14
  12     0.00000E+00     0.00000E+00
  13     0.67525E-22    -0.63912E-23
  14    -0.52160E-22     0.59503E-23
  15     0.11239E-01    -0.33475E-02
  16     0.29794E-14    -0.33213E-14
  17    -0.83403E-16     0.92973E-16
  18     0.00000E+00     0.00000E+00
  19    -0.32600E-23     0.37191E-24
  20    -0.10410E-21     0.11203E-22
  21    -0.13810E-01     0.10002E-02
  22     0.14337E-14    -0.15983E-14
  23    -0.97119E-15     0.10826E-14
  24     0.00000E+00     0.00000E+00
  25    -0.59901E-22     0.60994E-23
  26    -0.36576E-22     0.58097E-23
  27    -0.25215E-01     0.20521E-02
  28    -0.21853E-14     0.24361E-14
  29    -0.20504E-16     0.22857E-16
  30     0.00000E+00     0.00000E+00
  31     0.33482E-24    -0.79156E-25
  32     0.94649E-22    -0.16545E-22
  33    -0.25215E-06     0.20521E-07
  34    -0.21876E-26     0.24361E-26
  35    -0.20504E-28     0.22856E-28
  36     0.00000E+00     0.00000E+00
  37    -0.58327E-32     0.27062E-32
  38     0.24709E-29    -0.30441E-30


 COUPLED MODE NO.    3


   1     0.45953E-02     0.63990E-02
   2     0.42729E-02     0.63044E-02
   3     0.18921E-06     0.14397E-06
   4     0.85353E-29     0.50647E-29
   5     0.54292E-29     0.32216E-29
   6     0.00000E+00     0.00000E+00
   7    -0.65177E-30    -0.38675E-30
   8     0.10247E-29     0.60801E-30
   9     0.18922E-01     0.14397E-01
  10     0.85353E-17     0.50647E-17
  11     0.54292E-17     0.32216E-17
  12     0.00000E+00     0.00000E+00
  13     0.62021E-25     0.61465E-26
  14     0.34739E-24     0.56382E-24
  15     0.30258E-01     0.22018E-01
  16     0.12227E-16     0.72556E-17
  17    -0.34388E-18    -0.20414E-18
  18     0.00000E+00     0.00000E+00
  19     0.21725E-25     0.35249E-25
  20    -0.89992E-24    -0.11567E-23
  21     0.30229E-01     0.22011E-01
  22     0.58827E-17     0.34907E-17
  23    -0.39856E-17    -0.23650E-17
  24     0.00000E+00     0.00000E+00
  25     0.54135E-24     0.84992E-24
  26    -0.83788E-24    -0.11506E-23
  27     0.10869E-01     0.14397E-01
  28    -0.89673E-17    -0.53210E-17
  29    -0.66727E-19    -0.51597E-19
  30     0.00000E+00    0.00000E+00
  31    -0.18223E-25   -0.26622E-25
  32    -0.28780E-24   -0.54484E-24
  33     0.18869E-06    0.14387E-06
  34    -0.89462E-29   -0.52885E-29
  35    -0.86988E-31   -0.51967E-31
  36     0.00000E+00    0.00000E+00
  37     0.41693E-33    0.60918E-33
  38     0.25511E-31    0.33371E-31

 COUPLED MODE NO.    4


   1     0.92753E-01   -0.15313E-02
   2     0.14034E+00   -0.17321E-01
   3    -0.36821E-05   -0.11946E-06
   4    -0.16467E-26    0.63301E-27
   5    -0.10474E-26    0.40262E-27
   6     0.00000E+00    0.00000E+00
   7     0.12573E-27   -0.48334E-28
   8    -0.19760E-27    0.75991E-28
   9    -0.36822E+00   -0.11946E-01
  10    -0.16467E-14    0.63301E-15
  11    -0.10474E-14    0.40262E-15
  12     0.00000E+00    0.00000E+00
  13    -0.17803E-22    0.20019E-23
  14     0.30689E-22   -0.41331E-23
  15    -0.60165E+00   -0.18534E-01
  16    -0.23585E-14    0.90660E-15
  17     0.66069E-16   -0.25379E-16
  18     0.00000E+00    0.00000E+00
  19     0.19178E-23   -0.25833E-24
  20    -0.41634E-23    0.90884E-24
  21    -0.59402E+00   -0.19809E-01
  22    -0.11349E-14    0.43628E-15
  23     0.76879E-15   -0.29553E-15
  24     0.00000E+00    0.00000E+00
  25     0.40634E-22   -0.53624E-23
  26    -0.21960E-22    0.29112E-23
  27    -0.35400E+00   -0.14096E-01
  28     0.17299E-14   -0.66499E-15
  29     0.16307E-16   -0.62398E-17
  30     0.00000E+00    0.00000E+00
  31    -0.88218E-24    0.13117E-24
  32    -0.45303E-22    0.71625E-23
  33    -0.35400E-05   -0.14096E-06
  34     0.17313E-26   -0.66511E-27
  35     0.16296E-28   -0.62379E-29
  36     0.00000E+00    0.00000E+00
  37     0.20323E-31   -0.32441E-32
  38     0.26029E-30   -0.41434E-31

 COUPLED MODE NO.    5


   1    -0.29446E-01   -0.69833E-03
   2    -0.89025E-01   -0.22107E-02
   3     0.10477E-05    0.87712E-07
   4     0.56031E-26   -0.23488E-26
   5     0.35639E-26   -0.14940E-26
   6     0.00000E+00    0.00000E+00
   7    -0.42781E-27    0.17935E-27
   8     0.67264E-27   -0.28197E-27
   9     0.10477E+00    0.87713E-02
  10     0.56031E-14   -0.23488E-14
  11     0.35638E-14   -0.14940E-14
  12     0.00000E+00    0.00000E+00
  13     0.36361E-22   -0.43340E-23
  14    -0.42064E-22    0.41976E-23
  15     0.16232E+00    0.17334E-01
  16     0.80249E-14   -0.33641E-14
  17    -0.22466E-15    0.94170E-16
  18     0.00000E+00    0.00000E+00
  19    -0.26290E-23    0.26237E-24
  20    -0.37349E-22    0.95507E-23
  21     0.14465E+00    0.21006E-01
  22     0.38618E-14   -0.16189E-14
  23    -0.24159E-14    0.10966E-14
  24     0.00000E+00    0.00000E+00
  25    -0.50917E-22    0.39811E-23
  26    -0.98337E-24    0.52149E-23
  27     0.72984E-01    0.14630E-01
  28    -0.58862E-14    0.24675E-14
  29    -0.55255E-16    0.23149E-16
  30     0.00000E+00    0.00000E+00
  31     0.83537E-24   -0.61284E-25
  32     0.78845E-22   -0.13785E-22
  33     0.72983E-06    0.14630E-06
  34    -0.58875E-26    0.24674E-26
  35    -0.55245E-28    0.23148E-28
  36     0.00000E+00    0.00000E+00
  37    -0.20434E-31    0.23991E-32
  38     0.79573E-30   -0.24426E-30

 COUPLED MODE NO.    6


   1    -0.78340E-01    0.89025E-03
   2     0.29227E-01    0.21480E-02
   3    -0.28230E-06    0.15269E-06
   4    -0.26934E-25    0.11806E-25
   5    -0.17131E-25    0.75088E-26
   6     0.00000E+00    0.00000E+00
   7     0.20566E-26   -0.90142E-27
   8    -0.32334E-26    0.14172E-26
   9    -0.28230E-01    0.15270E-01
  10    -0.26934E-13    0.11806E-13
  11    -0.17131E-13    0.75088E-14
  12     0.00000E+00    0.00000E+00
  13    -0.11484E-21    0.24215E-22
  14     0.94163E-22   -0.23978E-22
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  15     0.17925E-01    0.88456E-02
  16    -0.38575E-13    0.16908E-13
  17     0.10790E-14   -0.47333E-15
  18     0.00000E+00    0.00000E+00
  19     0.58654E-23   -0.14987E-23
  20     0.21438E-21   -0.49595E-22
  21     0.82320E-01   -0.10440E-01
  22    -0.18563E-13    0.81366E-14
  23     0.12574E-13   -0.55116E-16
  24     0.00000E+00    0.00000E+00
  25     0.98036E-22   -0.23708E-22
  26     0.99520E-22   -0.25373E-22
  27     0.83544E-01   -0.15844E-01
  28     0.28295E-13   -0.12402E-13
  29     0.26547E-15   -0.11636E-15
  30     0.00000E+00    0.00000E+00
  31    -0.82479E-24    0.36702E-24
  32    -0.23892E-21    0.73464E-22
  33     0.83544E-06   -0.15844E-06
  34     0.28295E-25   -0.12401E-25
  35     0.26546E-27   -0.11636E-27
  36     0.00000E+00    0.00000E+00
  37     0.27516E-31   -0.13309E-31
  38    -0.53101E-29    0.12543E-29

 COUPLED MODE NO.    7


   1     0.29753E-01    0.29627E-03
   2     0.14696E-01   -0.42509E-02
   3    -0.35832E-07   -0.31364E-07
   4     0.10836E-25   -0.39641E-26
   5     0.68920E-26   -0.25213E-26
   6     0.00000E+00    0.00000E+00
   7    -0.82737E-27    0.30268E-27
   8     0.13008E-26   -0.47588E-27
   9    -0.35833E-02   -0.31365E-02
  10     0.10836E-13   -0.39641E-14
  11     0.68920E-14   -0.25213E-14
  12     0.00000E+00    0.00000E+00
  13     0.32633E-22   -0.53060E-23
  14    -0.22999E-22    0.56065E-23
  15    -0.30024E-01   -0.40861E-03
  16     0.15519E-13   -0.56774E-14
  17    -0.43442E-15    0.15893E-15
  18     0.00000E+00    0.00000E+00
  19    -0.14375E-23    0.33794E-24
  20    -0.75001E-22    0.13402E-22
  21    -0.51287E-01    0.51002E-02
  22     0.74681E-14   -0.27321E-14
  23    -0.50588E-14    0.18507E-14
  24     0.00000E+00    0.00000E+00
  25    -0.20585E-22    0.47161E-23
  26    -0.42359E-22    0.80932E-23
  27    -0.39265E-01    0.53771E-02
  28    -0.11383E-13    0.41643E-14
  29    -0.10679E-15    0.39071E-16
  30     0.00000E+00    0.00000E+00
  31     0.58096E-25   -0.87552E-25
  32     0.73984E-22   -0.20513E-22
  33    -0.39264E-06    0.53771E-07
  34    -0.11383E-25    0.41640E-26
  35    -0.10679E-27    0.39069E-28
  36     0.00000E+00    0.00000E+00
  37    -0.53655E-32    0.37705E-32
  38     0.19197E-29   -0.34979E-30

 COUPLED MODE NO.    8


   1    -0.29647E-03    0.90863E-03
   2     0.26042E-03   -0.54763E-03
   3     0.32872E-07   -0.59805E-07
   4     0.25694E-26   -0.46783E-26
   5     0.16342E-26   -0.29756E-26
   6     0.00000E+00    0.00000E+00
   7    -0.19619E-27    0.35721E-27
   8     0.30845E-27   -0.56162E-27
   9     0.32872E-02   -0.59805E-02
  10     0.25694E-14   -0.46783E-14
  11     0.16342E-14   -0.29756E-14
  12     0.00000E+00    0.00000E+00
  13     0.49432E-23   -0.86225E-23
  14    -0.50663E-23    0.90011E-23
  15     0.20705E-02   -0.39582E-02
  16     0.36799E-14   -0.67003E-14
  17    -0.10301E-15    0.18756E-15
  18     0.00000E+00    0.00000E+00
  19    -0.31666E-24    0.56260E-24
  20    -0.10110E-22    0.17712E-23
  21    -0.20149E-02    0.33511E-02
  22     0.17709E-14   -0.32244E-14
  23    -0.11995E-14    0.21841E-14
  24     0.00000E+00    0.00000E+00
  25    -0.50152E-23    0.88920E-23
  26    -0.51644E-23    0.90859E-23
  27    -0.32605E-02    0.56828E-02
  28    -0.26992E-14    0.49146E-14
  29    -0.25325E-16    0.46112E-16
  30     0.00000E+00    0.00000E+00
  31     0.82967E-25   -0.15239E-24
  32     0.25662E-22   -0.28091E-22
  33    -0.32605E-07    0.56828E-07
  34    -0.26991E-26    0.49146E-26
  35    -0.25324E-28    0.46110E-28
  36     0.00000E+00    0.00000E+00
  37    -0.29815E-32    0.54755E-32
  38     0.25582E-30   -0.46872E-30


 B A S E   R E S P O N S E   S P E C T R A   D A T A
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TOTAL NUMBER OF INPUT SPECTRUM CURVE = 10

MAXIMUM NUMBER OF DEFINITION POINTS IN INPUT SPECTRUM CURVES = 10

SPECTRUM SCALE FACTOR = 0.38640E+03

RIGID FREQUENCY = 0.20500E+32



  SPECTRUM PARAMETERS

  CURVE NO   1  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FN =  5.10786

INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20089E-01

    INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
    POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

       1     0.2129E+01    0.1222E+01           0.1222E+01
       2     0.6550E+01    0.8379E+00           0.7934E+00
       3     0.8941E+01    0.7189E+00           0.6039E+00
       4     0.1116E+02    0.7156E+00           0.5209E+00
       5     0.1323E+02    0.5345E+00           0.3261E+00
       6     0.1531E+02    0.6440E+00           0.3025E+00
       7     0.1698E+02    0.5146E+00           0.1642E+00
       8     0.1931E+02    0.5155E+00           0.1364E+00
       9     0.2592E+02    0.4395E+00           0.8661E-01
      10     0.3032E+02    0.4303E+00           0.7249E-01

  SPECTRUM PARAMETERS

  CURVE NO   2  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FN =  5.10786

INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20570E-01

    INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
    POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

       1     0.2129E+01    0.1213E+01           0.1213E+01
       2     0.6550E+01    0.8284E+00           0.7838E+00
       3     0.8941E+01    0.7150E+00           0.5995E+00
       4     0.1116E+02    0.7111E+00           0.5163E+00
       5     0.1323E+02    0.5334E+00           0.3245E+00
       6     0.1531E+02    0.6403E+00           0.3000E+00
       7     0.1698E+02    0.5136E+00           0.1650E+00
       8     0.1931E+02    0.5138E+00           0.1359E+00
       9     0.2592E+02    0.4376E+00           0.8623E-01
      10     0.3032E+02    0.4285E+00           0.7219E-01

  SPECTRUM PARAMETERS

  CURVE NO   3  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FN =  5.10786

INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.25668E-01

    INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
    POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

       1     0.2129E+01    0.1123E+01           0.1123E+01
       2     0.6550E+01    0.7413E+00           0.6960E+00
       3     0.8941E+01    0.6782E+00           0.5584E+00
       4     0.1116E+02    0.6669E+00           0.4737E+00
       5     0.1323E+02    0.5202E+00           0.3076E+00
       6     0.1531E+02    0.6033E+00           0.2754E+00
       7     0.1698E+02    0.5036E+00           0.1614E+00
       8     0.1931E+02    0.4974E+00           0.1316E+00
       9     0.2592E+02    0.4185E+00           0.8247E-01
      10     0.3032E+02    0.4137E+00           0.6969E-01

  SPECTRUM PARAMETERS

  CURVE NO   4  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FN =  5.10786

INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.38864E-01

    INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
    POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

       1     0.2129E+01    0.9478E+00           0.9478E+00
       2     0.6550E+01    0.6178E+00           0.5709E+00
       3     0.8941E+01    0.6087E+00           0.4824E+00
       4     0.1116E+02    0.5917E+00           0.3976E+00
       5     0.1323E+02    0.4939E+00           0.2697E+00
       6     0.1531E+02    0.5476E+00           0.2372E+00
       7     0.1698E+02    0.4849E+00           0.1533E+00
       8     0.1931E+02    0.4678E+00           0.1237E+00
       9     0.2592E+02    0.3803E+00           0.7494E-01
      10     0.3032E+02    0.3870E+00           0.6520E-01
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  SPECTRUM PARAMETERS

  CURVE NO   5  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FN =  5.10786

INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.47920E-01

    INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
    POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

       1     0.2129E+01    0.8611E+00           0.8611E+00
       2     0.6550E+01    0.5556E+00           0.5088E+00
       3     0.8941E+01    0.5705E+00           0.4487E+00
       4     0.1116E+02    0.5595E+00           0.3649E+00
       5     0.1323E+02    0.4633E+00           0.2497E+00
       6     0.1531E+02    0.5251E+00           0.2209E+00
       7     0.1698E+02    0.4717E+00           0.1480E+00
       8     0.1931E+02    0.4523E+00           0.1196E+00
       9     0.2592E+02    0.3646E+00           0.7185E-01
      10     0.3032E+02    0.3754E+00           0.6324E-01

  SPECTRUM PARAMETERS

  CURVE NO   6  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FN =  5.10786

INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.64194E-01

    INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
    POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

       1     0.2129E+01    0.7464E+00           0.7464E+00
       2     0.6550E+01    0.4921E+00           0.4446E+00
       3     0.8941E+01    0.5375E+00           0.4037E+00
       4     0.1116E+02    0.5194E+00           0.3234E+00
       5     0.1323E+02    0.4573E+00           0.2360E+00
       6     0.1531E+02    0.4935E+00           0.1986E+00
       7     0.1698E+02    0.4582E+00           0.1424E+00
       8     0.1931E+02    0.4316E+00           0.1142E+00
       9     0.2592E+02    0.3509E+00           0.7073E-01
      10     0.3033E+02    0.3621E+00           0.6100E-01

  SPECTRUM PARAMETERS

  CURVE NO   7  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FN =  5.10786

INPUT SPECTRUM CURVE NUMBER =  7

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.64394E-01

    INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
    POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

       1     0.2139E+01    0.7453E+00           0.7453E+00
       2     0.6550E+01    0.4918E+00           0.4443E+00
       3     0.8941E+01    0.5371E+00           0.4029E+00
       4     0.1116E+02    0.5191E+00           0.3231E+00
       5     0.1323E+02    0.4573E+00           0.2339E+00
       6     0.1531E+02    0.4932E+00           0.1984E+00
       7     0.1698E+02    0.4580E+00           0.1423E+00
       8     0.1931E+02    0.4314E+00           0.1141E+00
       9     0.2592E+02    0.3589E+00           0.7073E-01
      10     0.3032E+02    0.3620E+00           0.6098E-01

  SPECTRUM PARAMETERS

  CURVE NO   8  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FN =  5.10786

INPUT SPECTRUM CURVE NUMBER =  8

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.65102E-01

    INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
    POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

       1     0.2129E+01    0.7412E+00           0.7412E+00
       2     0.6550E+01    0.4907E+00           0.4431E+00
       3     0.8941E+01    0.5356E+00           0.4012E+00
       4     0.1116E+02    0.5176E+00           0.3216E+00
       5     0.1323E+02    0.4570E+00           0.2333E+00
       6     0.1531E+02    0.4920E+00           0.1976E+00
       7     0.1698E+02    0.4574E+00           0.1420E+00
       8     0.1931E+02    0.4306E+00           0.1139E+00
       9     0.2592E+02    0.3587E+00           0.7069E-01
      10     0.3032E+02    0.3615E+00           0.6090E-01

  SPECTRUM PARAMETERS

  CURVE NO   9  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FN =  5.10786

INPUT SPECTRUM CURVE NUMBER =  9

NUMBER OF DEFINITION POINTS = 10
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```
DAMPING RATIO FOR THIS CURVE =    0.67043E-01

     INPUT     FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1    0.2129E+01     0.7302E+00           0.7469E+00
         2    0.6550E+01     0.4876E+00           0.4396E+00
         3    0.8941E+01     0.5315E+00           0.3968E+00
         4    0.1116E+02     0.5137E+00           0.3175E+00
         5    0.1323E+02     0.4561E+00           0.2315E+00
         6    0.1531E+02     0.4889E+00           0.1954E+00
         7    0.1698E+02     0.4558E+00           0.1414E+00
         8    0.1931E+02     0.4287E+00           0.1134E+00
         9    0.2592E+02     0.3581E+00           0.7057E-01
        10    0.3032E+02     0.3604E+00           0.6071E-01

  SPECTRUM PARAMETERS

  CURVE NO  10  F1 =  1.83094  F2 = 17.22000  FL =  2.12900  FH =  5.10786

INPUT SPECTRUM CURVE NUMBER = 10

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.68084E-01

     INPUT     FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1    0.2129E+01     0.7245E+00           0.7245E+00
         2    0.6550E+01     0.4862E+00           0.4380E+00
         3    0.8941E+01     0.5294E+00           0.3944E+00
         4    0.1116E+02     0.5117E+00           0.3155E+00
         5    0.1323E+02     0.4556E+00           0.2306E+00
         6    0.1571E+02     0.4072E+00           0.1942E+00
         7    0.1698E+02     0.4549E+00           0.1430E+00
         8    0.1931E+02     0.4276E+00           0.1131E+00
         9    0.2592E+02     0.3578E+00           0.7051E-01
        10    0.3012E+02     0.3598E+00           0.6061E-01

INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS

     FREQUENCY   DAMPING RATIO          SPECTRAL ACCELERATIONS
       (HZ)          (%)                   SAD          SSV

    0.21326E+01    0.64491E+01          0.7442E+00   0.7441E+00
    0.65535E+01    0.64737E+01          0.4921E+00   0.4445E+00
    0.89326E+01    0.42568E+01          0.5963E+00   0.4688E+00
    0.11170E+02    0.48247E+01          0.5579E+00   0.3630E+00
    0.13230E+02    0.68083E+01          0.4558E+00   0.2303E+00
    0.15321E+02    0.65151E+01          0.4917E+00   0.1971E+00
    0.17007E+02    0.67222E+01          0.4553E+00   0.1409E+00
    0.19309E+02    0.25666E+01          0.4974E+00   0.1316E+00

 DISPLACEMENT RESPONSE UD (FROM SD)

   MODE NO      1
 0.1035E+01  0.1972E+01  0.1035E+01  0.4216E-28  0.2681E-28  0.0000E+00
-0.3219E-29  0.5061E-29  0.1276E+01  0.4216E-16  0.2681E-16  0.0000E+00
-0.1903E-22  0.1527E-22  0.1573E+01  0.6038E-16 -0.1690E-17  0.0000E+00
 0.9541E-24 -0.2913E-24  0.1684E+01  0.2906E-16 -0.1968E-16  0.0000E+00
 0.2035E-22 -0.1032E-22  0.1844E+01 -0.4429E-16 -0.4159E-18  0.0000E+00
-0.4021E-24 -0.2050E-22  0.1972E+01 -0.4348E-28 -0.4207E-30  0.0000E+00
 0.8783E-33  0.8853E-31
   MODE NO      2
 0.3560E-01 -0.2586E-01  0.3560E-01  0.2333E-27  0.1484E-27  0.0000E+00
-0.1781E-28  0.2801E-28  0.2396E-01  0.2333E-15  0.1494E-15  0.0000E+00
 0.7573E-23 -0.5850E-23  0.8381E-02  0.3341E-15 -0.9353E-17  0.0000E+00
-0.3656E-24 -0.1167E-22 -0.8821E-02  0.1608E-15 -0.1089E-15  0.0000E+00
-0.6718E-23 -0.4102E-23 -0.2439E-01 -0.2451E-15 -0.2299E-17  0.0000E+00
 0.3755E-25  0.1062E-22 -0.3586E-01 -0.2453E-27 -0.2300E-29  0.0000E+00
-0.6541E-33  0.2771E-30
   MODE NO      3
 0.3361E-03  0.3126E-03  0.3362E-03  0.6244E-30  0.3971E-30  0.0000E+00
-0.4768E-31  0.7495E-31  0.1716E-02  0.6244E-18  0.3971E-18  0.0000E+00
 0.4537E-26  0.2541E-25  0.2540E-02  0.8944E-18 -0.2516E-19  0.0000E+00
 0.1589E-26 -0.6583E-25  0.2533E-02  0.4303E-18 -0.2916E-18  0.0000E+00
 0.3960E-25 -0.6129E-25  0.1698E-02 -0.6560E-18 -0.6344E-20  0.0000E+00
-0.1333E-26 -0.2105E-25  0.3126E-03 -0.6544E-30 -0.6363E-32  0.0000E+00
 0.3050E-34  0.1866E-32
   MODE NO      4
 0.4059E-02  0.6142E-02  0.4059E-02 -0.7207E-28 -0.4584E-28  0.0000E+00
 0.5503E-29 -0.8652E-29 -0.1164E-01 -0.7207E-16 -0.4584E-16  0.0000E+00
-0.7792E-24  0.1343E-23 -0.2144E-01 -0.1032E-15  0.2892E-17  0.0000E+00
 0.8394E-25 -0.1822E-24 -0.2069E-01 -0.4967E-16  0.3365E-16  0.0000E+00
 0.1778E-23 -0.9614E-24 -0.9768E-02  0.7571E-16  0.7137E-18  0.0000E+00
-0.3861E-25 -0.1983E-23  0.6142E-02  0.7577E-28  0.7132E-30  0.0000E+00
 0.8895E-33  0.1139E-31
   MODE NO      5
-0.7495E-03 -0.2266E-02 -0.7495E-03  0.1426E-27  0.9071E-28  0.0000E+00
-0.1089E-28  0.1712E-28  0.1614E-02  0.1426E-15  0.9071E-16  0.0000E+00
 0.9255E-24 -0.1071E-23  0.2776E-02  0.2043E-15 -0.5719E-17  0.0000E+00
-0.6692E-25 -0.9507E-24  0.2023E-02  0.9830E-16 -0.6659E-16  0.0000E+00
-0.1296E-23 -0.2503E-25 -0.1050E-03 -0.1498E-15 -0.1406E-17  0.0000E+00
 0.2126E-25  0.2007E-23 -0.2266E-02 -0.1499E-27 -0.1406E-29  0.0000E+00
-0.5201E-33  0.2025E-31
   MODE NO      6
-0.1606E-02  0.5992E-03 -0.1606E-02 -0.5522E-27 -0.3512E-27  0.0000E+00
 0.4216E-28 -0.6629E-28 -0.1744E-02 -0.5522E-15 -0.3512E-15  0.0000E+00
-0.2354E-23  0.1931E-23 -0.3565E-03 -0.7909E-15  0.2214E-16  0.0000E+00
 0.1207E-24  0.4395E-23  0.1405E-02 -0.3806E-15  0.2578E-15  0.0000E+00
 0.2010E-23  0.2040E-23  0.1871E-02  0.5801E-15  0.5443E-17  0.0000E+00
-0.1691E-25 -0.4898E-23  0.5992E-03  0.5801E-27  0.5442E-29  0.0000E+00
 0.5641E-33 -0.1089E-30
   MODE NO      7
 0.4584E-03  0.2264E-03  0.4584E-03  0.1669E-27  0.1062E-27  0.0000E+00
-0.1275E-28  0.2004E-28  0.3569E-03  0.1669E-15  0.1062E-15  0.0000E+00
 0.5028E-24 -0.3543E-24 -0.9696E-04  0.2391E-15 -0.6693E-17  0.0000E+00
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-0.2215E-25 -0.1156E-23 -0.4710E-03  0.1151E-15 -0.7798E-16  0.0000E+00
-0.3171E-24 -0.6526E-24 -0.3321E-03 -0.1754E-15 -0.1645E-17  0.0000E+00
 0.8951E-27  0.1140E-33  0.3264E-03 -0.1754E-27 -0.1645E-29  0.0000E+00
-0.8267E-34  0.2958E-31
   MODE NO      8
-0.3871E-05  0.3801E-05 -0.3871E-05  0.3355E-28  0.2134E-28  0.0000E+00
-0.2562E-29  0.4028E-29  0.4051E-04  0.3355E-16  0.2134E-16  0.0000E+00
 0.6455E-25 -0.6616E-25  0.2608E-04  0.4805E-16 -0.1345E-17  0.0000E+00
-0.4135E-26 -0.1320E-24 -0.2582E-04  0.2312E-16 -0.1566E-16  0.0000E+00
-0.6549E-25 -0.6744E-25 -0.4063E-04 -0.3525E-16 -0.3307E-18  0.0000E+00
 0.1003E-26  0.2045E-24  0.3400E-05 -0.3525E-28 -0.3307E-30  0.0000E+00
-0.3893E-34  0.3341E-32

 DISPLACEMENT RESPONSE UV (FROM SV)

   MODE NO      1
 0.1874E-02 -0.1518E-02  0.1874E-02  0.3079E-27  0.1933E-27  0.0000E+00
-0.2327E-28  0.3648E-28 -0.5155E-02  0.3039E-15  0.1933E-15  0.0000E+00
 0.6768E-24 -0.6671E-24 -0.1028E-01  0.4352E-15 -0.1218E-16  0.0000E+00
-0.4170E-25 -0.1339E-23 -0.1137E-01  0.2095E-15 -0.1419E-15  0.0000E+00
-0.6714E-24 -0.6616E-24 -0.8030E-02 -0.3192E-15 -0.2994E-17  0.0000E+00
 0.1011E-25  0.1970E-23 -0.1518E-02 -0.3192E-27 -0.2994E-29  0.0000E+00
-0.3556E-33  0.3365E-31
   MODE NO      2
-0.9216E-03  0.6123E-03 -0.9218E-03 -0.2349E-27 -0.1494E-27  0.0000E+00
 0.1793E-28 -0.2820E-28 -0.1058E-02 -0.2349E-15 -0.1494E-15  0.0000E+00
-0.6474E-24  0.6027E-24 -0.6472E-03 -0.3364E-15  0.9417E-17  0.0000E+00
 0.3767E-25  0.1236E-23  0.9995E-04 -0.1619E-15  0.1097E-15  0.0000E+00
 0.6170E-24  0.5885E-24  0.5944E-03  0.2468E-15  0.2315E-17  0.0000E+00
-0.8010E-26 -0.1676E-23  0.6123E-03  0.2468E-27  0.2315E-29  0.0000E+00
 0.2741E-33 -0.3083E-31
   MODE NO      3
 0.3680E-03  0.3626E-03  0.3680E-03  0.2913E-30  0.1853E-30  0.0000E+00
-0.2224E-31  0.3497E-31  0.1195E-02  0.2913E-18  0.1853E-18  0.0000E+00
 0.3525E-27  0.3243E-25  0.1678E-02  0.4173E-18 -0.1174E-19  0.0000E+00
 0.2027E-26 -0.6652E-25  0.1677E-02  0.2008E-18 -0.1360E-18  0.0000E+00
 0.4088E-25 -0.6617E-25  0.1131E-02 -0.3060E-18 -0.2967E-20  0.0000E+00
-0.1531E-26 -0.3133E-25  0.3626E-03 -0.3041E-30 -0.2989E-32  0.0000E+00
 0.3503E-34  0.1919E-32
   MODE NO      4
-0.4361E-03 -0.4933E-03 -0.4361E-03  0.1803E-28  0.1147E-28  0.0000E+00
-0.1376E-29  0.2164E-29 -0.7977E-03  0.1803E-16  0.1147E-16  0.0000E+00
 0.5701E-25 -0.1177E-24 -0.9868E-03  0.2582E-16 -0.7228E-18  0.0000E+00
-0.7357E-26  0.2588E-25 -0.1035E-02  0.1242E-16 -0.8416E-17  0.0000E+00
-0.1527E-24  0.8291E-25 -0.8833E-03 -0.1894E-16 -0.1777E-19  0.0000E+00
 0.3735E-26  0.2040E-27 -0.4933E-03 -0.1894E-28 -0.1776E-30  0.0000E+00
-0.9230E-34 -0.1180E-32
   MODE NO      5
-0.8983E-05 -0.2044E-04 -0.8982E-05 -0.3021E-28 -0.1922E-28  0.0000E+00
 0.2307E-29 -0.3627E-29  0.9996E-04 -0.3021E-16 -0.1922E-16  0.0000E+00
-0.5575E-25  0.5400E-25  0.2062E-03 -0.4327E-16  0.1211E-17  0.0000E+00
 0.3375E-26  0.1229E-26  0.2496E-03 -0.2082E-16  0.1411E-16  0.0000E+00
 0.5121E-25  0.6708E-25  0.1637E-03  0.3174E-16  0.2978E-18  0.0000E+00
-0.7883E-27 -0.1773E-24 -0.2044E-04  0.3174E-28  0.2979E-30  0.0000E+00
 0.3086E-34 -0.3142E-32
   MODE NO      6
 0.7317E-05  0.1765E-04  0.7319E-05  0.9703E-28  0.6172E-28  0.0000E+00
-0.7409E-29  0.1165E-28  0.1349E-03  0.9703E-16  0.6172E-16  0.0000E+00
 0.1990E-24 -0.1971E-24  0.8416E-04  0.1390E-15 -0.3890E-17  0.0000E+00
-0.1232E-25 -0.4076E-24 -0.7229E-04  0.6688E-16 -0.4530E-16  0.0000E+00
-0.1949E-24 -0.2085E-24 -0.1166E-03 -0.1019E-15 -0.9564E-18  0.0000E+00
 0.3017E-26  0.6038E-24  0.1765E-04 -0.1019E-27 -0.9564E-30  0.0000E+00
-0.1094E-33  0.1031E-31
   MODE NO      7
 0.1413E-05 -0.2027E-04  0.1413E-05 -0.1891E-28 -0.1203E-28  0.0000E+00
 0.1444E-29 -0.2270E-29 -0.1788E-04 -0.1891E-16 -0.1203E-16  0.0000E+00
-0.2531E-25  0.2579E-25 -0.9311E-05 -0.2708E-16  0.7580E-18  0.0000E+00
 0.1612E-26  0.6392E-25  0.1273E-04 -0.1303E-16  0.8827E-17  0.0000E+00
 0.2249E-25  0.3860E-25  0.9709E-05  0.1986E-16  0.1864E-18  0.0000E+00
-0.4176E-27 -0.9784E-25 -0.2027E-04  0.1986E-28  0.1863E-30  0.0000E+00
 0.1798E-34 -0.1668E-32
   MODE NO      8
 0.3139E-05 -0.1092E-05  0.3139E-05 -0.1616E-28 -0.1028E-28  0.0000E+00
 0.1234E-29 -0.1940E-29 -0.1853E-04 -0.1616E-16 -0.1028E-16  0.0000E+00
-0.2979E-25  0.3109E-25 -0.1255E-04 -0.2315E-16  0.6479E-18  0.0000E+00
 0.1943E-26  0.6119E-25  0.1170E-04 -0.1114E-16  0.7545E-17  0.0000E+00
 0.3072E-25  0.3139E-25  0.1875E-04  0.1698E-16  0.1593E-18  0.0000E+00
-0.5264E-27 -0.9704E-25 -0.1892E-05  0.1698E-28  0.1593E-30  0.0000E+00
 0.1892E-34 -0.1550E-32

 CORRELATION EPSD

   MODE NO      1
 0.1000E+01  0.7046E-01  0.7403E-01  0.8384E-01  0.9257E-01  0.9581E-01
 0.9808E-01  0.9820E-01
   MODE NO      2
 0.7046E-01  0.1000E+01  0.5617E+00  0.5986E+00  0.6491E+00  0.6692E+00
 0.6840E+00  0.6849E+00
   MODE NO      3
 0.7403E-01  0.5617E+00  0.1000E+01  0.6922E+00  0.7229E+00  0.7389E+00
 0.7533E+00  0.7539E+00
   MODE NO      4
 0.8384E-01  0.5986E+00  0.6922E+00  0.1000E+01  0.8581E+00  0.8440E+00
 0.8543E+00  0.8538E+00
   MODE NO      5
 0.9257E-01  0.6491E+00  0.7229E+00  0.8581E+00  0.1000E+01  0.9466E+00
 0.9386E+00  0.9353E+00
   MODE NO      6
 0.9581E-01  0.6692E+00  0.7389E+00  0.8440E+00  0.9466E+00  0.1000E+01
 0.9799E+00  0.9717E+00
   MODE NO      7
 0.9808E-01  0.6840E+00  0.7533E+00  0.8543E+00  0.9386E+00  0.9799E+00
 0.1000E+01  0.9972E+00
   MODE NO      8
 0.9820E-01  0.6849E+00  0.7539E+00  0.8538E+00  0.9353E+00  0.9717E+00
 0.9972E+00  0.1000E+01

 CORRELATION EPSV

   MODE NO      1
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
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0.0000E+00  0.0000E+00
  MODE NO.     2
0.0000E+00  0.1000E+01  0.1353E+00  0.1141E+00  0.1473E+00  0.1665E+00
0.1820E+00  0.1867E+00
  MODE NO.     3
0.0000E+00  0.1363E+00  0.1000E+01  0.2586E+00  0.2427E+00  0.2434E+00
0.2646E+00  0.2715E+00
  MODE NO.     4
0.0000E+00  0.1141E+00  0.2586E+00  0.1000E+01  0.5023E+00  0.3897E+00
0.3903E+00  0.3813E+00
  MODE NO.     5
0.0000E+00  0.1473E+00  0.2427E+00  0.5023E+00  0.1000E+01  0.6751E+00
0.5729E+00  0.4960E+00
  MODE NO.     6
0.0000E+00  0.1665E+00  0.2434E+00  0.3897E+00  0.6751E+00  0.1000E+01
0.8135E+00  0.5896E+00
  MODE NO.     7
0.0000E+00  0.1820E+00  0.2646E+00  0.3903E+00  0.5729E+00  0.8135E+00
0.1000E+01  0.7136E+00
  MODE NO.     8
0.0000E+00  0.1867E+00  0.2715E+00  0.3813E+00  0.4960E+00  0.5896E+00
0.7136E+00  0.1000E+01


 CORRELATION MU (FOR CROSS TERM OF RD AND RV)

  MODE NO.     1
 0.0000E+00  0.5267E-01  0.2314E-01  0.2144E-01  0.2416E-01  0.2022E-01
 0.1817E-01  0.6761E-02
  MODE NO.     2
-0.5267E-01  0.0000E+00  0.1564E+00  0.8810E-01  0.6694E-01  0.4482E-01
 0.3434E-01  0.1303E-01
  MODE NO.     3
-0.2314E-01 -0.1664E+00  0.0000E+00  0.1774E+00  0.1071E+00  0.6598E-01
 0.4824E-01  0.1905E-01
  MODE NO.     4
-0.2144E-01 -0.8810E-01 -0.1774E+00  0.0000E+00  0.1729E+00  0.9848E-01
 0.6692E-01  0.2630E-01
  MODE NO.     5
-0.2416E-01 -0.6694E-01 -0.1071E+00 -0.1729E+00  0.0000E+00  0.1156E+00
 0.8163E-01  0.3298E-01
  MODE NO.     6
-0.2022E-01 -0.4482E-01 -0.6598E-01 -0.9848E-01 -0.1156E+00  0.0000E+00
 0.6978E-01  0.3693E-01
  MODE NO.     7
-0.1817E-01 -0.3434E-01 -0.4824E-01 -0.6692E-01 -0.8163E-01 -0.6978E-01
 0.0000E+00  0.1776E-01
  MODE NO.     8
-0.6761E-02 -0.1303E-01 -0.1905E-01 -0.2630E-01 -0.3298E-01 -0.3693E-01
-0.1776E-01  0.0000E+00

 COMBINED VALUES OF COUPLED MODAL DISPLACEMENTS

 DISPLACEMENYS AT PRIMARY SYSTEM CONNETING DOF

 DOF #      DISPLACEMENT

  2         0.1039E+01

  6         0.1970E+01

 DISPLACEMENTS AT SECONDARY SYSTEM DOF

 NODE       DX           DY           DZ          ROT-X        ROT-Y        ROT-Z


  1    0.1039E+01  0.4668E-27  0.2969E-27  0.0000E+00  0.3565E-28  0.5604E-28

  2    0.1277E+01  0.4668E-15  0.2969E-15  0.0000E+00  0.1180E-22  0.1587E-22

  3    0.1493E+01  0.6666E-15  0.1872E-15  0.0000E+00  0.9917E-24  0.1077E-22

  4    0.1682E+01  0.3218E-15  0.2179E-15  0.0000E+00  0.2091E-22  0.1130E-22

  5    0.1842E+01  0.4904E-15  0.4601E-17  0.0000E+00  0.4043E-24  0.2220E-22

  6    0.1970E+01  0.4904E-27  0.4601E-29  0.0000E+00  0.8863E-32  0.2763E-30

 COMBINED VALUES OF COUPLFD MEMEBER FORCES

 NODE       FX           FY           FZ           MX           MY           MZ


  1    0.2397E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  2    0.2397E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  2    0.2170E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  3    0.2170E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  3    0.1903E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  4    0.1903E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  4    0.1606E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  5    0.1606E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  5    0.1282E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  6    0.1282E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

 COMBINED VALUES OF COUPLED SUPPORT REACTIONS

 TYPE     NODE       SUPPORT REACTION
```

```
 FX        1         0.2397E+03

 FX        6         0.1282E+03
```

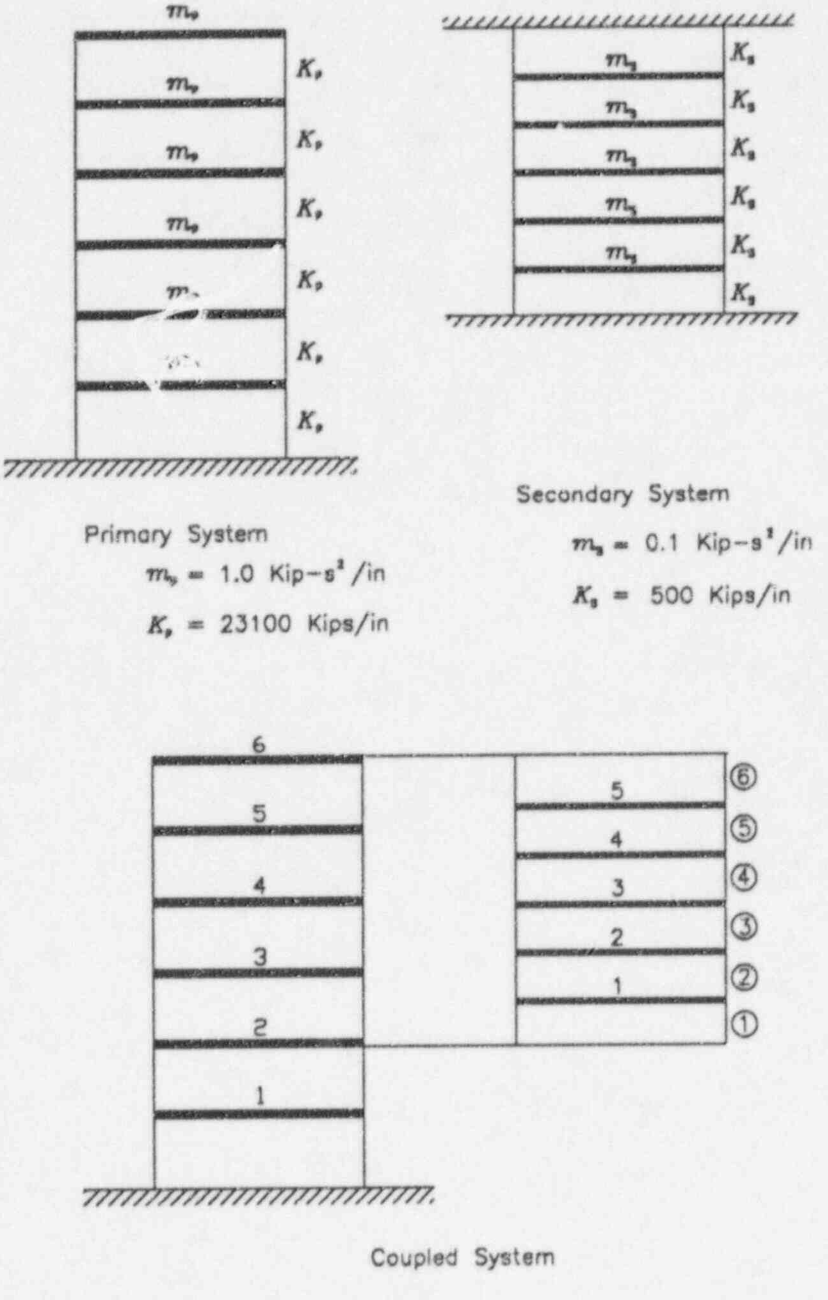
m_p
K_p
m_s
K_s
Primary System
m_p = 1.0 Kip-s²/in
K_p = 23100 Kips/in
Secondary System
m_s = 0.1 Kip-s²/in
K_s = 500 Kips/in
1
2
3
4
5
6
①
②
③
④
⑤
⑥
Coupled System

Figure 2: Primary, Secondary and Coupled Systems, Case 2

Table 4: Frequencies and Damping Ratios - Case 2

6-DOF Primary System			5-DOF Secondary System		
Mode No.	Freq. (Hz.)	Damping Ratio	Mode No.	Freq. (Hz.)	Damping Ratio
1	5.83144	0.07	1	5.82555	0.02
2	17.15531	0.07	2	11.25400	0.02
3	27.48288	0.07	3	15.91549	0.02
4	36.21252	0.07	4	19.49171	0.02
5	42.83814	0.07	5	21.74056	0.02
6	46.97300	0.07			

Table 5: Comparison of Nodal Displacements (inches) for Secondary System - Case 2

Node no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	0.3875	0.3875	0.3874
2	0.6098	0.6096	0.6097
3	0.7038	0.7035	0.7037
4	0.6497	0.6497	0.6496
5	0.4659	0.4657	0.4658

Table 6: Comparison of Spring Forces (kips) for Secondary System - Case 2

Element no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	154.0	154.0	154.0
2	112.9	112.9	112.9
3	48.04	47.98	48.02
4	33.6	33.61	33.61
5	100.2	100.1	100.2
6	146.2	146.1	146.2

```
IDEN JB=1111 IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL SU=1 CV=2 TI=/CASE-2, 5-DOF PROBLEM/
FREQ FR=33 LO=1 MX=5 TI=/INCLUDING ALL MODES /
RCAS CA=1 EV=1 TY=1 SU=3 LO=1 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 SU=1 FX=1 FY=1 FZ=1
SPEC EV=1 ME=1 FP=0 SH=0
     LV=1 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=2 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=3 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=4 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=5 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=6 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=7 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
MATL CD=3 EC=28.0 SC=75 SH=75 KL=1
ANCH PT=1 LV=1
SPRS PT=2 DX=1.0 AZ=500.0
LUMP PT=2 MA=38.64
RSUP PT=2 DY=1 LV=2
RSUP PT=2 DZ=1 LV=2
ROTR PT=2 RX=1
ROTR PT=2 RY=1
ROTR PT=2 RZ=1
SPRS PT=3 DX=1.0 AZ=500.0
LUMP PT=3 MA=38.64
RSUP PT=3 DY=1 LV=3
RSUP PT=3 DZ=1 LV=3
ROTR PT=3 RX=1
ROTR PT=3 RY=1
ROTR PT=3 RZ=1
SPRS PT=4 DX=1.0 AZ=500.0
LUMP PT=4 MA=38.64
RSUP PT=4 DY=1 LV=4
RSUP PT=4 DZ=1 LV=4
ROTR PT=4 RX=1
ROTR PT=4 RY=1
ROTR PT=4 RZ=1
SPRS PT=5 DX=1.0 AZ=500.0
LUMP PT=5 MA=38.64
RSUP PT=5 DY=1 LV=5
RSUP PT=5 DZ=1 LV=5
ROTR PT=5 RX=1
ROTR PT=5 RY=1
ROTR PT=5 RZ=1
SPRS PT=6 DX=1.0 AZ=500.0
LUMP PT=6 MA=38.64
RSUP PT=6 DY=1 LV=6
RSUP PT=6 DZ=1 LV=6
ROTR PT=6 RX=1
ROTR PT=6 RY=1
ROTR PT=6 RZ=1
SPRS PT=7 DX=1.0 AZ=500.0
ANCH PT=7 LV=7
ENDP
```

```
CREST/ PIPESTRESS RUN FOR CASE-2, WITH ALL THE S.S. MODES
    6     2     2     6  5  1  0  11  1     0     0     0     1
  900    11    11     1.0E-6       20.5       386.4 0.10
      0.07        0.07        0.07        0.07        0.07        0.07
      0.02        0.02        0.02        0.02        0.02
    2     6
    1    19
100000000. 0.0
0.0       100000000.
1 7
5.83144000 17.1553100 27.4828800 36.2125200 42.8381400 46.9730000
-0.25778    -0.55066    0.36783     0.13275     0.51865  0.45651
-0.55066    0.51865     0.45651     0.36783     -0.25778  0.13275
 -0.2284E+01 -0.7319E+00  0.4018E+00 -0.2457E+00  0.1455E+00 -0.6833E-01
   11  0.020068
 5.1640.8486 6.6590.837311.1490.711015.9360.652817.2960.552219.6100.5449
21.7360.423727.5810.359336.2420.355142.8910.351547.0050.3488
   11  0.020304
 5.1640.8466 6.6590.831611.1490.708715.9360.651617.2960.550919.6100.5440
21.7360.423027.5810.359336.2420.355042.8910.351447.0050.3488
   11  0.020811
 5.1640.8424 6.6590.821611.1490.703915.9360.649017.2960.548219.6100.5420
21.7360.421427.5810.359236.2420.354842.8910.351247.0050.3488
   11  0.022647
 5.1640.8272 6.6590.801811.1490.688215.9360.639917.2960.538519.6100.5352
21.7360.416027.5810.359036.2420.354242.8910.350647.0050.3488
   11  0.038318
 5.1640.7113 6.6590.655911.1490.599415.9360.576317.2960.473319.6100.4860
21.7360.389627.5810.358036.2420.352242.8910.348647.0050.3487
   11  0.047266
 5.1640.6557 6.6590.591511.1490.566415.9360.548617.2960.443719.6100.4653
21.7360.383427.5810.357436.2420.353242.8910.348447.0050.3487
   11  0.066337
 5.1640.5936 6.6590.501711.1490.517115.9360.503917.2960.433819.6100.4343
21.7360.371127.5810.356136.2420.350742.8910.348647.0050.3488
   11  0.069376
 5.1640.5893 6.6590.496411.1490.510915.9360.498117.2960.432519.6100.4305
21.7360.369227.5810.355936.2420.350742.8910.348647.0050.3489
   11  0.069785
 5.1640.5887 6.6590.495811.1490.510115.9360.497417.2960.432319.6100.4300
21.7360.369027.5810.355936.2420.350742.8910.348647.0050.3489
   11  0.069811
 5.1640.5886 6.6590.495811.1490.510115.9360.497317.2960.432319.6100.4300
21.7360.369027.5810.355936.2420.350742.8910.348647.0050.3489
   11  0.069887
 5.1640.5886 6.6590.495811.1490.510115.9360.497317.2960.432319.6100.4300
21.7360.369027.5810.355936.2420.350742.8910.348647.0050.3489
```

```
CREST: PIPESTRESS RUN FOR CASE-2, WITH ALL THE S.S. MODES

  NUMBER OF PRIMARY DOP                NP=    6

  NUMBER OF CONNECTING DOF             NC=    2

  NUMBER OF PIPING ANCHORS             NA=    2

  NUMBER OF PRIMARY MODES             NPM=    6

  NUMBER OF SECONDARY MODES           NSM=    5

  NORMALIZATION INDEX FOR P.S.      NORMP=    1

  NORMALIZATION INDEX FOR S.S.      NORMS=    0

  OUTPUT TYPE INDICATOR            IPRINT=    1

  OUTPUT TYPE INDICATOR           IPRINTS=    0

  PRIMARY RESIDUAL MODE KEY         KRESP=    0

  SECONDARY RESIDUAL MODE KEY       KRZSS=    0

  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX       NONZP=   11

  GLOBAL EARTHQUAKE DIRECTION  X=1  Y=2(VERTICAL)  Z=3       KFLG=    1

  NUMBER OF ITERATIONS             NITER=  900

  NUMBER OF SPECTRA CURVES        NCURVE=   11

  NUMBER OF SPECTRUM POINTS         MXLP=   11

  ITERATION TOLERANCE                TOL=  0.1000E-05

  RIGID FREQUENCY                     FR=  20.500

  SPECTRUM FACTOR                   SFTR= 386.400

  CORRELATION TOLERANCE               ET=   0.100


  TOTAL STORAGE REQUIRED  =      34335
  ACTUAL PROVIDED STORAGE  = 550000000

  PRIMARY DAMPING RATIOS

  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01

  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01

  CONECTING DOF # OF PRIMARY SYSTEM

    2    6

  CONECTING DOF # OF PIPING SUPPORTS

    1   19

  STIFFNESS OF CONNECTING DOF OF S.S.

  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09

  NODE # OF PIPING ANCHORS

    1    7

  MASS OF EACH SECONDARY DOF

  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00

  ADDRESS OF DIAGONAL ELEMENTS IN S.S. STIFFNESS MATRIX (JDG MATRIX)

    1    3    6   10   15   21   28   36   45   55   66   78   85   93  102  112
  123  135  142  150  159  169  180  192  199  207  216  226  237  249  256  264
  273  283  294  306  313  321  330  340  351  363

  LOWER TRIANGULAR STIFFNESS MATRIX OF SECONDARY SYSTEM

  0.1000E+09  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.5000E+03  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.5000E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
```

```
  0.1000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.5000E+03  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.5000E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.5000E+03  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.5000E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+09  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10


  SECONDARY FREQUENCIES (HZ)

   5.8254709  11.2539490  15.9154939  19.4924276  21.7409847


  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        2

  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8333E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6667E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3333E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1667E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8333E-06  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        6

  0.8333E-06  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1667E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3333E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6667E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8333E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


  UNNORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.2500E-05 -0.5000E-05  0.5000E-05 -0.5000E-05  0.2500E-05
  0.3337E-29 -0.5564E-34 -0.1130E-36 -0.1481E-23  0.3086E-23
  0.1555E-29  0.1557E-35  0.9611E-37  0.8036E-22 -0.4619E-24
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1867E-30 -0.1870E-36 -0.1154E-37 -0.9647E-23  0.5546E-25
  0.4006E-30 -0.6579E-35 -0.1356E-37 -0.1778E-24  0.3765E-24
  0.5000E+00 -0.1000E+01  0.1000E+01 -0.1000E+01  0.5000E+00
  0.3337E-17 -0.5564E-22 -0.1130E-24 -0.1481E-11  0.3086E-11
  0.1555E-17  0.1557E-23  0.9611E-25  0.8036E-10 -0.4619E-12
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.2199E-29  0.8305E-32 -0.2597E-33 -0.4385E-18 -0.1065E-20
  0.4719E-29 -0.2659E-30 -0.1597E-36  0.1027E-19 -0.8518E-20
  0.8660E+00 -0.1000E+01 -0.1670E-05  0.1000E+01 -0.8660E+00
  0.4779E-18 -0.2677E-22 -0.5064E-25  0.6448E-11 -0.1265E-10
  0.2324E-17  0.1814E-22 -0.6554E-26  0.9462E-10 -0.3760E-13
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1400E-25 -0.6644E-31  0.4869E-34 -0.2192E-18 -0.1332E-21
 -0.3501E-26  0.1994E-30 -0.1298E-33  0.1370E-19  0.3409E-19
  0.1000E+01 -0.3272E-09 -0.1000E+01 -0.5652E-07  0.1000E+01
  0.2272E-17  0.4081E-22 -0.1454E-24  0.2654E-10 -0.4856E-11
 -0.3899E-18  0.3829E-24  0.2788E-26 -0.1357E-10 -0.4113E-11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3257E-30 -0.1036E-32 -0.1121E-38 -0.5479E-19 -0.1704E-19
  0.9336E-26  0.1329E-30  0.5192E-33  0.2411E-23 -0.1704E-19
  0.8660E+00  0.1000E+01 -0.1664E-05 -0.1000E+01 -0.8660E+00
 -0.2401E-17  0.5692E-22  0.6987E-27 -0.4153E-10 -0.2157E-11
  0.3766E-17  0.3332E-22 -0.1032E-24 -0.5013E-10 -0.7397E-11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2801E-25  0.1329E-30  0.5192E-33  0.4388E-23  0.1704E-19
 -0.4569E-26 -0.2658E-30  0.2066E-35 -0.1094E-19  0.4261E-20
  0.5000E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.5000E+00
 -0.5770E-17  0.1404E-23  0.2022E-35 -0.6185E-10 -0.5879E-11
 -0.2288E-17  0.1009E-22  0.5783E-25 -0.1311E-09 -0.4477E-11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4669E-26  0.3323E-31  0.2596E-33  0.9711E-23  0.8522E-20
 -0.1867E-25 -0.6662E-35  0.2343E-30  0.2192E-18 -0.1704E-19
 0.2500E-05  0.5000E-05  0.5000E-05  0.5000E-05  0.2500E-05
-0.5770E-29  0.1404E-35  0.2022E-37 -0.6185E-22 -0.5878E-23
-0.2288E-29  0.1009E-34  0.5783E-37 -0.1311E-21 -0.4476E-23
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.8965E-35 -0.1615E-38 -0.3793E-42  0.3070E-25 -0.2869E-27
 0.1281E-33  0.1022E-39 -0.1049E-4*  0.2925E-27  0.4361E-27

NORMALIZED MODE SHAPE OF SECONDARY SYSTEM

 0.4564E-05 -0.7906E-05  0.9129E-05 -0.7906E-05  0.4564E-05
 0.6093E-29 -0.8797E-34 -0.2062E-36 -0.2342E-23  0.5634E-23
 0.2839E-29  0.2462E-35  0.1755E-36  0.1271E-21 -0.8434E-24
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.3408E-30 -0.2956E-36 -0.2106E-37 -0.1525E-22  0.1012E-24
 0.7315E-30 -0.1056E-34 -0.2476E-37 -0.2811E-24  0.6764E-24
 0.9129E+00 -0.1581E+01  0.1826E+01 -0.1581E+01  0.9129E+00
 0.6093E-17 -0.8797E-22 -0.2062E-24 -0.2342E-11  0.5634E-11
 0.2839E-17  0.2462E-23  0.1755E-24  0.1271E-09 -0.8434E-12
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.4014E-29  0.1313E-31 -0.4742E-33 -0.6934E-18 -0.1944E-20
 0.8615E-29 -0.4204E-30 -0.2916E-38  0.3624E-19 -0.1555E-19
 0.1581E+01 -0.1581E+01 -0.3049E-05  0.1581E+01 -0.1581E+01
 0.8725E-18 -0.4233E-22 -0.1071E-24  0.1020E-10 -0.2347E-10
 0.4244E-17  0.2868E-22 -0.1197E-25  0.1496E-09 -0.6866E-13
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.2557E-25 -0.1051E-30  0.8889E-34 -0.3466E-18 -0.2432E-21
-0.6393E-26  0.3152E-30 -0.2370E-33  0.2166E-19  0.6223E-19
 0.1826E+01 -0.5174E-09 -0.1826E+01 -0.8937E-07  0.1826E+01
 0.4149E-17  0.6452E-22 -0.2655E-24  0.4196E-10 -0.8866E-11
-0.7118E-18  0.6055E-24  0.5089E-26 -0.2145E-10 -0.7508E-11
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.5547E-30 -0.1638E-32 -0.2047E-38 -0.8663E-19 -0.3112E-19
 0.1705E-25  0.2102E-30  0.9679E-33  0.3811E-23 -0.3112E-19
 0.1581E+01  0.1581E+01 -0.3037E-05 -0.1581E+01 -0.1581E+01
-0.4384E-17  0.9000E-22  0.1276E-26 -0.6546E-10 -0.3957E-11
 0.6876E-17  0.5269E-22 -0.1883E-24 -0.7927E-10 -0.1350E-10
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.5113E-25  0.2101E-30  0.9479E-33  0.6930E-21  0.3112E-19
-0.8524E-26 -0.4203E-30  0.3735E-35 -0.1733E-18  0.7780E-20
 0.9129E+00  0.1581E+01  0.1826E+01  0.1581E+01  0.9129E+00
-0.1053E-16  0.2220E-23  0.3692E-25 -0.9779E-10 -0.1073E-10
-0.4178E-17  0.1595E-22  0.1056E-24 -0.2072E-09 -0.8173E-11
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.8524E-26  0.5254E-31  0.4739E-33  0.1535E-22  0.1556E-19
-0.3409E-2^ -0.1053E-34  0.4277E-38  0.3466E-18 -0.3112E-19
 0.4564E-05  0.7906E-05  0.9129E-05  0.7906E-05  0.4564E-05
-0.1053E-28  0.2219E-35  0.3692E-37 -0.9780E-22 -0.1073E-22
-0.4177E-29  0.1595E-34  0.1056E-36 -0.2072E-21 -0.8173E-23
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1637E-34 -0.2553E-38 -0.6924E-42  0.4854E-25 -0.5237E-27
 0.2339E-33  0.1616E-39 -0.1953E-41  0.4625E-27  0.7963E-27

PRIMARY FREQUENCIES (HZ)

 5.8314400  17.1553100  27.4828800  36.2125200  42.8331400  46.9730000

MODE SHAPE OF P.S. AT CONNECTING DOF        2

-0.2578E+00 -0.5507E+00  0.3678E+00  0.1328E+00  0.5187E+00  0.4565E+00

MODE SHAPE OF P.S. AT CONNECTING DOF        6

-0.5507E+00  0.5187E+00  0.4565E+00  0.3678E+00 -0.2578E+00  0.1328E+00

BASE INFLUENCE VECTOR FOR S.S.---UBS

0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

PARTICIPATION FACTOR FOR P.S.---GAMAP

-0.2284E+01 -0.7319E+00  0.4018E+00 -0.2457E+00  0.1455E+00 -0.6833E-01


     *************************************************************
     *                                                           *
     *                                                           *
     *                 A COMPUTER PROGRAM FOR                    *
     *                                                           *
     *  COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS  *
     *                                                           *
     *                      " C R E S T "                        *
     *                                                           *
     *                      DEVELOPED BY                         *
     *                                                           *
     *                    AJAYA KUMAR GUPTA                      *
     *              JING-WEN JAW   ABHINAV GUPTA                 *
     *                                                           *
     *            NORTH CAROLINA STATE UNIVERSITY                *
     *               RALEIGH, NORTH CAROLINA                     *
     *                                                           *
     *                    REVISION-1.0                           *
     *                                                           *
     *                                                           *
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PARTICIPATION FACTOR FOR S.S.---GAMAS
0.6914E+00  0.6594E-10  0.1826E+00  0.9466E-08  0.4892E-01

MASS RATIOS

  PRIMARY SYSTEM MODE     1
0.7586E-01  0.2144E-02  0.5446E-02  0.2303E-03  0.3910E-03

  PRIMARY SYSTEM MODE     2
0.1189E-03  0.2859E-01  0.8539E-05  0.3176E-02  0.6130E-06

  PRIMARY SYSTEM MODE     3
0.7807E-01  0.1966E-03  0.5663E-02  0.2184E-04  0.4066E-03

  PRIMARY SYSTEM MODE     4
0.2908E-01  0.1382E-02  0.2088E-02  0.1535E-03  0.1499E-03

  PRIMARY SYSTEM MODE     5
0.7899E-02  0.1507E-01  0.5671E-03  0.1675E-02  0.6072E-04

  PRIMARY SYSTEM MODE     6
0.4030E-01  0.2621E-02  0.2894E-02  0.3912E-03  0.2077E-03

COUPLED FREQUENCIES AND MODE SHAPES EXTRACTION

NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION   NITER =  900

CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                       TOL = 0.10000E-05

COUPLED  FREQUENCY  DAMPING RATIO
 MODE       (HZ)        (%)

  1    0.51637E+01    0.38317E+01
  2    0.66588E+01    0.47267E+01
  3    0.11149E+02    0.20811E+01
  4    0.15936E+02    0.20304E+01
  5    0.17296E+02    0.46336E+01
  6    0.19611E+02    0.22648E+01
  7    0.21737E+02    0.20069E+01
  8    0.27581E+02    0.69376E+01
  9    0.36242E+02    0.69814E+01
 10    0.42891E+02    0.69785E+01
 11    0.47004E+02    0.69811E+01

UNIT DISPLACEMENT & UNIT VELOCITY*W RESPONSE


COUPLED MODE NO.   1


  1    0.36475E+00    0.52127E-01
  2    0.77233E+00    0.11346E+00
  3    0.52338E-05   -0.48183E-06
  4    0.56371E-26    0.39123E-27
  5    0.20688E-24    0.16102E-25
  6    0.00000E+00    0.00000E+00
  7   -0.24835E-25   -0.19330E-26
  8    0.67672E-27    0.46566E-28
  9    0.10469E+01   -0.96366E-01
 10    0.56371E-14    0.39123E-15
 11    0.20688E-12    0.16102E-13
 12    0.00000E+00    0.00000E+00
 13   -0.11399E-20   -0.88649E-22
 14    0.49194E-24    0.16566E-24
 15    0.17959E+01   -0.16809E+00
 16   -0.22728E-13   -0.15762E-14
 17    0.24512E-12    0.19070E-13
 18    0.00000E+00    0.00000E+00
 19   -0.56862E-21   -0.44231E-22
 20    0.14010E-21    0.10391E-22
 21    0.20861E+01   -0.19314E+00
 22    0.53882E-13    0.42439E-14
 23   -0.47785E-13   -0.36561E-14
 24    0.00000E+00    0.00000E+00
 25   -0.19431E-21   -0.14862E-22
 26   -0.52270E-22   -0.38150E-23
 27    0.18457E+01   -0.16437E+00
 28   -0.11430E-12   -0.88590E-14
 29   -0.15263E-12   -0.11765E-13
 30    0.00000E+00    0.00000E+00
 31    0.52370E-22    0.38095E-23
 32   -0.27104E-21   -0.21149E-22
 33    0.11069E+01   -0.91843E-01
 34   -0.17836E-12   -0.13786E-13
 35   -0.35343E-12   -0.27429E-13
 36    0.00000E+00    0.00000E+00
 37    0.26183E-22    0.19079E-23
 38    0.51583E-21    0.40393E-22
 39    0.55345E-05   -0.45921E-06
 40   -0.17837E-24   -0.13787E-25
 41   -0.35344E-24   -0.27430E-25
 42    0.00000E+00    0.00000E+00
 43    0.78682E-28    0.61258E-29
 44    0.2096' '-29    0.15656E-30

COUPLED MODE NO.   2


  1    0.24352E+00   -0.60135E-01
  2    0.53221E+00   -0.11005E+00
  3   -0.51960E-05    0.46664E-06
  4    0.62129E-26   -0.21338E-26
  5    0.24820E-24   -0.84178E-25
  6    0.00000E+00    0.00000E+00
  7   -0.29796E-25    0.10105E-25
  8    0.74504E-27   -0.25614E-27
  9   -0.10392E+01    0.93329E-01
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   10      0.42128E-14    -0.21338E-14
   11      0.24820E-12    -0.84178E-13
   12      0.00000E+00     0.00000E+00
   13     -0.13670E-20     0.46365E-21
   14      0.20607E-23    -0.63039E-24
   15     -0.18163E+01     0.16696E+00
   16     -0.25042E-13     0.85968E-14
   17      0.29399E-12    -0.99714E-13
   18      0.00000E+00     0.00000E+00
   19     -0.68190E-21     0.23129E-21
   20      0.16216E-21    -0.55272E-22
   21     -0.20770E+01     0.18523E+00
   22      0.65453E-13    -0.22162E-13
   23     -0.56600E-13     0.19230E-13
   24      0.00000E+00     0.00000E+00
   25     -0.23010E-21     0.78181E-22
   26     -0.59791E-22     0.20412E-22
   27     -0.17469E+01     0.14200E+00
   28     -0.13670E-12     0.46383E-13
   29     -0.18180E-12     0.61718E-13
   30      0.00000E+00     0.00000E+00
   31      0.59740E-22    -0.20414E-22
   32     -0.32500E-21     0.11047E-21
   33     -0.95741E+00     0.64147E-01
   34     -0.21287E-12     0.72251E-13
   35     -0.42311E-12     0.14354E-12
   36      0.00000E+00     0.00000E+00
   37      0.29911E-22    -0.10216E-22
   38      0.62170E-21    -0.21072E-21
   39     -0.47870E-05     0.32073E-06
   40     -0.21289E-24     0.72257E-25
   41     -0.42313E-24     0.14355E-24
   42      0.00000E+00     0.00000E+00
   43      0.94419E-28    -0.32022E-28
   44      0.24389E-29    -0.83076E-30

 COUPLED MODE NO.    3

    1      0.20842E-01     0.45169E-03
    2     -0.71464E-02    -0.18273E-02
    3      0.18122E-05    -0.45452E-07
    4      0.23556E-26     0.29759E-29
    5     -0.91468E-25    -0.48620E-26
    6      0.00000E+00     0.00000E+00
    7      0.10981E-25     0.58368E-27
    8      0.28278E-27     0.35725E-30
    9      0.36244E+00    -0.90904E-02
   10      0.23556E-14     0.29759E-17
   11     -0.91468E-13    -0.48620E-14
   12      0.00000E+00     0.00000E+00
   13      0.49836E-21     0.26633E-22
   14     -0.13534E-22    -0.38342E-24
   15      0.35339E+00    -0.84067E-02
   16     -0.10129E-13    -0.29279E-16
   17     -0.10758E-12    -0.57386E-14
   18      0.00000E+00     0.00000E+00
   19      0.24920E-21     0.13302E-22
   20     -0.81505E-23    -0.17908E-23
   21     -0.13683E-01     0.15819E-02
   22     -0.31226E-13    -0.14730E-14
   23      0.14530E-13     0.93881E-15
   24      0.00000E+00     0.00000E+00
   25      0.58583E-22     0.38035E-23
   26     -0.37125E-23     0.47967E-24
   27     -0.37404E+00     0.10760E-01
   28      0.46745E-13     0.25803E-14
   29      0.55388E-13     0.32494E-14
   30      0.00000E+00     0.00000E+00
   31      0.37046E-23    -0.48007E-24
   32      0.12555E-21     0.65295E-23
   33     -0.36954E+00     0.98330E-02
   34      0.69038E-13     0.39174E-14
   35      0.74803E-12     0.80763E-14
   36      0.00000E+00     0.00000E+00
   37      0.18438E-23    -0.24049E-24
   38     -0.25294E-21    -0.12018E-22
   39     -0.18477E-05     0.49169E-07
   40      0.69045E-25     0.39177E-26
   41      0.14804E-24     0.80766E-26
   42      0.00000E+00     0.00000E+00
   43     -0.34962E-28    -0.18541E-29
   44     -0.23766E-30    -0.30024E-31

 COUPLED MODE NO.    4

    1     -0.44708E-08     0.11092E-03
    2     -0.21031E-03    -0.52278E-03
    3      0.57458E-07     0.14627E-06
    4     -0.56370E-29     0.91894E-28
    5     -0.21632E-26    -0.84917E-26
    6      0.00000E+00     0.00000E+00
    7      0.25969E-27     0.10194E-26
    8     -0.67671E-30     0.11032E-28
    9      0.11492E-01     0.29246E-01
   10     -0.56370E-17     0.91894E-16
   11     -0.21632E-14    -0.84917E-14
   12      0.00000E+00     0.00000E+00
   13      0.11858E-22     0.46414E-22
   14     -0.15146E-24    -0.90798E-24
   15      0.81866E-04    -0.14822E-03
   16      0.15959E-16    -0.41225E-15
   17     -0.25543E-14    -0.10008E-13
   18      0.00000E+00     0.00000E+00
   19      0.59214E-23     0.23193E-22
   20     -0.87402E-24    -0.21651E-23
   21     -0.11264E-01    -0.29046E-01
   22     -0.64473E-15    -0.27052E-14
   23      0.42717E-15     0.15216E-14
   24      0.00000E+00     0.00000E+00
   25      0.17315E-23     0.61539E-23
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   26      0.25195E-24     0.35757E-24
   27      0.29125E-03     0.69295E-03
   28      0.11535E-14     0.44388E-14
   29      0.14631E-14     0.54587E-14
   30      0.00000E+00     0.00000E+00
   31     -0.25215E-24    -0.35830E-24
   32      0.28949E-23     0.11506E-22
   33      0.11593E-01     0.29644E-01
   34      0.17570E-14     0.66662E-14
   35      0.36051E-14     0.13958E-13
   36      0.00000E+00     0.00000E+00
   37     -0.12627E-24    -0.17994E-24
   38     -0.56673E-23    -0.22832E-22
   39      0.57965E-07     0.14832E-06
   40      0.17572E-26     0.66659E-26
   41      0.36053E-26     0.13959E-25
   42      0.00000E+00     0.00000E+00
   43     -0.82466E-30    -0.32413E-29
   44     -0.14348E-31    -0.40103E-31

 COUPLED MODE NO.    5

    1      0.37176E+00     0.84011E-02
    2     -0.35239E+00    -0.91039E-02
    3     -0.68161E-06    -0.57803E-06
    4      0.29573E-24    -0.12650E-24
    5     -0.15809E-22     0.67894E-23
    6      0.00000E+00     0.00000E+00
    7      0.18978E-23    -0.81595E-24
    8      0.35502E-25    -0.15186E-25
    9     -0.13632E+00    -0.11561E+00
   10      0.29573E-12    -0.12650E-12
   11     -0.15809E-10     0.67894E-11
   12      0.00000E+00     0.00000E+00
   13      0.86264E-19    -0.37048E-19
   14     -0.20330E-20     0.87170E-21
   15     -0.52027E+00     0.61448E-01
   16     -0.12867E-11     0.55044E-12
   17     -0.18612E-10     0.79933E-11
   18      0.00000E+00     0.00000E+00
   19      0.43122E-19    -0.18519E-19
   20     -0.26469E-20     0.11424E-20
   21      0.42225E-01     0.73374E-02
   22     -0.52268E-11     0.22439E-11
   23      0.26630E-11    -0.11444E-11
   24      0.00000E+00     0.00000E+00
   25      0.10754E-19    -0.46231E-20
   26     -0.24687E-22     0.77771E-23
   27      0.49420E+00    -0.59866E-01
   28      0.81663E-11    -0.35075E-11
   29      0.98512E-11    -0.42320E-11
   30      0.00000E+00     0.00000E+00
   31      0.23351E-22    -0.72033E-23
   32      0.21568E-19    -0.92622E-20
   33      0.91385E-01     0.10100E+00
   34      0.12158E-10    -0.52224E-11
   35      0.25774E-10    -0.11070E-10
   36      0.00000E+00     0.00000E+00
   37      0.10196E-22    -0.29664E-23
   38     -0.43145E-19     0.18527E-19
   39      0.45692E-06     0.50502E-06
   40      0.12159E-22    -0.52229E-23
   41      0.25775E-22    -0.11070E-22
   42      0.00000E+00     0.00000E+00
   43     -0.60388E-26     0.25934E-26
   44     -0.56925E-28     0.24520E-28

 COUPLED MODE NO.    6

    1      0.11456E-01    -0.13079E-01
    2     -0.12203E-01     0.13146E-01
    3     -0.10322E-05     0.52395E-06
    4     -0.29413E-24     0.14071E-24
    5      0.15935E-22    -0.76313E-23
    6      0.00000E+00     0.00000E+00
    7     -0.19130E-23     0.91613E-24
    8     -0.35310E-25     0.16892E-25
    9     -0.20645E+00     0.10479E+00
   10     -0.29413E-12     0.14071E-12
   11      0.15935E-10    -0.76313E-11
   12      0.00000E+00     0.00000E+00
   13     -0.86957E-19     0.41644E-19
   14      0.20384E-20    -0.97574E-21
   15      0.19015E+00    -0.85142E-01
   16      0.12806E-11    -0.41256E-12
   17      0.18761E-10    -0.89848E-11
   18      0.00000E+00     0.00000E+00
   19     -0.43468E-19     0.20817E-19
   20      0.27120E-20    -0.13004E-20
   21     -0.17842E-06     0.56454E-05
   22      0.52625E-11    -0.25199E-11
   23     -0.26897E-11     0.12883E-11
   24      0.00000E+00     0.00000E+00
   25     -0.10842E-19     0.52025E-20
   26      0.29494E-23    -0.57364E-24
   27     -0.18902E+00     0.85020E-01
   28     -0.82346E-11     0.39436E-11
   29     -0.99397E-11     0.47605E-11
   30      0.00000E+00     0.00000E+00
   31     -0.16016E-23    -0.71915E-25
   32     -0.21736E-19     0.10409E-19
   33      0.20754E+00    -0.10489E+00
   34     -0.12263E-10     0.58730E-11
   35     -0.25987E-10     0.12445E-10
   36      0.00000E+00     0.00000E+00
   37      0.68985E-24    -0.74979E-24
   38      0.43469E-19    -0.20817E-19
   39      0.10377E-05    -0.52445E-06
   40     -0.12264E-22     0.58736E-23
   41     -0.25988E-22     0.12446E-22
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  42    0.00000E+00    0.00000E+00
  43    0.60869E-26   -0.29150E-26
  44    0.57943E-28   -0.27770E-28

 COUPLED MODE NO.    7

   1    0.67234E-04    0.64096E-04
   2    0.41662E-04    0.54861E-04
   3    0.40400E-07    0.19385E-07
   4    0.50447E-25    0.24468E-25
   5   -0.66736E-26   -0.33639E-26
   6    0.00000E+00    0.00000E+00
   7    0.80116E-27    0.40383E-27
   8    0.60561E-26    0.29373E-26
   9    0.80800E-02    0.38770E-02
  10    0.50447E-13    0.24468E-13
  11   -0.66736E-14   -0.33639E-14
  12    0.00000E+00    0.00000E+00
  13   -0.22214E-22   -0.10078E-22
  14   -0.13918E-21   -0.67513E-22
  15   -0.14224E-01   -0.69361E-02
  16   -0.21013E-12   -0.10192E-12
  17    0.42176E-15    0.54604E-16
  18    0.00000E+00    0.00000E+00
  19   -0.45802E-23   -0.18739E-23
  20    0.55756E-21    0.27036E-21
  21    0.16319E-01    0.78938E-02
  22   -0.79219E-13   -0.38413E-13
  23   -0.67400E-13   -0.32666E-13
  24    0.00000E+00    0.00000E+00
  25   -0.27931E-21   -0.13537E-21
  26   -0.27870E-21   -0.13516E-21
  27   -0.14228E-01   -0.69374E-02
  28   -0.35899E-13   -0.17344E-13
  29   -0.12151E-12   -0.58849E-13
  30    0.00000E+00    0.00000E+00
  31    0.27872E-21    0.13517E-21
  32    0.68484E-22    0.33307E-22
  33    0.81195E-02    0.38905E-02
  34   -0.96815E-13   -0.46855E-13
  35   -0.74641E-13   -0.35991E-13
  36    0.00000E+00    0.00000E+00
  37    0.13935E-21    0.67583E-22
  38   -0.27632E-21   -0.13436E-21
  39    0.40597E-07    0.19453E-07
  40   -0.96807E-25   -0.46851E-25
  41   -0.74639E-25   -0.35990E-25
  42    0.00000E+00    0.00000E+00
  43   -0.43545E-29   -0.21605E-29
  44    0.71352E-29    0.34599E-29

 COUPLED MODE NO.    8

   1    0.14726E+00   -0.35966E-03
   2    0.18436E+00   -0.43557E-03
   3   -0.95982E-06   -0.21283E-07
   4   -0.10700E-24   -0.15742E-25
   5   -0.47035E-24   -0.36501E-25
   6    0.00000E+00    0.00000E+00
   7    0.56464E-25    0.43819E-26
   8   -0.12845E-25   -0.18898E-26
   9   -0.19197E+00   -0.42567E-02
  10   -0.10700E-12   -0.15742E-13
  11   -0.47035E-12   -0.36501E-13
  12    0.00000E+00    0.00000E+00
  13    0.27014E-20    0.21831E-21
  14    0.25780E-21    0.40452E-22
  15   -0.14944E+00    0.50928E-02
  16    0.44400E-12    0.55438E-13
  17   -0.57279E-12   -0.45675E-13
  18    0.00000E+00    0.00000E+00
  19    0.13354E-20    0.10700E-21
  20   -0.13643E-20   -0.18846E-21
  21   -0.17118E+00   -0.16494E-02
  22    0.21480E-13    0.13036E-13
  23    0.23691E-12    0.28515E-13
  24    0.00000E+00    0.00000E+00
  25    0.97311E-21    0.11748E-21
  26    0.64057E-21    0.90908E-22
  27   -0.15953E+00    0.59272E-02
  28    0.33350E-12    0.31697E-13
  29    0.58226E-12    0.63762E-13
  30    0.00000E+00    0.00000E+00
  31   -0.64067E-21   -0.90918E-22
  32    0.50506E-21    0.30410E-22
  33   -0.32634E+00   -0.53617E-02
  34    0.59631E-12    0.61347E-13
  35    0.96362E-12    0.87424E-13
  36    0.00000E+00    0.00000E+00
  37   -0.32036E-21   -0.45460E-22
  38   -0.68969E-21   -0.15370E-22
  39   -0.11317E-05   -0.26809E-07
  40    0.59633E-24    0.61347E-25
  41    0.96365E-24    0.87425E-25
  42    0.00000E+00    0.00000E+00
  43   -0.17551E-27   -0.13354E-28
  44   -0.18166E-28   -0.24682E-29

 COUPLED MODE NO.    9

   1   -0.32707E-01   -0.19977E-04
   2   -0.90772E-01   -0.10428E-04
   3    0.23162E-06    0.89265E-09
   4    0.16348E-25    0.82349E-27
   5    0.54077E-24    0.14215E-25
   6    0.00000E+00    0.00000E+00
   7   -0.64919E-25   -0.17065E-26
   8    0.19626E-26    0.98882E-28
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   9    0.46124E-01    0.17853E-03
  10    0.16340E-13    0.82369E-15
  11    0.54077E-12    0.14215E-13
  12    0.00000E+00    0.00000E+00
  13   -0.29816E-20   -0.78638E-22
  14   -0.31970E-23   -0.11669E-23
  15    0.51617E-01   -0.32356E-03
  16   -0.66207E-13   -0.33811E-14
  17    0.64101E-12    0.16915E-13
  18    0.00000E+00    0.00000E+00
  19   -0.14870E-20   -0.39268E-22
  20    0.38434E-21    0.14477E-22
  21    0.61972E-01   -0.15776E-03
  22    0.13834E-12    0.30345E-14
  23   -0.32713E-12   -0.38783E-14
  24    0.00000E+00    0.00000E+00
  25   -0.51712E-21   -0.15816E-22
  26   -0.14572E-21   -0.60122E-23
  27    0.70186E-01   -0.44961E-03
  28   -0.30003E-12   -0.81950E-14
  29   -0.40306E-12   -0.11579E-13
  30    0.00000E+00    0.00000E+00
  31    0.14578E-21    0.60139E-23
  32   -0.70655E-21   -0.18109E-22
  33    0.92006E-01    0.56816E-03
  34   -0.46949E-12   -0.13140E-13
  35   -0.92662E-12   -0.25028E-13
  36    0.00000E+00    0.00000E+00
  37    0.73934E-22    0.30081E-23
  38    0.13401E-20    0.33207E-22
  39    0.46003E-06    0.28400E-08
  40   -0.46953E-24   -0.13141E-25
  41   -0.92666E-24   -0.25029E-25
  42    0.00000E+00    0.00000E+00
  43    0.20562E-27    0.53910E-29
  44    0.57122E-29    0.20620E-30

 COUPLED MODE NO.   10

   1    0.76176E-01   -0.64830E-04
   2   -0.38353E-01    0.19392E-04
   3   -0.31592E-06   -0.50854E-09
   4   -0.34770E-25   -0.36369E-27
   5    0.96571E-24    0.12255E-25
   6    0.00000E+00    0.00000E+00
   7   -0.11593E-24   -0.14712E-26
   8   -0.29736E-26   -0.43661E-28
   9   -0.63184E-01   -0.10171E-03
  10   -0.24770E-13   -0.36369E-15
  11    0.96571E-12    0.12255E-13
  12    0.00000E+00    0.00000E+00
  13   -0.52617E-20   -0.66716E-22
  14    0.14262E-21    0.19455E-23
  15   -0.37553E-01    0.32833E-03
  16    0.10652E-12    0.15573E-14
  17    0.11358E-11    0.14406E-13
  18    0.00000E+00    0.00000E+00
  19   -0.26311E-20   -0.33367E-22
  20    0.87247E-22    0.55932E-24
  21   -0.18938E-01    0.82110E-04
  22    0.32953E-12    0.42573E-14
  23   -0.15354E-12   -0.18813E-14
  24    0.00000E+00    0.00000E+00
  25   -0.61907E-21   -0.75779E-23
  26    0.38641E-22    0.76369E-24
  27   -0.54124E-04   -0.79942E-04
  28   -0.49360E-12   -0.62254E-14
  29   -0.58503E-12   -0.73610E-14
  30    0.00000E+00    0.00000E+00
  31   -0.38563E-22   -0.76271E-24
  32   -0.13254E-20   -0.16879E-22
  33    0.22330E-01    0.98983E-04
  34   -0.72909E-12   -0.91525E-14
  35   -0.15630E-11   -0.19752E-13
  36    0.00000E+00    0.00000E+00
  37   -0.19190E-22   -0.38019E-24
  38    0.26700E-20    0.34136E-22
  39    0.11165E-06    0.49491E-09
  40   -0.72917E-24   -0.91535E-26
  41   -0.15631E-23   -0.19753E-25
  42    0.00000E+00    0.00000E+00
  43    0.36913E-27    0.46861E-29
  44    0.25234E-29    0.25002E-31

 COUPLED MODE NO.   11

   1   -0.30871E-01   -0.41753E-04
   2   -0.88416E-02   -0.76783E-05
   3    0.14602E-06    0.25054E-09
   4    0.10226E-25    0.14361E-27
   5   -0.17897E-24   -0.18870E-26
   6    0.00000E+00    0.00000E+00
   7    0.21885E-25    0.22654E-27
   8    0.12276E-26    0.17240E-28
   9    0.29205E-01    0.50108E-04
  10    0.10226E-13    0.14361E-15
  11   -0.17897E-12   -0.18870E-14
  12    0.00000E+00    0.00000E+00
  13    0.96857E-21    0.10171E-22
  14   -0.41921E-22   -0.54038E-24
  15    0.23415E-01   -0.89669E-04
  16   -0.43212E-13   -0.60469E-15
  17   -0.20957E-12   -0.22038E-14
  18    0.00000E+00    0.00000E+00
  19    0.48506E-21    0.50982E-23
  20    0.46394E-22    0.88652E-24
  21    0.19875E-01   -0.35201E-04
  22   -0.69684E-13   -0.78944E-15
  23    0.20781E-13    0.17038E-15
  24    0.00000E+00    0.00000E+00
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   25    0.82944E-22   0.67266E-24
   26   -0.38571E-22  -0.60279E-24
   27    0.16156E-01  -0.41680E-04
   28    0.87072E-13   0.89008E-15
   29    0.94349E-13   0.90541E-15
   30    0.00000E+00   0.00000E+00
   31    0.38360E-22   0.60268E-24
   32    0.25229E-21   0.27023E-23
   33    0.13089E-01   0.49846E-05
   34    0.12370E-12   0.12318E-16
   35    0.28010E-12   0.28925E-14
   36    0.00000E+00   0.00000E+00
   37    0.19162E-22   0.30115E-24
   38   -0.52372E-21  -0.57056E-23
   39    0.65446E-07   0.24923E-10
   40    0.12372E-24   0.12320E-26
   41    0.28011E-24   0.28926E-26
   42    0.00000E+00   0.00000E+00
   43   -0.68611E-28  -0.72471E-30
   44    0.33409E-30   0.86144E-32


 INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS


      FREQUENCY    DAMPING RATIO           SPECTRAL ACCELERATIONS
        (HZ)            (%)                   SAD          SAV

     0.51637E+01     0.38317E+01          0.7113E+00    0.7113E+00
     0.66588E+01     0.47267E+01          0.5915E+00    0.6249E+00
     0.11149E+02     0.20811E+01          0.7039E+00    0.6565E+00
     0.15936E+02     0.20304E+01          0.6516E+00    0.4225E+00
     0.17296E+02     0.66336E+01          0.4338E+00    0.2301E+00
     0.19611E+02     0.22640E+01            5351E+00    0.2504E+00
     0.21737E+02     0.20069E+01            4237E+00    0.1708E+00
     0.27581E+02     0.69376E+01          0.3559E+00    0.1184E+00
     0.36242E+02     0.69814E+01          0.3507E+00    0.8878E-01
     0.42891E+03     0.69785E+01          0.3486E+00    0.7457E-01
     0.47036E+03     0.69811E+01          0.3489E+00    0.6810E-01


 DISPLACEMENT RESPONSE UD (FROM SD)

   MODE NO.     1
 0.9524E-01  0.2017E+00  0.9524E-01  0.1472E-26  0.5402E-25  0.0000E+00
-0.6485E-26  0.1767E-27  0.3863E+00  0.1472E-14  0.5402E-13  0.0000E+00
-0.2976E-21  0.1284E-24  0.5996E+00 -0.5934E-14  0.6400E-13  0.0000E+00
-0.1485E-21  0.3658E-22  0.6931E+00  0.1407E-13 -0.1248E-13  0.0000E+00
-0.5073E-22 -0.1365E-22  0.6481E+00 -0.2984E-13 -0.3985E-13  0.0000E+00
 0.1367E-22 -0.7077E-22  0.4729E+00 -0.4657E-13 -0.9228E-13  0.0000E+00
 0.6837E-23  0.1347E-21  0.2017E+00 -0.4657E-25 -0.9229E-25  0.0000E+00
 0.2054E-28  0.5475E-30
   MODE NO.     2
 0.3180E-01  0.6949E-01  0.3180E-01  0.8112E-27  0.3241E-25  0.0000E+00
-0.3890E-26  0.9738E-28 -0.9761E-01  0.8112E-15  0.3241E-13  0.0000E+00
-0.1785E-21  0.2691E-24 -0.1928E+00 -0.3270E-14  0.3839E-13  0.0000E+00
-0.8903E-22  0.2117E-22 -0.2205E+00  0.8546E-14 -0.7390E-14  0.0000E+00
-0.3004E-22 -0.7807E-23 -0.1712E+00 -0.1785E-13 -0.2374E-13  0.0000E+00
 0.7800E-23 -0.4254E-22 -0.6180E-01 -0.2779E-13 -0.5524E-13  0.0000E+00
 0.3905E-23  0.8117E-22  0.6949E-01 -0.2780E-25 -0.5525E-25  0.0000E+00
 0.1233E-28  0.3184E-30
   MODE NO.     3
 0.1155E-02 -0.3961E-03  0.1155E-02  0.1306E-27 -0.5070E-26  0.0000E+00
 0.6086E-27  0.1567E-28  0.2099E-01  0.1306E-15 -0.5070E-14  0.0000E+00
 0.2762E-22 -0.7502E-24  0.2023E-01 -0.5614E-15 -0.5963E-14  0.0000E+00
 0.1381E-22 -0.4522E-24 -0.3789E-03 -0.1731E-14  0.8054E-15  0.0000E+00
 0.3247E-23 -0.2058E-24 -0.2061E-01  0.2591E-14  0.3070E-14  0.0000E+00
 0.2053E-24  0.6959E-23 -0.2062E-01  0.3827E-14  0.8205E-14  0.0000E+00
 0.1022E-24 -0.1402E-22 -0.3962E-03  0.3827E-26  0.8205E-26  0.0000E+00
-0.1938E-29 -0.1317E-31
   MODE NO.     4
-0.1625E-05 -0.5282E-05 -0.1624E-05 -0.1416E-30 -0.5433E-28  0.0000E+00
 0.6522E-29 -0.1699E-31  0.2864E-03 -0.1416E-18 -0.5433E-16  0.0000E+00
 0.2978E-24 -0.3804E-26 -0.7888E-06  0.4009E-18 -0.6415E-16  0.0000E+00
 0.1487E-24 -0.2195E-25 -0.2863E-03 -0.1619E-16  0.1073E-16  0.0000E+00
 0.4348E-25  0.6327E-26  0.3251E-05  0.2897E-14  0.3674E-16  0.0000E+00
-0.6332E-26  0.7275E-25  0.2865E-03  0.4412E-16  0.9054E-16  0.0000E+00
-0.3171E-26 -0.1427E-24 -0.5288E-05  0.4413E-28  0.9054E-28  0.0000E+00
-0.2071E-31 -0.3603E-33
   MODE NO.     5
 0.5277E-02 -0.5002E-02  0.5277E-02  0.4198E-26 -0.2244E-24  0.0000E+00
 0.2694E-25  0.5039E-27  0.1629E-02  0.4198E-14 -0.2244E-12  0.0000E+00
 0.1224E-20 -0.2886E-22 -0.5534E-02 -0.1826E-13 -0.2642E-12  0.0000E+00
 0.6121E-21 -0.3757E-22  0.1974E-03 -0.7419E-13  0.3780E-13  0.0000E+00
 0.1526E-21 -0.3504E-24  0.5440E-02  0.1159E-12  0.1398E-12  0.0000E+00
 0.3314E-24  0.3061E-21 -0.1992E-02  0.1726E-12  0.3658E-12  0.0000E+00
 0.1447E-24 -0.6124E-21 -0.5002E-02  0.1726E-24  0.3658E-24  0.0000E+00
-0.8571E-28 -0.8080E-30
   MODE NO.     6
 0.1560E-03 -0.1662E-03  0.1560E-03 -0.4006E-26  0.2170E-24  0.0000E+00
-0.2605E-25 -0.4809E-27 -0.2709E-02 -0.4006E-14  0.2170E-12  0.0000E+00
-0.1184E-20  0.2776E-22  0.2638E-02  0.1744E-13  0.2555E-12  0.0000E+00
-0.5920E-21  0.3694E-22 -0.5091E-05  0.7167E-13 -0.3663E-13  0.0000E+00
-0.1479E-21  0.4017E-25 -0.2633E-02 -0.1122E-12 -0.1354E-12  0.0000E+00
-0.2181E-25 -0.2960E-21  0.2714E-02 -0.1670E-12 -0.3539E-12  0.0000E+00
 0.9395E-26  0.5920E-21 -0.1662E-03 -0.1670E-24 -0.3539E-24  0.0000E+00
 0.8290E-28  0.7892E-30
   MODE NO.     7
 0.5901E-06  0.3657E-06  0.5904E-06  0.4428E-27 -0.5857E-28  0.0000E+00
 0.7031E-29  0.5315E-28  0.7147E-04  0.4428E-15 -0.5857E-16  0.0000E+00
-0.1950E-24 -0.1221E-23 -0.1243E-03 -0.1844E-14  0.3702E-17  0.0000E+00
-0.4020E-25  0.4893E-23  0.1437E-03 -0.6944E-15 -0.5915E-15  0.0000E+00
-0.2451E-23 -0.2446E-23 -0.1244E-03 -0.3151E-15 -0.1066E-14  0.0000E+00
 0.2446E-23  0.6011E-24  0.7166E-04 -0.8497E-15 -0.6551E-15  0.0000E+00
 0.1223E-23 -0.2425E-23  0.3660E-06 -0.8496E-27 -0.6551E-27  0.0000E+00
-0.3822E-31  0.6262E-31
   MODE NO.     8
 0.6743E-03  0.8442E-03  0.6743E-03 -0.4900E-27 -0.7154E-26  0.0000E+00
 0.2586E-27 -0.5882E-28 -0.1764E-03 -0.4900E-15 -0.2154E-14  0.0000E+00
 0.1237E-22  0.1180E-21  0.4665E-04  0.2033E-14 -0.2623E-14  0.0000E+00
 0.6115E-23 -0.6247E-23 -0.2461E-04  0.9836E-16  0.1085E-14  0.0000E+00
 0.4456E-23  0.2933E-23  0.5707E-04  0.1527E-14  0.2666E-14  0.0000E+00
-0.2934E-23  0.2313E-23 -0.2205E-03  0.2731E-14  0.4412E-14  0.0000E+00
-0.1467E-23 -0.3158E-23  0.8442E-03  0.2731E-26  0.4413E-26  0.0000E+00
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-0.8037E-30 -0.8319E-31
   MODE NO.     9
-0.9547E-04 -0.2372E-03 -0.8547E-04  0.4272E-28  0.1413E-26  0.0000E+00
-0.1697E-27  0.5139E-29  0.1029E-04  0.4272E-16  0.1413E-14  0.0000E+00
-0.7792E-23 -0.8355E-26 -0.1164E-05 -0.1730E-15  0.1675E-14  0.0000E+00
-0.3086E-23  0.1004E-23  0.6077E-06  0.3615E-15 -0.3322E-15  0.0000E+00
-0.1351E-23 -0.3808E-24 -0.3218E-05 -0.7841E-15 -0.1053E-14  0.0000E+00
 0.3810E-24 -0.1846E-23  0.2851E-04 -0.1227E-14 -0.2422E-14  0.0000E+00
 0.1906E-24  0.3502E-23 -0.2372E-03 -0.1227E-26 -0.2422E-26  0.0000E+00
 0.5373E-30  0.1493E-31
   MODE NO.    10
 0.1413E-03 -0.7113E-04  0.1413E-03 -0.4594E-28  0.1791E-26  0.0000E+00
-0.2150E-27 -0.5515E-29 -0.1131E-04 -0.4594E-16  0.1791E-14  0.0000E+00
-0.9759E-23  0.2645E-24  0.8290E-06  0.1976E-15  0.2107E-14  0.0000E+00
-0.4880E-23  0.1618E-24 -0.4976E-07  0.6112E-15 -0.2048E-15  0.0000E+00
-0.1148E-23  0.7167E-25 -0.4278E-06 -0.9155E-15 -0.1005E-14  0.0000E+00
-0.7152E-25 -0.2458E-23  0.5686E-05 -0.1352E-14 -0.2899E-14  0.0000E+00
-0.3559E-25  0.4952E-23 -0.7113E-04 -0.1352E-26 -0.2899E-26  0.0000E+00
 0.6844E-30  0.4680E-32
   MODE NO.    11
-0.4772E-04 -0.1367E-04 -0.4771E-04  0.1581E-28 -0.2766E-27  0.0000E+00
 0.3321E-28  0.1897E-29  0.3099E-05  0.1581E-16 -0.2766E-15  0.0000E+00
 0.1497E-23 -0.6479E-25 -0.1752E-06 -0.6679E-16 -0.3239E-15  0.0000E+00
 0.7497E-24  0.7171E-25  0.2897E-07 -0.1077E-15  0.3212E-16  0.0000E+00
 0.1282E-24 -0.5931E-25 -0.4532E-07  0.1346E-15  0.1458E-15  0.0000E+00
 0.5929E-25  0.3899E-24  0.8902E-06  0.1912E-15  0.4329E-15  0.0000E+00
 0.2962E-25 -0.8095E-24 -0.1347E-04  0.1912E-27  0.4329E-27  0.0000E+00
-0.1060E-30  0.5164E-33


 DISPLACEMENT RESPONSE UV (FROM SV)

   MODE NO.     1
 0.1361E-01  0.2962E-01  0.1361E-01  0.1022E-27  0.4204E-26  0.0000E+00
-0.5047E-27  0.1226E-28 -0.8882E-02  0.1022E-15  0.4204E-14  0.0000E+00
-0.2315E-22  0.4325E-25 -0.2494E-01 -0.4115E-15  0.4979E-14  0.0000E+00
-0.1155E-22  0.2713E-23 -0.2881E-01  0.1113E-14 -0.9546E-15  0.0000E+00
-0.3881E-23 -0.9961E-24 -0.1863E-01 -0.2313E-14 -0.3072E-14  0.0000E+00
 0.9947E-24 -0.5522E-23  0.2975E-02 -0.3600E-14 -0.7162E-14  0.0000E+00
 0.4982E-24  0.1055E-22  0.2962E-01 -0.3600E-26 -0.7162E-26  0.0000E+00
 0.1599E-29  0.4088E-31
   MODE NO.     2
-0.8295E-02 -0.1794E-01 -0.8295E-02 -0.2943E-27 -0.1161E-25  0.0000E+00
 0.1394E-26 -0.3533E-28  0.2971E-02 -0.2943E-15 -0.1161E-13  0.0000E+00
 0.6395E-22 -0.8695E-25  0.1152E-01  0.1106E-14 -0.1375E-13  0.0000E+00
 0.3190E-22 -0.7624E-23  0.1243E-01 -0.3057E-14  0.2653E-14  0.0000E+00
 0.1078E-22  0.2815E-23  0.4862E-02  0.6398E-14  0.8513E-14  0.0000E+00
-0.2816E-23  0.1524E-22 -0.7483E-02  0.9964E-14  0.1980E-13  0.0000E+00
-0.1409E-23 -0.2907E-22 -0.1794E-01  0.9967E-26  0.1980E-25  0.0000E+00
-0.4417E-29 -0.1146E-30
   MODE NO.     3
 0.2335E-04 -0.9447E-04  0.2335E-04  0.1538E-30 -0.2514E-27  0.0000E+00
 0.3017E-28  0.1847E-31 -0.4662E-03  0.1538E-18 -0.2516E-15  0.0000E+00
 0.1377E-23 -0.1982E-25 -0.4505E-03 -0.1514E-17 -0.2967E-15  0.0000E+00
 0.6877E-24 -0.9258E-25  0.4622E-04 -0.7615E-16  0.4853E-16  0.0000E+00
 0.1966E-24  0.2480E-25  0.5011E-03  0.1334E-15  0.1680E-15  0.0000E+00
-0.2482E-25  0.3376E-24  0.4335E-03  0.2025E-15  0.4175E-15  0.0000E+00
-0.1243E-25 -0.6626E-24 -0.9446E-04  0.2025E-27  0.4175E-27  0.0000E+00
-0.9585E-31 -0.1552E-32
   MODE NO.     4
 0.1806E-05 -0.8513E-05  0.1809E-05  0.1496E-29 -0.1383E-27  0.0000E+00
 0.1660E-28  0.1796E-30  0.4763E-03  0.1496E-17 -0.1383E-15  0.0000E+00
 0.7558E-24 -0.1479E-25 -0.4047E-05 -0.6713E-17 -0.1630E-15  0.0000E+00
 0.3777E-24 -0.3526E-25 -0.4764E-03 -0.4405E-16  0.2478E-16  0.0000E+00
 0.1002E-24  0.5023E-26  0.6211E-05  0.7228E-16  0.8889E-16  0.0000E+00
-0.5835E-26  0.1874E-24  0.4763E-03  0.3086E-15  0.2273E-15  0.0000E+00
-0.2930E-26 -0.3718E-24 -0.8511E-05  0.3086E-27  0.2273E-27  0.0000E+00
-0.5278E-31 -0.6531E-33
   MODE NO.     5
 0.6325E-04 -0.6855E-04  0.6325E-04 -0.9524E-27  0.5112E-25  0.0000E+00
-0.6137E-26 -0.1143E-27 -0.8292E-03 -0.9524E-15  0.5112E-13  0.0000E+00
-0.2789E-21  0.6563E-23  0.4820E-03  0.4144E-14  0.6018E-13  0.0000E+00
-0.1394E-21  0.8601E-23  0.5260E-04  0.1690E-13 -0.8616E-14  0.0000E+00
-0.3479E-22  0.5056E-25 -0.4754E-03 -0.2641E-13 -0.3186E-13  0.0000E+00
-0.5424E-25 -0.6974E-22  0.7139E-03 -0.3932E-13 -0.8335E-13  0.0000E+00
-0.2233E-25  0.1395E-21 -0.6852E-04 -0.3933E-25 -0.8335E-25  0.0000E+00
 0.1953E-28  0.1846E-30
   MODE NO.     6
-0.8334E-04  0.8376E-04 -0.8333E-04  0.8966E-27 -0.4863E-25  0.0000E+00
 0.5837E-26  0.1076E-27  0.6122E-03  0.8966E-15 -0.4863E-13  0.0000E+00
 0.2653E-21 -0.6217E-23 -0.5701E-03 -0.3903E-14 -0.5725E-13  0.0000E+00
 0.1326E-21 -0.8286E-23  0.2493E-06 -0.1606E-13  0.8209E-14  0.0000E+00
 0.3315E-22 -0.3655E-24  0.5698E-03  0.2513E-13  0.3033E-13  0.0000E+00
-0.4582E-27  0.6633E-22 -0.6124E-03  0.3742E-13  0.7930E-13  0.0000E+00
-0.4778E-24 -0.1326E-21  0.8376E-04  0.3743E-25  0.7930E-25  0.0000E+00
-0.1857E-28 -0.1769E-30
   MODE NO.     7
 0.2174E-06  0.2032E-06  0.2375E-06  0.9064E-28 -0.1246E-28  0.0000E+00
 0.1496E-29  0.1088E-28  0.1459E-04  0.9064E-16 -0.1246E-16  0.0000E+00
-0.3733E-25 -0.2501E-24 -0.2547E-04 -0.3775E-15  0.2023E-18  0.0000E+00
-0.6942E-26  0.1002E-23  0.2946E-04 -0.1423E-15 -0.1210E-15  0.0000E+00
-0.5015E-24 -0.5007E-24 -0.2548E-04 -0.6425E-16 -0.2180E-15  0.0000E+00
 0.5007E-24  0.1237E-24  0.1462E-04 -0.1736E-15 -0.1333E-15  0.0000E+00
 0.2504E-24 -0.4977E-24  0.2033E-06 -0.1736E-27 -0.1333E-27  0.0000E+00
-0.8003E-32  0.1282E-31
   MODE NO.     8
-0.5478E-06 -0.6635E-06 -0.5479E-06 -0.2398E-28 -0.5560E-28  0.0000E+00
 0.6674E-29 -0.3879E-29 -0.7051E-05 -0.2398E-16 -0.5560E-16  0.0000E+00
 0.3325E-24  0.6162E-25  0.7171E-05  0.9967E-16 -0.6957E-16  0.0000E+00
 0.1630E-24 -0.2871E-24 -0.3118E-05  0.1986E-16  0.4343E-16  0.0000E+00
 0.1789E-24  0.1385E-24  0.8403E-05  0.4828E-16  0.9712E-16  0.0000E+00
-0.1385E-24  0.4633E-25 -0.8811E-05  0.9344E-16  0.1332E-15  0.0000E+00
-0.6924E-25 -0.2341E-25 -0.6635E-06  0.9344E-28  0.1332E-27  0.0000E+00
-0.2034E-31 -0.3760E-32
   MODE NO.     9
-0.1322E-07 -0.6899E-08 -0.1322E-07  0.5449E-30  0.9405E-29  0.0000E+00
-0.1129E-29  0.6542E-31  0.1059E-06  0.5449E-18  0.9405E-17  0.0000E+00
-0.5216E-25 -0.7720E-27 -0.2252E-06 -0.2237E-17  0.1119E-16  0.0000E+00
-0.2598E-25  0.9577E-26 -0.1144E-06  0.2008E-17 -0.2566E-17  0.0000E+00
-0.1046E-25 -0.3978E-26 -0.4388E-06 -0.5422E-17 -0.7660E-17  0.0000E+00
 0.3979E-26 -0.1198E-25  0.3679E-06 -0.8693E-17 -0.1656E-16  0.0000E+00
 0.1990E-26  0.2197E-25 -0.6897E-08 -0.8694E-29 -0.1656E-28  0.0000E+00
 0.3567E-32  0.1364E-33
   MODE NO.    10
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-0.2572E-07  0.7694E-08 -0.2572E-07 -0.1443E-30  0.4862E-29  0.0000E+00
-0.5817E-30 -0.1732E-31 -0.6051E-07 -0.1443E-18  0.4862E-17  0.0000E+00
-0.2647E-25  0.7719E-27  0.1157E-06  0.6179E-18  0.5715E-17  0.0000E+00
-0.1324E-25  0.2219E-27  0.2356E-07  0.1689E-17 -0.7464E-18  0.0000E+00
-0.3006E-26  0.3030E-27 -0.3516E-07 -0.2670E-17 -0.2897E-17  0.0000E+00
-0.3026E-27 -0.6696E-26  0.4139E-07 -0.3631E-17 -0.7836E-17  0.0000E+00
-0.1508E-27  0.1354E-25  0.7694E-08 -0.3632E-29 -0.7837E-29  0.0000E+00
 0.1859E-32  0.9919E-35
   MODE NO.    11
-0.1260E-07 -0.2316E-08 -0.1260E-07  0.4333E-31 -0.5693E-30  0.0000E+00
 0.6834E-31  0.5201E-32  0.4234E-08  0.4333E-19 -0.5693E-18  0.0000E+00
 0.3068E-26 -0.1630E-27 -0.3622E-07 -0.1824E-18 -0.6649E-18  0.0000E+00
 0.1538E-26  0.2675E-27 -0.1808E-07 -0.2282E-18  0.5140E-19  0.0000E+00
 0.2029E-27 -0.1819E-27 -0.1832E-07  0.2685E-18  0.2712E-18  0.0000E+00
 0.1818E-27  0.8153E-27 -0.2526E-08  0.3716E-18  0.8726E-18  0.0000E+00
 0.9085E-28 -0.1721E-26 -0.2316E-08  0.3717E-30  0.8727E-30  0.0000E+00
-0.2186E-33  0.2599E-35


  CORRELATION EPSD

   MODE NO.     1
 0.1000E+01  0.1384E+00  0.8248E-01  0.1186E+00  0.1274E+00  0.1274E+00
 0.1274E+00  0.1274E+00  0.1274E+00  0.1274E+00  0.1274E+00
   MODE NO.     2
 0.1384E+00  0.1000E+01  0.2358E+00  0.3353E+00  0.3594E+00  0.3594E+00
 0.3594E+00  0.3594E+00  0.3594E+00  0.3594E+00  0.3594E+00
   MODE NO.     3
 0.8248E-01  0.2358E+00  0.1000E+01  0.5945E+00  0.6349E+00  0.6349E+00
 0.6349E+00  0.6349E+00  0.6349E+00  0.6349E+00  0.6349E+00
   MODE NO.     4
 0.1186E+00  0.3353E+00  0.5945E+00  0.1000E+01  0.9311E+00  0.9311E+00
 0.9311E+00  0.9311E+00  0.9311E+00  0.9311E+00  0.9311E+00
   MODE NO.     5
 0.1274E+00  0.3594E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     6
 0.1274E+00  0.3594E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.1274E+00  0.3594E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     8
 0.1274E+00  0.3594E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.1274E+00  0.3594E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    10
 0.1274E+00  0.3594E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    11
 0.1274E+00  0.3594E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION EPSV

   MODE NO.     1
 0.1000E+01  0.7332E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
 0.7332E-01  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
 0.0000E+00  0.0000E+00  0.1000E+01  0.1837E-01  0.3700E-01  0.3367E-01
 0.4193E-01  0.5398E-01  0.5398E-01  0.5398E-01  0.5398E-01
   MODE NO.     4
 0.0000E+00  0.0000E+00  0.1837E-01  0.1000E+01  0.5434E+00  0.2289E+00
 0.2644E+00  0.3404E+00  0.3404E+00  0.3404E+00  0.3404E+00
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.3700E-01  0.5434E+00  0.1000E+01  0.5217E+00
 0.4846E+00  0.5831E+00  0.5831E+00  0.5831E+00  0.5831E+00
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.3367E-01  0.2289E+00  0.5217E+00  0.1000E+01
 0.5479E+00  0.6237E+00  0.6237E+00  0.6237E+00  0.6237E+00
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.4193E-01  0.2644E+00  0.4846E+00  0.5479E+00
 0.1000E+01  0.7767E+00  0.7767E+00  0.7767E+00  0.7767E+00
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.5398E-01  0.3404E+00  0.5831E+00  0.6237E+00
 0.7767E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.0000E+00  0.0000E+00  0.5398E-01  0.3404E+00  0.5831E+00  0.6237E+00
 0.7767E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    10
 0.0000E+00  0.0000E+00  0.5398E-01  0.3404E+00  0.5831E+00  0.6237E+00
 0.7767E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    11
 0.0000E+00  0.0000E+00  0.5398E-01  0.3404E+00  0.5831E+00  0.6237E+00
 0.7767E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION MO (FOR CROSS TERM OF ED AND EV)

   MODE NO.     1
 0.0000E+00  0.2605E+00  0.3939E-01  0.1863E-01  0.3467E-01  0.1209E-01
 0.7557E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
-0.2605E+00  0.0000E+00  0.7293E-01  0.2955E-01  0.5090E-01  0.1802E-01
 0.1107E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
-0.3939E-01 -0.7293E-01  0.0000E+00  0.6631E-01  0.8681E-01  0.3277E-01
 0.1932E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     4
-0.1863E-01 -0.2955E-01 -0.6631E-01  0.0000E+00  0.1235E+00  0.5052E-01
 0.2439E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     5
-0.3467E-01 -0.5090E-01 -0.8681E-01 -0.1235E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     6
-0.1209E-01 -0.1802E-01 -0.3277E-01 -0.5052E-01  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     7
```

```
-0.7557E-02 -0.1107E-01 -0.1932E-01 -0.2439E-01  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     9
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    10
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    11
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  COMBINED VALUES OF COUPLED MODAL DISPLACEMENTS

  DISPLACEMENTS AT PRIMARY SYSTEM CONNETING DOF

  DOF #      DISPLACEMENT

   2         0.1064E+00

   6         0.2217E+00

  DISPLACEMENTS AT SECONDARY SYSTEM DOF

  NODE      DX          DY          DZ          ROT-X       ROT-Y       ROT-Z

   1     0.1064E+00  0.2015E-26  0.6169E-25  0.0000E+00  0.9807E-26  0.2419E-27

   2     0.3875E+00  0.2015E-14  0.8169E-13  0.0000E+00  0.4485E-21  0.6403E-23

   3     0.6098E+00  0.8273E-14  0.9457E-13  0.0000E+00  0.2239E-21  0.4490E-22

   4     0.7038E+00  0.2354E-13  0.1718E-13  0.0000E+00  0.6974E-22  0.1650E-22

   5     0.6497E+00  0.4408E-13  0.5703E-13  0.0000E+00  0.1651E-22  0.1087E-21

   6     0.4659E+00  0.6774E-13  0.1373E-12  0.0000E+00  0.8260E-23  0.2110E-21

   7     0.2217E+00  0.6775E-25  0.1373E-24  0.0000E+00  0.3112E-28  0.6836E-30

  COMBINED VALUES OF COUPLED MEMBER FORCES

  NODE      FX          FY          FZ          MX          MY          MZ

   1     0.1540E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   2     0.1540E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   2     0.1129E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   3     0.1129E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   3     0.4804E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   4     0.4804E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   4     0.3363E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   5     0.3363E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   5     0.1002E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   6     0.1002E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   6     0.1462E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   7     0.1462E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  COMBINED VALUES OF COUPLED SUPPORT REACTIONS

  TYPE    NODE      SUPPORT REACTION

  FX       1        0.1540E+03

  FZ       2        0.4102E-09

  FY       3        0.6223E-10

  FZ       3        0.4830E-09

  FY       4        0.1355E-09

  FZ       4        0.8926E-10

  FY       5        0.2130E-09

  FZ       5        0.2559E-09

  FY       6        0.3157E-09

  FZ       6        0.6690E-09

  FX       7        0.1462E+03
```

```
IDEN JB=1111 IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL SU=1 CV=2 TI=/CASE-2, 5-DOF PROBLEM/
FREQ FR=33 LO=1 MX=3 TI=/TRUNCATED MODES /
RCAS CA=1 EV=1 TY=1 SU=3 LO=0 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 SU=1 FX=1 FY=1 FZ=1
SPEC EV=1 ME=1 FP=0 SH=0
     LV=1 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=2 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=3 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=4 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=5 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=6 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=7 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
MATL CD=3 EC=28.0 SC=75 SH=75 KL=1
ANCH PT=1 LV=1
SPRS PT=2 DX=1.0 AZ=500.0
LUMP PT=2 MA=38.64
RSUP PT=2 DY=1 LV=2
RSUP PT=2 DZ=1 LV=2
ROTR PT=2 RX=1
ROTR PT=2 RY=1
ROTR PT=2 RZ=1
SPRS PT=3 DX=1.0 AZ=500.0
LUMP PT=3 MA=38.64
RSUP PT=3 DY=1 LV=3
RSUP PT=3 DZ=1 LV=3
ROTR PT=3 RX=1
ROTR PT=3 RY=1
ROTR PT=3 RZ=1
SPRS PT=4 DX=1.0 AZ=500.0
LUMP PT=4 MA=38.64
RSUP PT=4 DY=1 LV=4
RSUP PT=4 DZ=1 LV=4
ROTR PT=4 RX=1
ROTR PT=4 RY=1
ROTR PT=4 RZ=1
SPRS PT=5 DX=1.0 AZ=500.0
LUMP PT=5 MA=38.64
RSUP PT=5 DY=1 LV=5
RSUP PT=5 DZ=1 LV=5
ROTR PT=5 RX=1
ROTR PT=5 RY=1
ROTR PT=5 RZ=1
SPRS PT=6 DX=1.0 AZ=500.0
LUMP PT=6 MA=38.64
RSUP PT=6 DY=1 LV=6
RSUP PT=6 DZ=1 LV=6
ROTR PT=6 RX=1
ROTR PT=6 RY=1
ROTR PT=6 RZ=1
SPRS PT=7 DX=1.0 AZ=500.0
ANCH PT=7 LV=7
ENDP
```

```
CREST/ PIPESTRESS RUN FOR CASE-2, TRUNCATED MODES OF S.S.
    6    2    2    6  3  1  0  11  1    0    0    1    1
  900   11   11    1.0E-6       20.5      386.4 0.10
      0.07        0.07        0.07        0.07        0.07        0.07
      0.02        0.02        0.02
    2    6
    1   19
100000000. 0.0
0.0       100000000.
1 7
5.83144000 17.1553100 27.4828800 36.2125200 42.8381400 46.9730000
-0.25778   -0.55066   0.36783    0.13275    0.51865  0.45651
-0.55066   0.51865    0.45651    0.36783    -0.25778  0.13275
 -0.2284E+01 -0.7319E+00  0.4018E+00 -0.2457E+00  0.1455E+00 -0.6833E-01
   11  0.020068
 5.1640.8486 6.6590.837311.1490.711015.9360.652817.2960.552219.6100.5449
21.7360.423727.5810.359336.2420.355142.8910.351547.0050.3488
   11  0.020304
 5.1640.8466 6.6590.831611.1490.708715.9360.651617.2960.550919.6100.5440
21.7360.423027.5810.359336.2420.355042.8910.351447.0050.3488
   11  0.020811
 5.1640.8424 6.6590.821611.1490.703915.9360.649017.2960.548219.6100.5420
21.7360.421427.5810.359236.2420.354842.8910.351247.0050.3488
   11  0.022647
 5.1640.8272 6.6590.801811.1490.688215.9360.639917.2960.538519.6100.5352
21.7360.416027.5810.359036.2420.354242.8910.350647.0050.3488
   11  0.038318
 5.1640.7113 6.6590.655911.1490.599415.9360.576317.2960.473319.6100.4860
21.7360.389627.5810.358036.2420.352242.8910.348647.0050.3487
   11  0.047266
 5.1640.6557 6.6590.591511.1490.566415.9360.548617.2960.443719.6100.4653
21.7360.383427.5810.357436.2420.353242.8910.348447.0050.3487
   11  0.066337
 5.1640.5936 6.6590.501711.1490.517115.9360.503917.2960.433819.6100.4343
21.7360.371127.5810.356136.2420.350742.8910.348647.0050.3488
   11  0.069376
 5.1640.5893 6.6590.496411.1490.510915.9360.498117.2960.432519.6100.4305
21.7360.369227.5810.355936.2420.350742.8910.348647.0050.3489
   11  0.069785
 5.1640.5887 6.6590.495811.1490.510115.9360.497417.2960.432319.6100.4300
21.7360.369027.5810.355936.2420.350742.8910.348647.0050.3489
   11  0.069811
 5.1640.5886 6.6590.495811.1490.510115.9360.497317.2960.432319.6100.4300
21.7360.369027.5810.355936.2420.350742.8910.348647.0050.3489
   11  0.069887
 5.1640.5886 6.6590.495811.1490.510115.9360.497317.2960.432319.6100.4300
21.7360.369027.5810.355936.2420.350742.8910.348647.0050.3489
```

```
CREST/ PIPESTRESS RUN FOR CASE-2. TRUNCATED MODES OF S.S.

  NUMBER OF PRIMARY DOF              NP=    6

  NUMBER OF CONNECTING DOF           NC=    2

  NUMBER OF PIPING ANCHORS           NA=    2

  NUMBER OF PRIMARY MODES           NPM=    6

  NUMBER OF SECONDARY MODES         NSM=    3

  NORMALIZATION INDEX FOR P.S.    NORMP=    1

  NORMALIZATION INDEX FOR S.S.    NORMS=    0

  OUTPUT TYPE INDICATOR          IPRINT=    1

  OUTPUT TYPE INDICATOR         IPRINTS=    0

  PRIMARY RESIDUAL MODE KEY       KRESP=    0

  SECONDARY RESIDUAL MODE KEY     KRESS=    1

  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX      NONZP=   11

  GLOBAL EARTHQUAKE DIRECTION  X=1  Y=2(VERTICAL)  Z=3      KFLG=    1

  NUMBER OF ITERATIONS            NITER=  960

  NUMBER OF SPECTRA CURVES       NCURVE=   11

  NUMBER OF SPECTRUM POINTS        MXLP=   11

  ITTRATION TOLERANCE               TOL=  0.1000E-05

  RIGID FREQUENCY                    FR=  20.500

  SPECTRUM FACTOR                  SFTR= 386.400

  CORRELATION TOLERANCE              ET=   0.100


  TOTAL STORAGE REQUIRED  =      28749
  ACTUAL PROVIDED STORAGE  = 550000000

  PRIMARY DAMPING RATIOS

  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01

  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01  0.2000E-01

  CONECTING DOF # OF PRIMARY SYSTEM

    2    6

  CONECTING DOF # OF PIPING SUPPORTS

    1   19

  STIFFNESS OF CONNECTING DOF OF S.S.

  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09

  NODE # OF PIPING ANCHORS

    1    7

  MASS OF EACH SECONDARY DOF

  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00

  ADDRESS OF DIAGONAL ELEMENTS IN S.S.  STIFFNESS MATRIX (JDG MATRIX)

    1    3    6   10   15   21   28   36   45   55   66   78   85   93  102  112
  123  135  142  150  159  169  180  192  199  207  216  226  237  249  256  264
  273  283  294  306  313  321  330  340  351  363

  LOWER TRIANGULAR STIFFNESS MATRIX OF SECONDARY SYSTEM

  0.1000E+09  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.5000E+03  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+04  0.0000E+00 -0.1200E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.5000E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
```

```
  0.1000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.5000E+03  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.5000E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.5000E+03  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.5000E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+09  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10

  SECONDARY FREQUENCIES (HZ)

   5.8254709  11.2539490  15.9154939

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        2

  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8333E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6667E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3333E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1667E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8333E-06  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        6

  0.8333E-06  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1667E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3333E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6667E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8333E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  UNNORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.2500E-05 -0.5000E-05  0.5000E-05
  0.3337E-29 -0.5564E-34 -0.1130E-36
  0.1555E-29  0.1557E-35  0.9611E-37
  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1867E-30 -0.1870E-36 -0.1154E-37
  0.4006E-30 -0.6679E-35 -0.1356E-37
  0.5000E+00 -0.1000E+01  0.1000E+01
  0.3337E-17 -0.5564E-22 -0.1130E-24
  0.1555E-17  0.1557E-23  0.9611E-25
  0.0000E+00  0.0000E+00  0.0000E+00
 -0.2199E-29  0.8305E-32 -0.2597E-33
  0.4719E-29 -0.2659E-30 -0.1597E-36
  0.8660E+00 -0.1000E+01 -0.1670E-05
  0.4779E-18 -0.2677E-22 -0.5864E-25
  0.2324E-17  0.1814E-22 -0.6554E-26
  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1400E-25 -0.6646E-31  0.4869E-34
 -0.3501E-26  0.1994E-30 -0.1298E-33
  0.1000E+01 -0.3272E-09 -0.1000E+01
  0.2272E-17  0.4081E-22 -0.1454E-24
 -0.3899E-18  0.3829E-24  0.2788E-26
  0.0000E+00  0.0000E+00  0.0000E+00
  0.3257E-30 -0.1036E-32 -0.1121E-38
  0.9336E-26  0.1129E-30  0.5192E-33
  0.8660E+00  0.1000E+01 -0.1664E-05
 -0.2401E-17  0.5692E-22  0.6987E-27
  0.3766E-17  0.3332E-22 -0.1032E-26
  0.0000E+00  0.0000E+00  0.0000E+00
  0.2801E-25  0.1329E-30  0.5192E-33
 -0.4669E-26 -0.2656E-30  0.2646E-35
  0.5000E+00  0.1000E+01  0.1000E+01
 -0.5770E-17  0.1404E-23  0.2022E-25
 -0.2288E-17  0.1009E-22  0.5781E-25
  0.0000E+00  0.0000E+00  0.0000E+00
  0.4669E-26  0.3323E-31  0.2596E-33
 -0.1867E-25 -0.6662E-35  0.2343E-38
 0.2500E-05  0.5000E-05  0.5000E-05
-0.5770E-29  0.1404E-35  0.2022E-37
-0.2288E-29  0.1009E-34  0.5783E-37
 0.0000E+00  0.0000E+00  0.0000E+00
 0.8965E-35 -0.1615E-38 -0.3793E-42
 0.1281E-33  0.1022E-39 -0.1069E-41


 NORMALIZED MODE SHAPE OF SECONDARY SYSTEM

 0.4564E-05 -0.7906E-05  0.9129E-05
 0.6093E-29 -0.8797E-34 -0.2062E-36
 0.2839E-29  0.2462E-35  0.1755E-36
 0.0000E+00  0.0000E+00  0.0000E+00
-0.3400E-30 -0.2956E-36 -0.2106E-37
 0.7315E-30 -0.1056E-34 -0.2476E-37
 0.9129E+00 -0.1581E+01  0.1826E+01
 0.6093E-17 -0.8797E-22 -0.2062E-24
 0.2839E-17  0.2462E-23  0.1755E-24
 0.0000E+00  0.0000E+00  0.0000E+00
-0.4014E-29  0.1313E-31 -0.4742E-33
 0.8615E-29 -0.4204E-30 -0.2916E-36
 0.1581E+01 -0.1581E+01 -0.3049E-05
 0.8725E-18 -0.4233E-22 -0.1071E-24
 0.4244E-17  0.2868E-22 -0.1197E-25
 0.0000E+00  0.0000E+00  0.0000E+00
-0.2557E-25 -0.1051E-30  0.8889E-34
-0.6393E-26  0.3152E-30 -0.2370E-33
 0.1826E+01 -0.5174E-09 -0.1826E+01
 0.8149E-17  0.6452E-22 -0.2655E-24
-0.7118E-18  0.6055E-24  0.5009E-26
 0.0000E+00  0.0000E+00  0.0000E+00
 0.5947E-30 -0.1638E-32 -0.2047E-38
 0.1705E-25  0.2102E-30  0.9479E-33
 0.1581E+01  0.1581E+01 -0.3037E-05
-0.4384E-17  0.9000E-22  0.1276E-25
 0.6876E-17  0.5269E-22 -0.1883E-24
 0.0000E+00  0.0000E+00  0.0000E+00
 0.5213E-25  0.2101E-30  0.9479E-33
-0.8524E-26 -0.4203E-30  0.3735E-35
 0.9129E+00  0.1581E+01  0.1826E+01
-0.1053E-16  0.2220E-23  0.3692E-25
-0.4178E-17  0.1595E-22  0.1056E-24
 0.0000E+00  0.0000E+00  0.0000E+00
 0.8524E-26  0.5254E-31  0.4739E-33
-0.3409E-25 -0.1053E-34  0.4277E-38
 0.4564E-05  0.7906E-05  0.9129E-05
-0.1053E-28  0.2219E-35  0.3692E-37
-0.4177E-29  0.1595E-34  0.1056E-36
 0.0000E+00  0.0000E+00  0.0000E+00
 0.1637E-34 -0.2553E-38 -0.6924E-42
 0.2339E-33  0.1616E-39 -0.1953E-41

 PRIMARY FREQUENCIES (HZ)

  5.0314400  17.1553100  27.4828800  36.2125200  42.0381400  46.9730000

 MODE SHAPE OF P.S. AT CONNECTING DOF        3

-0.2578E+00 -0.5507E+00  0.3678E+00  0.1328E+00  0.5187E+00  0.4565E+00

 MODE SHAPE OF P.S. AT CONNECTING DOF        6

-0.5507E+00  0.5187E+00  0.4565E+00  0.3678E+00 -0.2578E+00  0.1328E+00

 BASE INFLUENCE VECTOR FOR S.S.---UBS

 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

 PARTICIPATION FACTOR FOR P.S.---GAMAP

-0.2284E-01 -0.7319E+00  0.4018E+00 -0.2457E+00  0.1455E+00 -0.6833E-01



        ***************************************************************
        *                                                             *
        *                                                             *
        *                                                             *
        *                 A COMPUTER PROGRAM FOR                      *
        *                                                             *
        *                                                             *
        *    COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS  *
        *                                                             *
        *                     " C R E S T "                           *
        *                                                             *
        *                                                             *
        *                      DEVELOPED BY                           *
        *                                                             *
        *                   AJAIA KUMAR GUPTA                         *
        *             JING-WEN JAW    ABHINAV GUPTA                   *
        *                                                             *
        *             NORTH CAROLINA STATE UNIVERSITY                 *
        *                RALEIGH, NORTH CAROLINA                      *
        *                                                             *
        *                     REVISION-1.0                            *
        *                                                             *
        *                                                             *
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 PARTICIPATION FACTOR FOR S.S.---GAMAS
 0.6814E+00  0.6584E-10  0.1826E+00


 MASS RATIOS

   PRIMARY SYSTEM MODE    1
 0.7586E-01  0.2144E-02  0.5446E-02

   PRIMARY SYSTEM MODE    2
 0.1109E-03  0.2859E-01  0.8539E-05

   PRIMARY SYSTEM MODE    3
 0.7887E-01  0.1966E-03  0.5663E-02

   PRIMARY SYSTEM MODE    4
 0.2908E-01  0.1382E-02  0.2088E-02

   PRIMARY SYSTEM MODE    5
 0.7899E-02  0.1507E-01  0.5671E-03

   PRIMARY SYSTEM MODE    6
 0.4030E-01  0.2621E-02  0.2894E-02


 C O U P L E D   F R E Q U E N C I E S   A N D   M O D E   S H A P E S   E X T R A C T I O N

 NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION   NITER =  900

 CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                           TOL = 0.10000E-05


 COUPLED  FREQUENCY  DAMPING RATIO
  MODE      (HZ)         (%)

   1    0.51637E+01    0.38298E+01
   2    0.66601E+01    0.47313E+01
   3    0.11149E+02    0.20809E+01
   4    0.15936E+02    0.20303E+01
   5    0.17404E+03    0.69927E+01
   6    0.27572E+02    0.69270E+01
   7    0.36239E+02    0.69822E+01
   8    0.42881E+02    0.69817E+01
   9    0.47002E+02    0.69820E+01


 UNIT DISPLACEMENT & UNIT VELOCITY*W RESPONSE



 COUPLED MODE NO.    1


   1     0.36460E+00    0.52093E-01
   2     0.77263E+00    0.11341E+00
   3     0.52324E-05   -0.48222E-06
   4     0.51704E-29   -0.90988E-30
   5     0.24088E-29   -0.42390E-30
   6     0.00000E+00    0.00000E+00
   7    -0.28917E-30    0.50888E-31
   8     0.62069E-30   -0.10923E-30
   9     0.10465E+01   -0.96444E-01
  10     0.51704E-17   -0.90988E-18
  11     0.24088E-17   -0.42390E-18
  12     0.00000E+00    0.00000E+00
  13    -0.35036E-26   -0.51082E-27
  14     0.41762E-26    0.60573E-27
  15     0.17952E+01   -0.16813E+00
  16     0.74037E-18   -0.13029E-19
  17     0.36012E-17   -0.63374E-18
  18     0.00000E+00    0.00000E+00
  19    -0.32307E-25    0.22694E-26
  20    -0.61402E-26    0.85129E-27
  21     0.20851E+01   -0.19298E+00
  22     0.35203E-17   -0.61950E-18
  23    -0.60400E-18    0.10629E-18
  24     0.00000E+00    0.00000E+00
  25     0.35445E-27    0.51905E-28
  26     0.19650E-25   -0.17903E-26
  27     0.18454E+01   -0.16472E+00
  28    -0.37203E-17    0.65471E-18
  29     0.58351E-17   -0.10269E-17
  30     0.00000E+00    0.00000E+00
  31     0.57455E-25   -0.55954E-26
  32    -0.13995E-25    0.28824E-27
  33     0.11062E+01   -0.91605E-01
  34    -0.89389E-17    0.15731E-17
  35    -0.35453E-17    0.62391E-18
  36     0.00000E+00    0.00000E+00
  37     0.98261E-26   -0.89530E-27
  38    -0.42289E-25    0.31300E-26
  39     0.55309E-05   -0.45032E-06
  40    -0.89398E-29    0.15731E-29
  41    -0.35447E-29    0.62384E-30
  42     0.00000E+00    0.00000E+00
  43     0.16328E-33    0.19525E-34
  44     0.30870E-33   -0.18874E-34


 COUPLED MODE NO.    2


   1     0.24386E+00   -0.60069E-01
   2     0.53292E+00   -0.12991E+00
   3    -0.51951E-05    0.46377E-06
   4    -0.89615E-29    0.11027E-29
   5    -0.41750E-29    0.51374E-30
   6     0.00000E+00    0.00000E+00
   7     0.50120E-30   -0.61674E-31
   8    -0.10758E-29    0.13238E-30
   9    -0.10390E+01    0.92555E-01
  10    -0.89615E-17    0.11027E-17
  11    -0.41750E-17    0.51374E-18
  12     0.00000E+00    0.00000E+00
  13    -0.39897E-26    0.97515E-27
  14     0.47269E-26   -0.11576E-26
  15    -0.18164E+01    0.16595E+00
  16    -0.12832E-17    0.15791E-18
  17    -0.62417E-17    0.76806E-18
  18     0.00000E+00    0.00000E+00
  19     0.25508E-25   -0.16717E-26
  20     0.85962E-26   -0.95923E-27
  21    -0.20773E+01    0.18443E+00
  22    -0.61015E-17    0.75081E-18
  23     0.10469E-17   -0.12882E-18
  24     0.00000E+00    0.00000E+00
  25     0.40558E-27   -0.98970E-28
  26    -0.19174E-25    0.16429E-26
  27    -0.17463E+01    0.14022E+00
  28     0.64482E-17   -0.79347E-18
  29    -0.10114E-16    0.12445E-17
  30     0.00000E+00    0.00000E+00
  31    -0.59282E-25    0.53545E-26
  32     0.48485E-26    0.33752E-27
  33    -0.95768E+00    0.64105E-01
  34     0.15493E-16   -0.15065E-17
  35     0.61449E-17   -0.75614E-18
  36     0.00000E+00    0.00000E+00
  37    -0.95885E-26    0.82167E-27
  38     0.34820E-25   -0.24336E-26
  39    -0.47884E-05    0.32053E-06
  40     0.15494E-28   -0.19065E-29
  41     0.61442E-29   -0.75608E-30
  42     0.00000E+00    0.00000E+00
  43     0.14770E-33   -0.38851E-34
  44    -0.21865E-33    0.11677E-34

COUPLED MODE NO.    3

   1     0.20842E-01    0.45311E-03
   2    -0.71465E-02   -0.18261E-02
   3     0.18102E-05   -0.45290E-07
   4    -0.14310E-30    0.14872E-31
   5    -0.66715E-31    0.69287E-32
   6     0.00000E+00    0.00000E+00
   7     0.80090E-32   -0.83170E-33
   8    -0.17189E-31    0.17853E-32
   9     0.36205E+00   -0.90581E-02
  10    -0.14310E-18    0.14872E-19
  11    -0.66715E-19    0.69287E-20
  12     0.00000E+00    0.00000E+00
  13    -0.55896E-28    0.27330E-28
  14     0.23405E-27   -0.23456E-28
  15     0.35382E+00   -0.83950E-02
  16    -0.20496E-19    0.21294E-20
  17    -0.99747E-19    0.10359E-19
  18     0.00000E+00    0.00000E+00
  19     0.28616E-27    0.12618E-28
  20     0.39652E-28   -0.15390E-28
  21    -0.13740E-01    0.15913E-02
  22    -0.97514E-19    0.10126E-19
  23     0.16728E-19   -0.17374E-20
  24     0.00000E+00    0.00000E+00
  25    -0.15287E-28   -0.39013E-29
  26    -0.10936E-27    0.12404E-28
  27    -0.37438E+00    0.10724E-01
  28     0.10302E-18   -0.10701E-19
  29    -0.16162E-18    0.16785E-19
  30     0.00000E+00    0.00000E+00
  31     0.15041E-27    0.76172E-28
  32    -0.17939E-27    0.17269E-28
  33    -0.36921E+00    0.98122E-02
  34     0.24757E-18   -0.25712E-19
  35     0.98189E-19   -0.10198E-19
  36     0.00000E+00    0.00000E+00
  37    -0.54692E-28    0.62043E-29
  38     0.11757E-26    0.53132E-28
  39    -0.18460E-05    0.49061E-07
  40     0.24756E-30   -0.25711E-31
  41     0.98194E-31   -0.10197E-31
  42     0.00000E+00    0.00000E+00
  43    -0.87461E-35   -0.17113E-35
  44     0.69383E-36   -0.49952E-37

COUPLED MODE NO.    4

   1    -0.63294E-04    0.11085E-03
   2    -0.21201E-03   -0.52055E-03
   3     0.57664E-07    0.14525E-06
   4     0.49470E-32    0.73390E-32
   5     0.23047E-32    0.34191E-32
   6     0.00000E+00    0.00000E+00
   7    -0.27668E-33   -0.41046E-33
   8     0.59388E-33    0.88103E-33
   9     0.11533E-01    0.29050E-01
  10     0.49470E-20    0.73390E-20
  11     0.23047E-20    0.34191E-20
  12     0.00000E+00    0.00000E+00
  13     0.85084E-29    0.16243E-28
  14    -0.96103E-29   -0.14302E-28
  15     0.92129E-04   -0.87439E-04
  16     0.70838E-21    0.10509E-20
  17     0.34456E-20    0.51117E-20
  18     0.00000E+00    0.00000E+00
  19     0.45934E-29    0.14094E-28
  20    -0.37573E-29   -0.73381E-29
  21    -0.11312E-01   -0.28906E-01
  22     0.33682E-20    0.49969E-20
  23    -0.57790E-21   -0.85734E-21
  24     0.00000E+00    0.00000E+00
  25    -0.92528E-30   -0.22723E-29
  26     0.18754E-29    0.27268E-29
  27     0.26715E-03    0.61016E-03
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  28    -0.35596E-20   -0.52808E-20
  29     0.55830E-20    0.82826E-20
  30     0.00000E+00    0.00000E+00
  31     0.10820E-28    0.30234E-28
  32     0.86787E-29    0.12947E-28
  33     0.11675E-01    0.29607E-01
  34    -0.85527E-20   -0.12688E-19
  35    -0.33921E-20   -0.50324E-20
  36     0.00000E+00    0.00000E+00
  37     0.93863E-30    0.13648E-29
  38     0.66195E-29    0.38659E-28
  39     0.58374E-07    0.14804E-06
  40    -0.85521E-32   -0.12687E-31
  41    -0.33920E-32   -0.50319E-32
  42     0.00000E+00    0.00000E+00
  43    -0.38140E-36   -0.99729E-36
  44    -0.64423E-37   -0.96788E-37

COUPLED MODE NO.    5

   1     0.38240E+00    0.43439E-02
   2    -0.36259E+00   -0.55602E-02
   3    -0.14486E-05   -0.13470E-06
   4    -0.41332E-30    0.25272E-31
   5    -0.19254E-30    0.11774E-31
   6     0.00000E+00    0.00000E+00
   7     0.23114E-31   -0.14135E-32
   8    -0.49619E-31    0.30338E-32
   9    -0.28968E+00   -0.26940E-01
  10    -0.41332E-18    0.25272E-19
  11    -0.19254E-18    0.11774E-19
  12     0.00000E+00    0.00000E+00
  13     0.71414E-26    0.14116E-27
  14     0.82458E-27   -0.50649E-28
  15    -0.37852E+00   -0.21457E-01
  16    -0.59200E-19    0.36183E-20
  17    -0.28784E-18    0.17603E-19
  18     0.00000E+00    0.00000E+00
  19     0.15302E-25    0.22019E-27
  20    -0.36251E-26   -0.67121E-28
  21     0.26935E-02    0.72359E-02
  22    -0.28136E-18    0.17209E-19
  23     0.48279E-19   -0.29524E-25
  24     0.00000E+00    0.00000E+00
  25    -0.18885E-26   -0.28956E-28
  26    -0.12949E-27    0.76592E-29
  27     0.35351E+00    0.22930E-01
  28     0.29742E-18   -0.18184E-19
  29    -0.46639E-18    0.28523E-19
  30     0.00000E+00    0.00000E+00
  31     0.30452E-25    0.43563E-27
  32    -0.76051E-27    0.46842E-28
  33     0.24438E+00    0.14823E-01
  34     0.71451E-18   -0.43694E-19
  35     0.28339E-18   -0.17330E-19
  36     0.00000E+00    0.00000E+00
  37    -0.64832E-28    0.38336E-29
  38     0.62340E-25    0.81001E-27
  39     0.12219E-05    0.74116E-07
  40     0.71444E-30   -0.43691E-31
  41     0.28334E-30   -0.17322E-31
  42     0.00000E+00    0.00000E+00
  43    -0.90489E-33   -0.13498E-34
  44     0.58829E-35   -0.37097E-36

COUPLED MODE NO.    6

   1     0.14694E+00   -0.67393E-03
   2     0.18395E+00   -0.80086E-03
   3    -0.86586E-06   -0.84469E-08
   4    -0.16106E-28    0.73485E-31
   5    -0.75036E-29    0.34235E-31
   6     0.00000E+00    0.00000E+00
   7     0.90080E-30   -0.41099E-32
   8    -0.19335E-29    0.88218E-32
   9    -0.17317E+00   -0.17294E-02
  10    -0.16106E-16    0.73485E-19
  11    -0.75036E-17    0.34235E-19
  12     0.00000E+00    0.00000E+00
  13    -0.26908E-25    0.11893E-27
  14     0.34579E-25   -0.15412E-27
  15    -0.18995E+00    0.139[illegible]E-02
  16    -0.23063E-17    0.10523E-19
  17    -0.11218E-16    0.51183E-19
  18     0.00000E+00    0.00000E+00
  19    -0.16218E-25    0.63165E-28
  20     0.98903E-26   -0.65367E-28
  21    -0.10951E+00    0.38482E-02
  22    -0.10966E-16    0.50033E-19
  23     0.18615E-17   -0.85845E-20
  24     0.00000E+00    0.00000E+00
  25     0.24029E-26   -0.10461E-28
  26    -0.20130E-26    0.13724E-28
  27    -0.22447E+00    0.13333E-02
  28     0.11589E-16   -0.52876E-19
  29    -0.18177E-16    0.82933E-19
  30     0.00000E+00    0.00000E+00
  31    -0.99042E-26    0.54421E-28
  32    -0.33593E-25    0.14735E-27
  33    -0.18301E+00   -0.18762E-02
  34     0.27846E-16   -0.12705E-18
  35     0.11044E-16   -0.50389E-19
  36     0.00000E+00    0.00000E+00
  37    -0.10095E-26    0.68750E-29
  38    -0.37158E-26   -0.90072E-30
  39    -0.91505E-06   -0.93810E-08
  40     0.27844E-28   -0.12704E-30
  41     0.11044E-28   -0.50389E-31
  42     0.00000E+00    0.00000E+00
  43     0.94253E-33   -0.40779E-35
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   44     0.29671E-33    -0.12572E-35

 COUPLED MODE NO.    7

    1    -0.32703E-01    -0.21722E-04
    2    -0.90759E-01    -0.10784E-04
    3     0.28941E-06     0.88759E-09
    4     0.10181E-29     0.19182E-32
    5     0.47432E-29     0.89367E-33
    6     0.00000E+00     0.00000E+00
    7    -0.56942E-30    -0.10728E-33
    8     0.12222E-29     0.23028E-33
    9     0.57883E-01     0.17752E-03
   10     0.10181E-16     0.19182E-20
   11     0.47432E-17     0.89367E-21
   12     0.00000E+00     0.00000E+00
   13     0.19342E-25     0.39088E-29
   14    -0.22269E-25    -0.58693E-29
   15     0.46781E-01    -0.18875E-03
   16     0.14579E-17     0.27468E-21
   17     0.70913E-17     0.13361E-20
   18     0.00000E+00     0.00000E+00
   19     0.15291E-25     0.40561E-29
   20    -0.71638E-26    -0.49421E-30
   21     0.38094E-01    -0.51376E-03
   22     0.69320E-17     0.13061E-20
   23    -0.11896E-17    -0.22409E-21
   24     0.00000E+00     0.00000E+00
   25    -0.20494E-26    -0.24333E-30
   26     0.73692E-27    -0.19386E-29
   27     0.11435E+00    -0.16394E-03
   28    -0.73259E-17    -0.13803E-20
   29     0.11490E-16     0.21649E-20
   30     0.00000E+00     0.00000E+00
   31     0.12695E-25    -0.77922E-29
   32     0.21933E-25     0.68411E-29
   33     0.56560E-01     0.21493E-03
   34    -0.17602E-16    -0.33164E-20
   35    -0.69813E-17    -0.13153E-20
   36     0.00000E+00     0.00000E+00
   37     0.37635E-27    -0.96894E-30
   38     0.19502E-25    -0.74399E-31
   39     0.20280E-06     0.10746E-08
   40    -0.17601E-28    -0.33159E-32
   41    -0.69811E-29    -0.13155E-32
   42     0.00000E+00     0.00000E+00
   43    -0.84613E-33    -0.83728E-37
   44    -0.19896E-33    -0.81634E-37

 COUPLED MODE NO.    8

    1     0.76177E-01    -0.48297E-04
    2    -0.38351E-01    -0.21258E-05
    3    -0.28799E-08     0.20950E-09
    4    -0.43348E-29     0.60112E-32
    5    -0.20195E-29     0.28005E-32
    6     0.00000E+00     0.00000E+00
    7     0.24243E-30    -0.33619E-33
    8    -0.52038E-30     0.72163E-33
    9    -0.57602E-03     0.41900E-04
   10    -0.43348E-17     0.60112E-20
   11    -0.20195E-17     0.28005E-20
   12     0.00000E+00     0.00000E+00
   13     0.69188E-28     0.56418E-29
   14     0.95615E-26    -0.12745E-28
   15    -0.10340E+00     0.15580E-03
   16    -0.62072E-18     0.86077E-31
   17    -0.35192E-17     0.41868E-20
   18     0.00000E+00     0.00000E+00
   19     0.10036E-25    -0.88741E-30
   20    -0.11447E-26    -0.20855E-29
   21    -0.10102E-01     0.12044E-03
   22    -0.29513E-17     0.40927E-20
   23     0.50638E-18    -0.70222E-21
   24     0.00000E+00     0.00000E+00
   25    -0.12130E-26    -0.66627E-31
   26    -0.22416E-27     0.95035E-30
   27     0.50484E-01     0.35619E-04
   28     0.31191E-17    -0.43253E-20
   29    -0.48920E-17     0.67839E-20
   30     0.00000E+00     0.00000E+00
   31     0.28297E-25    -0.88293E-29
   32    -0.94550E-26     0.12270E-28
   33    -0.31445E-01    -0.37954E-05
   34     0.74942E-17    -0.10392E-19
   35     0.29723E-17    -0.41218E-20
   36     0.00000E+00     0.00000E+00
   37    -0.11288E-27     0.47629E-30
   38     0.58385E-25    -0.25257E-28
   39    -0.15722E-06    -0.18977E-10
   40     0.74936E-29    -0.10392E-31
   41     0.29729E-29    -0.41220E-32
   42     0.00000E+00     0.00000E+00
   43    -0.63376E-33     0.43126E-37
   44     0.86533E-34    -0.10647E-36

 COUPLED MODE NO.    9

    1    -0.30870E-01    -0.35306E-04
    2    -0.88414E-02    -0.16840E-05
    3     0.55232E-07    -0.86780E-10
    4     0.54501E-29     0.48374E-32
    5     0.25391E-29     0.22537E-32
    6     0.00000E+00     0.00000E+00
    7    -0.30481E-30    -0.27055E-33
    8     0.65427E-30     0.58072E-33
    9     0.15047E-01    -0.17356E-04
   10     0.54501E-17     0.48374E-20
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   11     0.25391E-17     0.22537E-20
   12     0.00000E+00     0.00000E+00
   13     0.73735E-26     0.58730E-29
   14    -0.12060E-25    -0.11234E-28
   15     0.65428E-01    -0.19695E-04
   16     0.78043E-18     0.69269E-21
   17     0.37960E-17     0.33693E-20
   18     0.00000E+00     0.00000E+00
   19     0.23351E-26     0.11883E-29
   20    -0.22685E-26    -0.13643E-29
   21     0.93346E-02    -0.83821E-04
   22     0.37107E-17     0.32936E-20
   23    -0.63668E-18    -0.56510E-21
   24     0.00000E+00     0.00000E+00
   25    -0.33531E-27    -0.63498E-31
   26     0.23465E-27    -0.45079E-30
   27     0.12395E-01    -0.50622E-04
   28    -0.39216E-17    -0.34808E-20
   29     0.61508E-17     0.54593E-20
   30     0.00000E+00     0.00000E+00
   31    -0.59919E-26    -0.11571E-28
   32     0.11949E-25     0.11465E-28
   33     0.20706E-01     0.16880E-04
   34    -0.94225E-17    -0.83632E-20
   35    -0.37371E-17    -0.33170E-20
   36     0.00000E+00     0.00000E+00
   37     0.11833E-27    -0.22450E-30
   38    -0.13857E-25    -0.19533E-28
   39     0.10353E-06     0.84399E-10
   40    -0.94217E-29    -0.83625E-32
   41    -0.37373E-29    -0.33172E-32
   42     0.00000E+00     0.00000E+00
   43    -0.89574E-34     0.34518E-37
   44    -0.10987E-33    -0.11152E-36

 INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS

     FREQUENCY    DAMPING RATIO          SPECTRAL ACCELERATIONS
       (HZ)           (%)                   SAD          SAV

    0.51637E+01    0.38298E+01          0.7115E+00   0.7115E+00
    0.66601E+01    0.47313E+01          0.5913E+00   0.6246E+00
    0.11149E+02    0.20809E+01          0.7039E+00   0.6545E+00
    0.15936E+02    0.20303E+01          0.6516E+00   0.4225E+00
    0.17404E+02    0.68927E+01          0.4326E+00   0.2281E+00
    0.27572E+02    0.69370E+01          0.3559E+00   0.1184E+00
    0.36239E+02    0.69822E+01          0.3507E+00   0.8879E-01
    0.42881E+02    0.69817E+01          0.3496E+00   0.7459E-01
    0.47002E+02    0.69820E+01          0.3489E+00   0.6811E-01

 DISPLACEMENT RESPONSE UD (FROM SD)

   MODE NO.     1
  0.9522E-01  0.2016E+00  0.9522E-01  0.1350E-29  0.6291E-30  0.0000E+00
 -0.7552E-31  0.1621E-30  0.3863E+00  0.1350E-17  0.6291E-18  0.0000E+00
 -0.9150E-27  0.1091E-26  0.5995E+00  0.1934E-18  0.9405E-18  0.0000E+00
 -0.8437E-26 -0.1604E-26  0.6930E+00  0.9194E-18 -0.1577E-18  0.0000E+00
  0.9257E-28  0.5132E-26  0.6481E+00 -0.9716E-18  0.1524E-17  0.0000E+00
  0.1500E-25 -0.3655E-26  0.4728E+00 -0.2334E-17 -0.9259E-18  0.0000E+00
  0.2566E-26 -0.1104E-25  0.2016E+00 -0.2335E-29 -0.9257E-30  0.0000E+00
  0.4264E-34  0.8062E-34
   MODE NO.     2
  0.3182E-01  0.6953E-01  0.3182E-01 -0.1169E-29 -0.5447E-30  0.0000E+00
  0.6539E-31 -0.1404E-30 -0.9746E-01 -0.1169E-17 -0.5447E-18  0.0000E+00
 -0.5205E-27  0.6167E-27 -0.1926E+00 -0.1674E-18 -0.8143E-18  0.0000E+00
  0.3328E-26  0.1122E-26 -0.2203E+00 -0.7960E-18  0.1366E-18  0.0000E+00
  0.5291E-28 -0.2502E-26 -0.1709E+00  0.8413E-18 -0.1319E-17  0.0000E+00
 -0.7734E-26  0.6326E-27 -0.6170E-01  0.2021E-17  0.8017E-18  0.0000E+00
 -0.1251E-26  0.4543E-26  0.6953E-01  0.2021E-29  0.8016E-30  0.0000E+00
  0.1927E-34 -0.2853E-34
   MODE NO.     3
  0.1155E-02 -0.3961E-03  0.1155E-02 -0.7936E-32 -0.3698E-32  0.0000E+00
  0.4439E-33 -0.9528E-33  0.2097E-01 -0.7936E-20 -0.3698E-20  0.0000E+00
 -0.3098E-29  0.1297E-28  0.2025E-01 -0.1136E-20 -0.5529E-20  0.0000E+00
  0.1586E-28  0.2198E-29 -0.3821E-03 -0.5405E-20  0.9273E-21  0.0000E+00
 -0.8473E-30 -0.6062E-29 -0.2063E-01  0.5710E-20 -0.8959E-20  0.0000E+00
  0.8348E-29 -0.9944E-29 -0.2060E-01  0.1372E-19  0.5443E-20  0.0000E+00
 -0.3032E-29  0.6517E-28 -0.3962E-03  0.1372E-31  0.5443E-32  0.0000E+00
 -0.4848E-36  0.3846E-37
   MODE NO.     4
 -0.1590E-05 -0.5324E-05 -0.1588E-05  0.1242E-33  0.5788E-34  0.0000E+00
 -0.6940E-35  0.1491E-34  0.2874E-03  0.1242E-21  0.5788E-22  0.0000E+00
  0.2137E-30 -0.2413E-30 -0.5208E-06  0.1779E-22  0.8653E-22  0.0000E+00
  0.1154E-30 -0.9436E-31 -0.2876E-03  0.8459E-22 -0.1451E-22  0.0000E+00
 -0.2324E-31  0.4710E-31  0.2630E-05 -0.8939E-22  0.1402E-21  0.0000E+00
  0.2717E-30  0.2180E-30  0.2885E-03 -0.2148E-21 -0.8519E-22  0.0000E+00
  0.2357E-31  0.1667E-30 -0.5323E-05 -0.2148E-33 -0.8519E-34  0.0000E+00
 -0.9628E-38 -0.1618E-38
   MODE NO.     5
  0.5345E-02 -0.5069E-02  0.5345E-02 -0.5778E-32 -0.2691E-32  0.0000E+00
  0.3231E-33 -0.6936E-33 -0.4396E-03 -0.5778E-20 -0.2691E-20  0.0000E+00
  0.9903E-28  0.1153E-28 -0.3417E-02 -0.8275E-21 -0.4024E-20  0.0000E+00
  0.2139E-27 -0.5067E-28  0.1761E-03 -0.3933E-20  0.6749E-21  0.0000E+00
 -0.2640E-28 -0.1010E-29  0.3344E-02  0.4158E-20 -0.6520E-20  0.0000E+00
  0.4285E-27 -0.1063E-28  0.8319E-04  0.9988E-20  0.3961E-20  0.0000E+00
 -0.9063E-30  0.8714E-27 -0.5069E-02  0.9987E-32  0.3969E-32  0.0000E+00
 -0.1265E-34  0.8224E-37
   MODE NO.     6
  0.6733E-03  0.8429E-03  0.6733E-03 -0.7381E-31 -0.3438E-31  0.0000E+00
  0.4128E-32 -0.8860E-32 -0.9195E-04 -0.7381E-19 -0.3438E-19  0.0000E+00
 -0.1233E-27  0.1585E-27 -0.1406E-03 -0.1057E-19 -0.5141E-19  0.0000E+00
 -0.7432E-28  0.4532E-28  0.2563E-03 -0.5025E-19  0.8622E-20  0.0000E+00
  0.1101E-28 -0.9224E-29 -0.2422E-03  0.5311E-19 -0.8329E-19  0.0000E+00
 -0.4538E-28 -0.1539E-27 -0.2395E-04  0.1276E-18  0.5061E-19  0.0000E+00
 -0.4626E-29 -0.1703E-28  0.8429E-03  0.1276E-30  0.5061E-31  0.0000E+00
  0.4319E-35  0.1360E-35
   MODE NO.     7
 -0.8548E-04 -0.2372E-03 -0.8547E-04  0.2661E-31  0.1240E-31  0.0000E+00
 -0.1488E-32  0.3195E-32  0.4052E-04  0.2661E-19  0.1240E-19  0.0000E+00
  0.5056E-28 -0.5826E-28 -0.8557E-05  0.3011E-20  0.1853E-19  0.0000E+00
  0.3997E-28 -0.1872E-28 -0.6176E-04  0.1812E-19 -0.3109E-20  0.0000E+00
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-0.5354E-29  0.1926E-29  0.1122E-01 -0.1915E-19  0.3003E-19  0.0000E+00
 0.3319E-28  0.5733E-28 -0.6410E-04 -0.4601E-19 -0.1825E-19  0.0000E+00
 0.9680E-30  0.5097E-28 -0.2372E-03 -0.4600E-31 -0.1825E-31  0.0000E+00
-0.2212E-35 -0.5200E-36
   MODE NO.     8
 0.1414E-03 -0.7116E-04  0.1414E-03 -0.8043E-32 -0.3747E-32  0.0000E+00
 0.4498E-33 -0.9656E-33  0.1049E-03 -0.8043E-20 -0.3747E-20  0.0000E+00
 0.1284E-30  0.1774E-28 -0.1216E-03 -0.1152E-20 -0.5602E-20  0.0000E+00
 0.1862E-28 -0.2124E-29  0.1635E-04 -0.5476E-20  0.9396E-21  0.0000E+00
-0.2251E-29 -0.4159E-30  0.9335E-04  0.5788E-20 -0.9077E-20  0.0000E+00
 0.5251E-28 -0.1754E-28 -0.9409E-04  0.1391E-19  0.5515E-20  0.0000E+00
-0.2095E-30  0.1083E-27 -0.7116E-04  0.1390E-31  0.5516E-32  0.0000E+00
-0.1176E-35  0.1606E-36
   MODE NO.     9
-0.4772E-04 -0.1367E-04 -0.4772E-04  0.8425E-32  0.3925E-32  0.0000E+00
-0.4712E-33  0.1011E-32 -0.2497E-04  0.8425E-20  0.3925E-20  0.0000E+00
 0.1140E-28 -0.1864E-28  0.3385E-04  0.1206E-20  0.5868E-20  0.0000E+00
 0.3610E-29 -0.3507E-29 -0.1626E-04  0.5736E-20 -0.9842E-21  0.0000E+00
-0.5181E-30  0.3627E-30 -0.5857E-05 -0.6082E-20  0.9508E-20  0.0000E+00
-0.9262E-29  0.1847E-28  0.1267E-04 -0.1457E-19 -0.5777E-20  0.0000E+00
 0.1829E-30 -0.2142E-28 -0.1367E-04 -0.1456E-31 -0.5777E-32  0.0000E+00
-0.1385E-36 -0.1698E-36


  DISPLACEMENT RESPONSE UV (FROM SV)

   MODE NO.     1
 0.1360E-01  0.2962E-01  0.1360E-01 -0.2376E-30 -0.1107E-30  0.0000E+00
 0.1329E-31 -0.2853E-31 -0.8914E-02 -0.2376E-18 -0.1107E-18  0.0000E+00
-0.1334E-27  0.1582E-27 -0.2497E-01 -0.3403E-19 -0.1655E-18  0.0000E+00
 0.5927E-27  0.2223E-27 -0.2079E-01 -0.1618E-18  0.2776E-19  0.0000E+00
 0.1356E-28 -0.4675E-27 -0.1874E-01  0.1710E-18 -0.2682E-18  0.0000E+00
-0.1461E-26  0.7528E-28  0.3025E-02  0.4108E-18  0.1629E-18  0.0000E+00
-0.2338E-27  0.8176E-27  0.2962E-01  0.4108E-30  0.1629E-30  0.0000E+00
 0.5099E-35 -0.4929E-35
   MODE NO.     2
-0.8279E-02 -0.1790E-01 -0.8279E-02  0.1520E-30  0.7081E-31  0.0000E+00
-0.8500E-32  0.1825E-31  0.2873E-02  0.1520E-18  0.7081E-19  0.0000E+00
 0.1344E-27 -0.1595E-27  0.1138E-01  0.2176E-19  0.1059E-18  0.0000E+00
-0.2304E-27 -0.1322E-27  0.1233E-01  0.1035E-18 -0.1775E-19  0.0000E+00
-0.1364E-28  0.2264E-27  0.4630E-02 -0.1094E-18  0.1715E-18  0.0000E+00
 0.7380E-27  0.4652E-28 -0.7465E-02 -0.2628E-18 -0.1042E-18  0.0000E+00
 0.1132E-27 -0.3354E-27 -0.1790E-01 -0.2628E-30 -0.1042E-30  0.0000E+00
-0.5366E-35  0.1609E-35
   MODE NO.     3
 0.2342E-04 -0.9441E-04  0.2342E-04  0.7688E-33  0.3582E-33  0.0000E+00
-0.4300E-34  0.9230E-34 -0.4645E-03  0.7688E-21  0.3582E-21  0.0000E+00
 0.1413E-29 -0.1213E-29 -0.4499E-03  0.1101E-21  0.5355E-21  0.0000E+00
 0.6523E-30 -0.7956E-30  0.4678E-04  0.5235E-21 -0.8982E-22  0.0000E+00
-0.2017E-30  0.6413E-30  0.4993E-03 -0.5532E-21  0.8677E-21  0.0000E+00
 0.3938E-29  0.8928E-30  0.4325E-03 -0.1329E-20 -0.5272E-21  0.0000E+00
 0.3208E-30  0.2747E-29 -0.9440E-04 -0.1329E-32 -0.5272E-33  0.0000E+00
-0.8847E-37 -0.2582E-38
   MODE NO.     4
 0.1805E-05 -0.8477E-05  0.1807E-05  0.1195E-33  0.5568E-34  0.0000E+00
-0.6684E-35  0.1435E-34  0.4732E-03  0.1195E-21  0.5568E-22  0.0000E+00
 0.2645E-30 -0.2329E-30 -0.3046E-05  0.1711E-22  0.8324E-22  0.0000E+00
 0.2295E-30 -0.1198E-30 -0.4741E-03  0.8137E-22 -0.1396E-22  0.0000E+00
-0.3700E-31  0.4440E-31  0.4886E-05 -0.8600E-22  0.1349E-21  0.0000E+00
 0.4923E-30  0.2108E-30  0.4754E-03 -0.2066E-21 -0.8195E-22  0.0000E+00
 0.2222E-31  0.6295E-30 -0.8475E-05 -0.2066E-33 -0.8194E-34  0.0000E+00
-0.1624E-37 -0.1576E-38
   MODE NO.     5
 0.3201E-04 -0.4097E-04  0.3201E-04  0.1862E-33  0.8677E-34  0.0000E+00
-0.1042E-34  0.2236E-34 -0.1787E-03  0.1862E-21  0.8677E-22  0.0000E+00
 0.1040E-29 -0.3712E-30 -0.1504E-03  0.2666E-22  0.1297E-21  0.0000E+00
 0.1623E-29 -0.4946E-30  0.4884E-04  0.1268E-21 -0.2176E-22  0.0000E+00
-0.2134E-30  0.5644E-31  0.1524E-03 -0.1340E-21  0.2102E-21  0.0000E+00
 0.3210E-29  0.3452E-30  0.8042E-04 -0.3220E-21 -0.1277E-21  0.0000E+00
 0.2825E-31  0.5969E-29 -0.4097E-04 -0.3220E-33 -0.1276E-33  0.0000E+00
-0.9947E-37 -0.2734E-38
   MODE NO.     6
-0.1028E-05 -0.1221E-05 -0.1028E-05  0.1121E-33  0.5220E-34  0.0000E+00
-0.6267E-35  0.1345E-34 -0.3697E-05  0.1121E-21  0.5220E-22  0.0000E+00
 0.1814E-30 -0.2350E-30  0.1036E-05  0.1605E-22  0.7804E-22  0.0000E+00
 0.9632E-31 -0.6918E-31  0.4743E-05  0.7629E-22 -0.1309E-22  0.0000E+00
-0.1595E-31  0.2093E-31  0.8764E-06 -0.8063E-22  0.1265E-21  0.0000E+00
 0.8298E-31  0.2247E-30 -0.4050E-05 -0.1937E-21 -0.7683E-22  0.0000E+00
 0.1048E-31 -0.1373E-32 -0.1221E-05 -0.1937E-33 -0.7683E-34  0.0000E+00
-0.6218E-38 -0.1917E-38
   MODE NO.     7
-0.1437E-07 -0.7136E-08 -0.1437E-07  0.1269E-35  0.5914E-36  0.0000E+00
-0.7099E-37  0.1524E-36  0.1043E-06  0.1269E-23  0.5914E-24  0.0000E+00
 0.2507E-32 -0.3884E-32 -0.1369E-06  0.1816E-24  0.8841E-24  0.0000E+00
 0.3213E-32 -0.3270E-33 -0.3507E-06  0.8642E-24 -0.1483E-24  0.0000E+00
-0.1610E-33 -0.1283E-32 -0.1180E-06 -0.9134E-24  0.1433E-23  0.0000E+00
-0.5156E-32  0.4527E-32  0.1339E-06 -0.2195E-23 -0.8704E-24  0.0000E+00
-0.6412E-33 -0.4923E-34 -0.7135E-08 -0.2194E-35 -0.8705E-36  0.0000E+00
-0.5540E-40 -0.5402E-40
   MODE NO.     8
-0.1917E-07 -0.8440E-09 -0.1917E-07  0.2306E-35  0.1112E-35  0.0000E+00
-0.1335E-36  0.2865E-36  0.5153E-09  0.2306E-23  0.1112E-23  0.0000E+00
 0.2637E-32 -0.5060E-32  0.4879E-07  0.3417E-24  0.1662E-23  0.0000E+00
-0.3523E-33 -0.8280E-33  0.3781E-07  0.1625E-23 -0.2788E-24  0.0000E+00
-0.2645E-34  0.3773E-33  0.7187E-08 -0.1717E-23  0.2693E-23  0.0000E+00
-0.3505E-32  0.4874E-32 -0.5406E-08 -0.4126E-23 -0.1636E-23  0.0000E+00
 0.1891E-33 -0.1003E-31 -0.8440E-09 -0.4126E-35 -0.1636E-35  0.0000E+00
 0.1712E-40 -0.4227E-40
   MODE NO.     9
-0.1065E-07 -0.5081E-09 -0.1065E-07  0.1460E-35  0.6800E-36  0.0000E+00
-0.8163E-37  0.1752E-36 -0.1420E-07  0.1460E-23  0.6800E-24  0.0000E+00
 0.1772E-32 -0.3390E-32 -0.1321E-07  0.2090E-24  0.1017E-23  0.0000E+00
 0.3585E-33 -0.4117E-33 -0.3087E-07  0.9938E-24 -0.1705E-24  0.0000E+00
-0.1916E-34 -0.1360E-33 -0.1916E-07 -0.1050E-23  0.1647E-23  0.0000E+00
-0.3491E-32  0.3460E-32  0.2894E-08 -0.2524E-23 -0.1001E-23  0.0000E+00
-0.6774E-34 -0.5894E-32 -0.5081E-09 -0.2523E-35 -0.1001E-35  0.0000E+00
 0.1042E-40 -0.3365E-40


  CORRELATION EPSD

   MODE NO.     1
 0.1000E+01  0.1383E+00  0.8246E-01  0.1106E+00  0.1273E+00  0.1273E+00
 0.1273E+00  0.1273E+00  0.1273E+00
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   MODE NO.     2
 0.1383E+00  0.1000E+01  0.2360E+00  0.3356E+00  0.3597E+00  0.3597E+00
 0.3597E+00  0.3597E+00  0.3597E+00
   MODE NO.     3
 0.8246E-01  0.2360E+00  0.1000E+01  0.5945E+00  0.6349E+00  0.6349E+00
 0.6349E+00  0.6349E+00  0.6349E+00
   MODE NO.     4
 0.1106E+00  0.3356E+00  0.5945E+00  0.1000E+01  0.9311E+00  0.9311E+00
 0.9311E+00  0.9311E+00  0.9311E+00
   MODE NO.     5
 0.1273E+00  0.3597E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     6
 0.1273E+00  0.3597E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.1273E+00  0.3597E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     8
 0.1273E+00  0.3597E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.1273E+00  0.3597E+00  0.6349E+00  0.9311E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION EPSV

   MODE NO.     1
 0.1000E+01  0.7124E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
 0.7124E-01  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
 0.0000E+00  0.0000E+00  0.1000E+01  0.1837E-01  0.3781E-01  0.5397E-01
 0.5397E-01  0.5397E-01  0.5397E-01
   MODE NO.     4
 0.0000E+00  0.0000E+00  0.1837E-01  0.1000E+01  0.5262E+00  0.3404E+00
 0.3404E+00  0.3404E+00  0.3404E+00
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.3781E-01  0.5262E+00  0.1000E+01  0.5946E+00
 0.5946E+00  0.5946E+00  0.5946E+00
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.5397E-01  0.3404E+00  0.5946E+00  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.5397E-01  0.3404E+00  0.5946E+00  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.5397E-01  0.3404E+00  0.5946E+00  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.0000E+00  0.0000E+00  0.5397E-01  0.3404E+00  0.5946E+00  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION RU (FOR CROSS TERM OF RD AND SV)

   MODE NO.     1
 0.0000E+00  0.2604E+00  0.3938E-01  0.1863E-01  0.3494E-01  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
-0.2604E+00  0.0000E+00  0.7298E-01  0.2956E-01  0.5121E-01  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
-0.3938E-01 -0.7298E-01  0.0000E+00  0.6631E-01  0.8624E-01  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     4
-0.1863E-01 -0.2956E-01 -0.6631E-01  0.0000E+00  0.1209E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     5
-0.3494E-01 -0.5121E-01 -0.8624E-01 -0.1209E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     9
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00


  COMBINED VALUES OF COUPLED NODAL DISPLACEMENTS

  DISPLACEMENTS AT PRIMARY SYSTEM CONNECTING DOF

  DOF #      DISPLACEMENT


   2         0.1064E+00

   6         0.2217E+00


  DISPLACEMENTS AT SECONDARY SYSTEM DOF

  NODE       DX          DY          DZ         ROT-X       ROT-Y       ROT-Z


   1    0.1064E+00  0.1761E-29  0.8206E-30  0.0000E+00  0.9851E-31  0.2115E-30

   2    0.3875E+00  0.1761E-17  0.8206E-18  0.0000E+00  0.1105E-26  0.1364E-26

   3    0.6096E+00  0.2522E-18  0.1227E-17  0.0000E+00  0.8772E-26  0.1902E-26

   4    0.7035E+00  0.1199E-17  0.2058E-16  0.0000E+00  0.1089E-27  0.5521E-26

   5    0.6497E+00  0.1267E-17  0.1988E-17  0.0000E+00  0.1631E-25  0.3623E-26
  6    0.4657E+00  0.3045E-17  0.1208E-17  0.0000E+00  0.2761E-26  0.1561E-25
  7    0.2217E+00  0.3046E-29  0.1208E-29  0.0000E+00  0.4736E-34  0.8270E-34

COMBINED VALUES OF COUPLED MEMBER FORCES

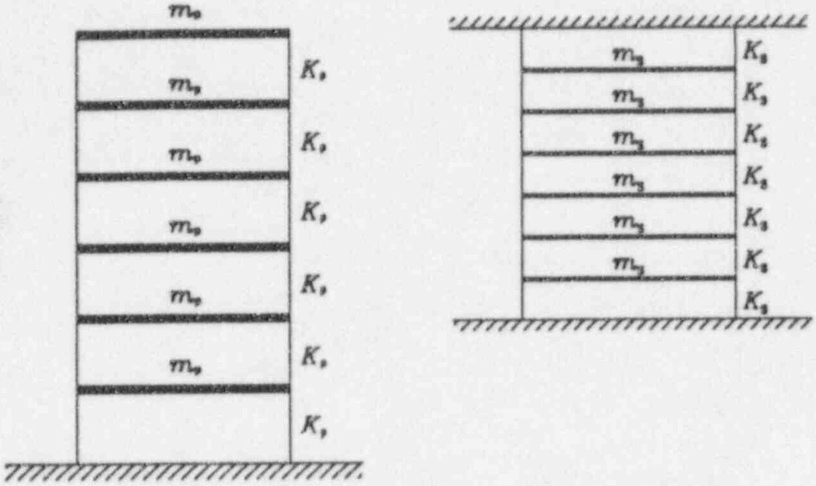
NODE      FX          FY          FZ          MX          MY          MZ

  1    0.1540E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  2    0.1540E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  2    0.1129E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  3    0.1129E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  3    0.4798E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  4    0.4798E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  4    0.3361E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  5    0.3361E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  5    0.1001E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  6    0.1001E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  6    0.1461E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  7    0.1461E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

COMBINED VALUES OF COUPLED SUPPORT REACTIONS

TYPE    NODE      SUPPORT REACTION

FX       1         0.1540E+03
FX       7         0.1461E+03
```



Primary System

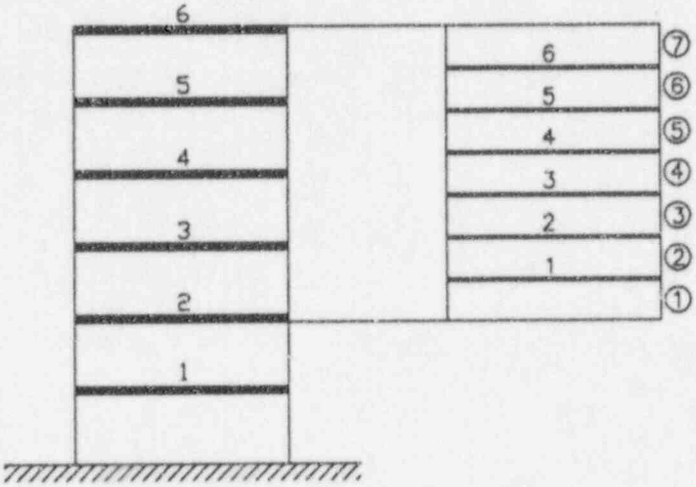
$m_p = 0.5$ Kip–s^2/in

$K_p = 33000$ Kips/in

Secondary System

$m_s = 0.1$ Kip–s^2/in

$K_s = 4000$ Kips/in


6
5
4
3
2
1
6
5
4
3
2
1
⑦
⑥
⑤
④
③
②
①

Coupled System

Figure 3: Primary, Secondary and Coupled Systems, Case 3

Table 7: Frequencies and Damping Ratios - Case 3

6-DOF Primary System			6-DOF Secondary System		
Mode No.	Freq. (Hz.)	Damping Ratio	Mode No.	Freq. (Hz.)	Damping Ratio
1	9.85694	0.07	1	14.16606	0.02
2	28.99800	0.07	2	27.62134	0.02
3	46.45145	0.07	3	39.69324	0.02
4	61.20940	0.07	4	49.77253	0.02
5	72.40913	0.07	5	57.35785	0.02
6	79.39922	0.07	6	62.06565	0.02

Table 8: Comparison of Nodal Displacements (inches) for Secondary System - Case 3

Node no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	0.07188	0.07182	0.07186
2	0.0944	0.0944	0.09435
3	0.1097	0.1097	0.1097
4	0.1168	0.1167	0.1167
5	0.1152	0.1151	0.1152
6	0.1053	0.1052	0.1053

Table 9: Comparison of Spring Forces (kips) for Secondary System Case - 3

Element no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	112.9	112.9	112.9
2	90.40	90.46	90.39
3	61.62	61.58	61.63
4	28.92	28.86	28.92
5	8.58	8.51	8.58
6	40.50	40.67	40.50
7	71.17	71.26	71.17

```
IDEN JB=1111 IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL SU=1 CV=2 TI=/CASE-3, 6-DOF PROBLEM/
FREQ FR=65 LO=1 MX=6 TI=/INCLUDING ALL MODES /
RCAS CA=1 EV=1 TY=1 SU=3 LO=1 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 SU=1 FX=1 FY=1 FZ=1
SPEC EV=1 ME=1 FP=0 SH=0
     LV=1 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=2 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=3 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=4 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=5 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=6 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=7 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=8 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
MATL CD=3 EC=28.0 SC=75 SH=75 KL=1
ANCH PT=1 LV=1
SPRS PT=2 DX=1.0 AZ=4000.0
LUMP PT=2 MA=38.64
MULR PT=2 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=2
SPRS PT=3 DX=1.0 AZ=4000.0
LUMP PT=3 MA=38.64
MULR PT=3 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=3
SPRS PT=4 DX=1.0 AZ=4000.0
LUMP PT=4 MA=38.64
MULR PT=4 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=4
SPRS PT=5 DX=1.0 AZ=4000.0
LUMP PT=5 MA=38.64
MULR PT=5 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=5
SPRS PT=6 DX=1.0 AZ=4000.0
LUMP PT=6 MA=38.64
MULR PT=6 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=6
SPRS PT=7 DX=1.0 AZ=4000.0
LUMP PT=7 MA=38.64
MULR PT=7 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=7
SPRS PT=8 DX=1.0 AZ=4000.0
ANCH PT=8 LV=8
ENDP
```

cc3.dat

```
CREST/ PIPESTRESS RUN FOR CASE-3, WITH ALL THE S.S. MODES
    6     2     2  6  6   1     0  11  1    1     0     0     1
  900    11   10     1.0E-6       20.5       386.4 0.10
      0.07        0.07        0.07        0.07        0.07        0.07
      0.02        0.02        0.02        0.02        0.02        0.02
    2     6
    1    22
100000000. 0.0
0.0      100000000.
1 8
9.85694300 28.9980000 46.4514500 61.2094000 72.4091330 79.3992200
0.36456 -0.77874  0.52020  -0.18773 -0.73349 -0.64560
 0.77874 0.73349 0.64560 -0.52020 0.36456 -0.18773
   0.1615E+01 -0.5171E+00  0.2841E+00  0.1737E+00  0.1029E+00  0.4834E-01
   10  0.020151
 8.4050.712511.6820.682818.4690.517425.8030.443029.4140.390330.4910.4236
46.6630.348861.2760.348272.5310.348679.7720.3498
   10  0.021093
 8.4050.710011.6820.680818.4690.512125.8030.439929.4140.388830.4910.4216
46.6630.348861.2760.348372.5310.348779.7720.3498
   10  0.029183
 8.4050.680111.6820.656518.4690.464425.8030.409029.4140.374930.4910.4024
46.6630.348561.2760.348572.5310.349079.7720.3498
   10  0.037682
 8.4050.649511.6820.629618.4690.431225.8030.384429.4140.364330.4910.3875
46.6630.348561.2760.348572.5310.349179.7720.3498
   10  0.047921
 8.4050.626511.6820.598718.4690.415225.8030.363829.4140.358130.4910.3749
46.6630.348661.2760.348672.5310.349279.7720.3497
   10  0.058319
 8.4050.603711.6820.570318.4690.406325.8030.360629.4140.354530.4910.3660
46.6630.348761.2760.348772.5310.349279.7720.3496
   10  0.069036
 8.4050.580211.6820.544418.4690.402125.8030.357629.4140.353230.4910.3594
46.6630.348861.2760.348772.5310.349279.7720.3495
   10  0.069702
 8.4050.578811.6820.543018.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.7720.3495
   10  0.069721
 8.4050.578811.6820.542918.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.7720.3495
   10  0.069726
 8.4050.578711.6820.542918.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.7720.3495
   10  0.070000
 8.4050.578211.6820.542318.4690.402225.8030.357429.4140.353130.4910.3589
46.6630.348861.2760.348772.5310.349279.7720.3495
```

```
CREST/ PIPESTRESS RUN FOR CASE-3, WITH ALL THE S.S. MODES

  NUMBER OF PRIMARY DOF              NP=    6

  NUMBER OF CONNECTING DOF           NC=    2

  NUMBER OF PIPING ANCHORS           NA=    2

  NUMBER OF PRIMARY MODES           NPM=    6

  NUMBER OF SECONDARY MODES         NSM=    6

  NORMALIZATION INDEX FOR P.S.    NORMP=    1

  NORMALIZATION INDEX FOR S.S.    NORMS=    0

  OUTPUT TYPE INDICATOR          IPRINT=    1

  OUTPUT TYPE INDICATOR         IPRINTS=    1

  PRIMARY RESIDUAL MODE KEY       KRESP=    0

  SECONDARY RESIDUAL MODE KEY     KRESS=    0

  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX       NONZP=   11

  GLOBAL EARTHQUAKE DIRECTION  X=1  Y=2(VERTICAL)  Z=3       KFLG=    1

  NUMBER OF ITERATIONS            NITER=  900

  NUMBER OF SPECTRA CURVES       NCURVE=   11

  NUMBER OF SPECTRUM POINTS        NKLP=   10

  ITERATION TOLERANCE               TOL=  0.1000E-05

  RIGID FREQUENCY                    FR=  20.500

  SPECTRUM FACTOR                  SPTR= 386.400

  CORRELATION TOLERANCE              ET=   0.100


  TOTAL STORAGE REQUIRED   =      42373
  ACTUAL PROVIDED STORAGE  = 550000000

  PRIMARY DAMPING RATIOS

  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01

  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01

  CONNECTING DOF # OF PRIMARY SYSTEM

    2    6

  CONNECTING DOF # OF PIPING SUPPORT:

    1   22

  STIFFNESS OF CONNECTING DOF OF S.S.

  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09

  NODE # OF PIPING ANCHORS

    1    8

  MASS OF EACH SECONDARY DOF

  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00

  ADDRESS OF DIAGONAL ELEMENTS IN S.S. STIFFNESS MATRIX (JDG MATRIX)

    1    3    6   10   15   21   28   36   45   55   66   78   85   93  102  112
  123  135  142  150  159  169  180  192  199  207  216  226  237  249  256  264
  273  283  294  306  313  321  330  340  351  363  370  378  387  397  408  420

  LOWER TRIANGULAR STIFFNESS MATRIX OF SECONDARY SYSTEM

  0.1000E+09  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.4000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.8000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
```

```
 -0.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.4000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.8000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
 -0.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.4000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.8000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
 -0.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.4000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1500E+09  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1050E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10

  SECONDARY FREQUENCIES (HZ)

  14.1659802  27.6216628  39.6923463  49.7727571  57.3573824  62.0658535

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        2

  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8571E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.7143E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5714E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4286E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2857E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1429E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5714E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        6

  0.5714E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1429E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2857E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4286E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5714E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.7143E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8571E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  UNNORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.1780E-04  0.3208E-04  0.4000E-04 -0.4000E-04 -0.3208E-04 -0.1780E-04
  0.5576E-68 -0.2230E-74  0.1330E-84 -0.1244E-92  0.1121E-45 -0.[illegible]446E-28
  0.2590E-60 -0.1039E-74  0.6190E-85 -0.5793E-93 -0.8770E-46  0.4[illegible]50E-28
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.3129E-65  0.1247E-75 -0.7440E-86  0.6954E-94  0.1053E-[illegible] -0.486[illegible]E-29
  0.6694E-69 -0.2477E-75  0.1597E-85 -0.1493E-93  0.1346E-4[illegible] -0.613[illegible]E-29
  0.4451E+00  0.8020E+00  0.1000E+01 -0.1000E+01 -0.8019E+00  0.4[illegible]E+00
  0.5575E-56 -0.2230E-62  0.1330E-72 -0.1243E-80  0.1121E-33 [illegible]4446E-16
  0.2598E-56 -0.1039E-62  0.6197E-73 -0.5793E-81 -0.9769E-34  0.4050E-16
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.6723E-64  0.2689E-70  0.4524E-77  0.2652E-85  0.6433E-36 -0.1048E-23
  0.3324E-60 -0.5772E-70  0.3443E-80  0.1060E-84 -0.6428E-38 -0.8917E-24
  0.8019E+00  0.1000E+01  0.4450E+00  0.4451E+00  0.1000E+01  0.8019E+00
  0.7984E-57 -0.3193E-63  0.1905E-73 -0.1781E-81 -0.1426E-33 -0.2470E-16
  0.3883E-56 -0.1553E-62  0.9266E-73 -0.8662E-81 -0.1372E-33 -0.4735E-16
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3323E-60 -0.3012E-44 -0.3683E-86 -0.5301E-85 -0.2572E-37 -0.6511E-20
 -0.5735E-69  0.2294E-75 -0.2263E-77  0.1988E-85 -0.3058E-46 -0.2170E-20
  0.1000E+01  0.4450E+00 -0.8019E+00  0.8019E+00 -0.4450E+00 -0.1000E+01
  0.3797E-56 -0.1518E-62  0.9058E-73 -0.8467E-81  0.9077E-34  0.5626E-16
 -0.6513E-57  0.2605E-63 -0.1554E-73  0.1453E-81 -0.1116E-33  0.3359E-16
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.4153E-61 -0.2170E-75  0.1299E-85  0.1325E-85 -0.6431E-38  0.2170E-20
  0.3599E-69 -0.1439E-75  0.4525E-77 -0.8027E-94 -0.6431E-38 -0.4341E-20
 0.1000E+01 -0.4450E+00 -0.8019E+00 -0.8019E+00 -0.4450E+00  0.1000E+01
-0.4012E-56  0.1605E-62 -0.9571E-73  0.8948E-81 -0.7086E-34  0.1812E-16
 0.6292E-56 -0.2517E-62  0.1501E-72 -0.1003E-80  0.4127E-34 -0.4341E-16
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.6645E-60  0.3334E-75 -0.9050E-77  0.1060E-84 -0.1660E-36 -0.2170E-20
-0.9374E-69 -0.1506E-66  0.9050E-77  0.2091E-93  0.6431E-38 -0.4579E-29
 0.8019E+00 -0.1000E+01  0.4450E+00 -0.4451E+00  0.1000E+01 -0.8019E+00
-0.9638E-56  0.3856E-62 -0.2299E-72  0.2150E-80 -0.1525E-34  0.7441E-16
-0.3823E-56  0.1529E-62 -0.9121E-73  0.8526E-81  0.2082E-34 -0.4053E-16
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1661E-60 -0.4957E-75  0.9050E-77  0.1060E-84  0.2455E-47 -0.3472E-30
 0.1329E-59 -0.1506E-66  0.9050E-77  0.1060E-84  0.6205E-47 -0.4341E-20
 0.4451E+00 -0.8020E+00  0.1000E+01  0.1000E+01 -0.8019E+00  0.4450E+00
 0.1307E-56 -0.5227E-63  0.3117E-73 -0.2915E-81 -0.1008E-33 -0.6248E-16
-0.3260E-57  0.1304E-63 -0.7779E-74  0.7273E-82 -0.9646E-35 -0.9353E-17
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.2077E-61  0.1679E-75 -0.1002E-85  0.6637E-86  0.3658E-47  0.5426E-21
 0.1314E-68 -0.3765E-67 -0.2263E-77  0.1325E-85 -0.5796E-47  0.4341E-20
 0.1780E-04 -0.3208E-04  0.4000E-04  0.4000E-04 -0.3208E-04  0.1780E-04
 0.1307E-68 -0.5227E-75  0.3118E-85 -0.2914E-93 -0.1008E-45 -0.6250E-28
-0.3261E-69  0.1304E-75 -0.7779E-86  0.7272E-94 -0.9645E-47 -0.9353E-29
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.8984E-74 -0.8962E-80  0.1383E-89  0.1535E-97  0.1322E-51  0.2091E-33
-0.5812E-73  0.9383E-79  0.1928E-89 -0.1109E-97  0.1674E-49 -0.6999E-32


NORMALIZED MODE SHAPE OF SECONDARY SYSTEM

 0.2934E-04  0.5286E-04  0.6591E-04 -0.6591E-04 -0.5286E-04 -0.2933E-04
 0.9189E-68 -0.3675E-74  0.2192E-84 -0.2049E-92  0.1847E-45 -0.5678E-28
 0.4281E-68 -0.1712E-74  0.1021E-84 -0.9547E-93 -0.1445E-45  0.6674E-28
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.5139E-69  0.2055E-75 -0.1226E-85  0.1146E-93  0.1735E-46 -0.8011E-29
 0.1103E-68 -0.4411E-75  0.2632E-85 -0.2460E-93  0.2210E-46 -0.6817E-29
 0.7334E+00  0.1322E+01  0.1648E+01 -0.1648E+01 -0.1322E+01 -0.7334E+00
 0.9187E-56 -0.3675E-62  0.2192E-72 -0.2049E-80  0.1847E-33 -0.5678E-16
 0.4281E-56 -0.1712E-62  0.1021E-72 -0.9547E-81 -0.1445E-33  0.6674E-16
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.1108E-63  0.4431E-70  0.7455E-77  0.4371E-85  0.1060E-37 -0.1727E-23
 0.5478E-60 -0.9512E-70  0.5674E-80  0.1747E-84 -0.1059E-37 -0.1470E-23
 0.1322E+01  0.1648E+01  0.7334E+00  0.7334E+00  0.1648E+01  0.1322E+01
 0.3316E-56 -0.5261E-63  0.3139E-73 -0.2935E-81 -0.2351E-33 -0.4070E-16
 0.6398E-56 -0.2559E-62  0.1537E-72 -0.1427E-80 -0.2260E-33 -0.7803E-16
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.5475E-60 -0.4963E-66 -0.6070E-86 -0.8736E-85 -0.4239E-37 -0.1073E-19
-0.9451E-69  0.3780E-75 -0.3729E-77  0.3276E-85 -0.5040E-46 -0.3577E-20
 0.1648E+01  0.7334E+00 -0.1322E+01  0.1322E+01 -0.7334E+00 -0.1648E+01
 0.6257E-56 -0.2502E-62  0.1493E-72 -0.1395E-80  0.1644E-33  0.9272E-16
-0.1073E-56  0.4293E-63 -0.2561E-73  0.2394E-81 -0.1839E-33  0.5536E-16
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.6044E-61 -0.3508E-75  0.2141E-85  0.2184E-85 -0.1060E-37  0.3577E-20
 0.5931E-69 -0.2372E-75  0.7457E-77 -0.1323E-93 -0.1060E-37 -0.7153E-20
 0.1648E+01 -0.7334E+00 -0.1322E+01 -0.1322E+01 -0.7334E+00  0.1648E+01
-0.6612E-56  0.2644E-62 -0.1577E-72  0.1475E-80 -0.1168E-33  0.2985E-16
 0.1037E-55 -0.4148E-62  0.2474E-72 -0.2313E-80  0.6802E-34 -0.7254E-16
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1095E-59 -0.5495E-75 -0.1491E-76  0.1747E-84 -0.2649E-38 -0.3577E-20
-0.1545E-68 -0.2452E-66  0.1491E-76  0.3445E-93  0.1060E-37 -0.7546E-29
 0.1322E+01 -0.1648E+01  0.7334E+00 -0.7334E+00  0.1648E+01 -0.1322E+01
-0.1588E-55  0.6354E-62 -0.3789E-72  0.3543E-80 -0.3162E-34  0.1226E-15
-0.6300E-56  0.2520E-62 -0.1503E-72  0.1405E-80  0.3431E-34 -0.6679E-16
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.2738E-60 -0.8005E-75  0.1491E-76  0.1747E-84  0.4045E-47 -0.5722E-30
 0.2190E-59 -0.2482E-66  0.1491E-76  0.1747E-84  0.1023E-46 -0.7153E-20
 0.7334E+00 -0.1322E+01  0.1648E+01  0.1648E+01 -0.1322E+01  0.7334E+00
 0.2154E-56 -0.8614E-63  0.5137E-73 -0.4803E-81 -0.1661E-33 -0.1030E-15
-0.5372E-57  0.2149E-63 -0.1282E-73  0.1199E-81 -0.1590E-34 -0.1541E-16
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.3422E-61  0.2767E-75 -0.1651E-85  0.1092E-85  0.6027E-47  0.8942E-21
 0.2166E-68 -0.6204E-67 -0.3729E-77  0.2184E-85 -0.1614E-46  0.7153E-20
 0.2934E-04 -0.5286E-04  0.6591E-04  0.6591E-04 -0.5286E-04  0.2933E-04
 0.2154E-68 -0.8614E-75  0.5139E-85 -0.4803E-93 -0.1661E-45 -0.1030E-27
-0.5373E-69  0.2149E-75 -0.1282E-85  0.1198E-93 -0.1589E-46 -0.1541E-28
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.1401E-73 -0.1467E-79  0.2260E-89  0.2529E-97  0.2178E-51  0.3445E-33
-0.9577E-73  0.1546E-78  0.3178E-89 -0.1828E-97  0.2750E-49 -0.1153E-31


PRIMARY FREQUENCIES (HZ)

  9.8569430  28.9980000  46.4514500  61.2094000  72.4091330  79.3992200


MODE SHAPE OF P.S. AT CONNECTING DOF        2

 0.3646E+00 -0.7787E+00  0.5202E+00 -0.1677E+05 -0.7335E+00 -0.6456E+00


MODE SHAPE OF P.S. AT CONNECTING DOF        6

 0.7787E+00  0.7335E+00  0.6456E+00 -0.5202E+00  0.3646E+00 -0.1877E+00


BASE INFLUENCE VECTOR FOR S.S.---UBS

 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


PARTICIPATION FACTOR FOR P.S.---GAMAP

 0.1615E+01 -0.5171E+00  0.2841E+00  0.1737E+00  0.1029E+00  0.4834E-01


INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10
```

```
DAMPING RATIO FOR THIS CURVE =    0.20151E-01

      INPUT       FREQUENCY    INPUT SPECTRAL
      POINT         (HZ)       ACCELERATION
         1     0.8405E+01      0.7125E+00
         2     0.1168E+02      0.6829E+00
         3     0.1847E+02      0.5174E+00
         4     0.2580E+02      0.4430E+00
         5     0.2941E+02      0.3903E+00
         6     0.3049E+02      0.4236E+00
         7     0.4666E+02      0.3488E+00
         8     0.6128E+02      0.3482E+00
         9     0.7253E+02      0.3486E+00
        10     0.7977E+02      0.3498E+00

INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.21093E-01

      INPUT       FREQUENCY    INPUT SPECTRAL
      POINT         (HZ)       ACCELERATION
         1     0.8405E+01      0.7100E+00
         2     0.1168E+02      0.6908E+00
         3     0.1847E+02      0.5121E+00
         4     0.2580E+02      0.4399E+00
         5     0.2941E+02      0.3888E+00
         6     0.3049E+02      0.4215E+00
         7     0.4666E+02      0.3488E+00
         8     0.6128E+02      0.3483E+00
         9     0.7253E+02      0.3487E+00
        10     0.7977E+02      0.3498E+00

INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.29183E-01

      INPUT       FREQUENCY    INPUT SPECTRAL
      POINT         (HZ)       ACCELERATION
         1     0.8405E+01      0.6801E+00
         2     0.1168E+02      0.6565E+00
         3     0.1847E+02      0.4644E+00
         4     0.2580E+02      0.4090E+00
         5     0.2941E+02      0.3740E+00
         6     0.3049E+02      0.4024E+00
         7     0.4666E+02      0.3485E+00
         8     0.6128E+02      0.3485E+00
         9     0.7253E+02      0.3490E+00
        10     0.7977E+02      0.3498E+00

INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.37682E-01

      INPUT       FREQUENCY    INPUT SPECTRAL
      POINT         (HZ)       ACCELERATION
         1     0.8405E+01      0.6495E+00
         2     0.1168E+02      0.6296E+00
         3     0.1847E+02      0.4312E+00
         4     0.2580E+02      0.3844E+00
         5     0.2941E+02      0.3643E+00
         6     0.3049E+02      0.3875E+00
         7     0.4666E+02      0.3485E+00
         8     0.6128E+02      0.3485E+00
         9     0.7253E+02      0.3491E+00
        10     0.7977E+02      0.3498E+00

INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.47921E-01

      INPUT       FREQUENCY    INPUT SPECTRAL
      POINT         (HZ)       ACCELERATION
         1     0.8405E+01      0.6265E+00
         2     0.1168E+02      0.5987E+00
         3     0.1847E+02      0.4152E+00
         4     0.2580E+02      0.3638E+00
         5     0.2941E+02      0.3561E+00
         6     0.3049E+02      0.3749E+00
         7     0.4666E+02      0.3486E+00
         8     0.6128E+02      0.3486E+00
         9     0.7253E+02      0.3492E+00
        10     0.7977E+02      0.3497E+00

INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.58319E-01

      INPUT       FREQUENCY    INPUT SPECTRAL
      POINT         (HZ)       ACCELERATION
         1     0.8405E+01      0.6037E+00
         2     0.1168E+02      0.5703E+00
         3     0.1847E+02      0.4063E+00
         4     0.2580E+02      0.3604E+00
         5     0.2941E+02      0.3545E+00
         6     0.3049E+02      0.3660E+00
         7     0.4656E+02      0.3487E+00
         8     0.6128E+02      0.3687E+00
         9     0.7253E+02      0.3492E+00
        10     0.7977E+02      0.3496E+00
```

```
INPUT SPECTRUM CURVE NUMBER =  7

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69036E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01     0.5802E+00
         2     0.1168E+02     0.5444E+00
         3     0.1847E+02     0.4021E+00
         4     0.2580E+02     0.3576E+00
         5     0.2941E+02     0.3532E+00
         6     0.3049E+02     0.3594E+00
         7     0.4666E+02     0.3488E+00
         8     0.6128E+02     0.3487E+00
         9     0.7253E+02     0.3492E+00
        10     0.7977E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER =  8

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69702E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01     0.5788E+00
         2     0.1168E+02     0.5430E+00
         3     0.1847E+02     0.4022E+00
         4     0.2580E+02     0.3574E+00
         5     0.2941E+02     0.3532E+00
         6     0.3049E+02     0.3590L+00
         7     0.4666E+02     0.3488E+00
         8     0.6128E+02     0.3487E+00
         9     0.7253E+02     0.3492E+00
        10     0.7977E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER =  9

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69721E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01     0.5784E+00
         2     0.1168E+02     0.5429E+00
         3     0.1847E+02     0.4022E+00
         4     0.2580E+02     0.3574E+00
         5     0.2941E+02     0.3532E+00
         6     0.3049E+02     0.3590E+00
         7     0.4666E+02     0.3488E+00
         8     0.6128E+02     0.3487E+00
         9     0.7253E+02     0.3492E+00
        10     0.7977E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER = 10

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69726E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01     0.5787E+00
         2     0.1168E+02     0.5429E+00
         3     0.1847E+02     0.4022E+00
         4     0.2580E+02     0.3574E+00
         5     0.2941E+02     0.3532E+00
         6     0.3049E+02     0.3590E+00
         7     0.4666E+02     0.3488E+00
         8     0.6128E+02     0.3487E+00
         9     0.7253E+02     0.3492E+00
        10     0.7977E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER = 11

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.70000E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01     0.5782E+00
         2     0.1168E+02     0.5423E+00
         3     0.1847E+02     0.4022E+00
         4     0.2580E+02     0.3574E+00
         5     0.2941E+02     0.3531E+00
         6     0.3049E+02     0.3589E+00
         7     0.4666E+02     0.3488E+00
         8     0.6128E+02     0.3487E+00
         9     0.7253E+02     0.3492E+00
        10     0.7977E+02     0.3495E+00



    *******************************************************************
    *                                                                 *
    *                                                                 *
    *                                                                 *
    *                    A COMPUTER PROGRAM FOR                       *
    *                                                                 *
    *                                                                 *
    *    COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS      *
    *                                                                 *
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    *                          * C R E S T *                          *
    *                                                                 *
    *                          DEVELOPED BY                           *
    *                                                                 *
    *                        AJAYA KUMAR GUPTA                        *
    *                 JING-WEN JAN    ABHINAV GUPTA                   *
    *                                                                 *
    *                NORTH CAROLINA STATE UNIVERSITY                  *
    *                   RALEIGH, NORTH CAROLINA                       *
    *                                                                 *
    *                          REVISION-1.0                           *
    *                                                                 *
    *                                                                 *
    *******************************************************************


PARTICIPATION FACTOR FOR S.S.---GAMAS
0.7406E+00  0.1057E-06  0.2120E+00  0.3451E-09 -0.3140E-01  0.4834E-11

MASS RATIOS

  PRIMARY SYSTEM MODE    1
0.1792E+00  0.5283E-02  0.1468E-01  0.7792E-03  0.2165E-02  0.6363E-04

  PRIMARY SYSTEM MODE    2
0.2807E-03  0.7043E-01  0.2300E-04  0.1039E-01  0.3392E-05  0.8508E-03

  PRIMARY SYSTEM MODE    3
0.1863E+00  0.4843E-03  0.1526E-01  0.7143E-04  0.2251E-02  0.5851E-05

  PRIMARY SYSTEM MODE    4
0.6872E-01  0.3404E-02  0.5629E-02  0.5021E-01  0.8301E-03  0.4113E-04

  PRIMARY SYSTEM MODE    5
0.1966E-01  0.3717E-01  0.1529E-02  0.5477E-02  0.2254E-03  0.4486E-03

  PRIMARY SYSTEM MODE    6
0.9522E-01  0.6457E-02  0.7799E-02  0.9523E-03  0.1150E-02  0.7800E-04

C O U P L E D   F R E Q U E N C I E S   A N D   M O D E   S H A P E S   E X T R A C T I O N

NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION   NITER =  900

CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                        TOL = 0.10000E-05


COUPLED  FREQUENCY   DAMPING RATIO
 MODE       (HZ)         (%)

  1     0.87186E+01    0.54654E+01
  2     0.16401E+02    0.36729E+01
  3     0.25258E+02    0.33925E+01
  4     0.32348E+02    0.51692E+01
  5     0.39227E+02    0.24132E+01
  6     0.47528E+02    0.65853E+01
  7     0.50053E+02    0.21505E+01
  8     0.57451E+02    0.22314E+01
  9     0.61634E+02    0.68607E+01
 10     0.62068E+02    0.20412E+01
 11     0.73029E+02    0.69143E+01
 12     0.79752E+02    0.69228E+01

UNIT DISPLACEMENT & UNIT VELOCITY*W RESPONSE


COUPLED MODE NO.    1


  1     0.55023E+00    0.10774E-01
  2     0.11250E+01    0.22576E-01
  3     0.11086E-04   -0.12898E-05
  4    -0.12704E-31    0.10836E-32
  5     0.14931E-31   -0.12735E-32
  6     0.00000E+00    0.00000E+00
  7    -0.17924E-32    0.15288E-33
  8    -0.15251E-33    0.13008E-33
  9     0.27717E+00   -0.32247E-01
 10    -0.12704E-19    0.10836E-20
 11     0.14932E-19   -0.12736E-20
 12     0.00000E+00    0.00000E+00
 13    -0.38648E-27    0.32965E-28
 14    -0.32878E-27    0.28043E-28
 15     0.48609E+00   -0.56968E-01
 16    -0.91055E-20    0.77665E-21
 17    -0.17459E-19    0.14892E-20
 18     0.00000E+00    0.00000E+00
 19    -0.24007E-23    0.20477E-24
 20    -0.80023E-24    0.68255E-25
 21     0.60503E+00   -0.70958E-01
 22     0.20745E-19   -0.17694E-20
 23     0.12386E-19   -0.10564E-20
 24     0.00000E+00    0.00000E+00
 25     0.80023E-24   -0.68255E-25
 26    -0.16005E-23    0.13651E-24
 27     0.61892E+00   -0.72171E-01
 28     0.66792E-20   -0.56970E-21
 29    -0.16007E-19    0.13653E-20
 30     0.00000E+00    0.00000E+00
 31    -0.80023E-24    0.68255E-25
 32    -0.16882E-32    0.14400E-33
 33     0.52057E+00   -0.59968E-01
 34     0.27437E-19   -0.23402E-20
 35    -0.14947E-19    0.12745E-20
 36     0.00000E+00    0.00000E+00
 37     0.12802E-33    0.10919E-34
 38    -0.16005E-23    0.13651E-24
 39     0.31112E+00   -0.35109E-01
 40    -0.23038E-19    0.19650E-20
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  41   -0.34494E-20    0.29413E-21
  42    0.00000E+00    0.00000E+00
  43    0.20006E-24   -0.17064E-25
  44    0.16005E-23   -0.13651E-24
  45    0.12444E-04   -0.14075E-05
  46   -0.23043E-31    0.19654E-32
  47   -0.34485E-32    0.29414E-33
  48    0.00000E+00    0.00000E+00
  49    0.77086E-37   -0.65750E-38
  50   -0.25804E-35    0.22010E-36

COUPLED MODE NO.    2


   1    0.52195E-02   -0.26427E-02
   2    0.17271E-01   -0.87870E-02
   3   -0.15624E-05    0.73563E-06
   4   -0.95710E-33    0.56991E-33
   5    0.11249E-32   -0.66981E-33
   6    0.00000E+00    0.00000E+00
   7   -0.13503E-33    0.80405E-34
   8   -0.11490E-33    0.68416E-34
   9   -0.39060E-01    0.18392E-01
  10   -0.95712E-21    0.56992E-21
  11    0.11250E-20   -0.66986E-21
  12    0.00000E+00    0.00000E+00
  13   -0.29117E-28    0.17339E-28
  14   -0.24770E-28    0.14749E-28
  15   -0.70550E-01    0.33220E-01
  16   -0.68599E-21    0.40847E-21
  17   -0.13153E-20    0.78321E-21
  18    0.00000E+00    0.00000E+00
  19   -0.18086E-24    0.10769E-24
  20   -0.60287E-25    0.35898E-25
  21   -0.87368E-01    0.41057E-01
  22    0.15629E-20   -0.93061E-21
  23    0.93310E-21   -0.55562E-21
  24    0.00000E+00    0.00000E+00
  25    0.60287E-25   -0.35898E-25
  26   -0.12057E-24    0.71797E-25
  27   -0.85942E-01    0.40188E-01
  28    0.50319E-21   -0.29963E-21
  29   -0.12059E-20    0.71808E-21
  30    0.00000E+00    0.00000E+00
  31   -0.60287E-25    0.35898E-25
  32   -0.12719E-33    0.75734E-34
  33   -0.67088E-01    0.31123E-01
  34    0.20670E-20   -0.12308E-20
  35   -0.11257E-20    0.67033E-21
  36    0.00000E+00    0.00000E+00
  37   -0.96446E-35    0.57429E-35
  38   -0.12057E-24    0.71797E-25
  39   -0.35796E-01    0.16413E-01
  40   -0.17356E-20    0.10335E-20
  41   -0.25979E-21    0.15469E-21
  42    0.00000E+00    0.00000E+00
  43    0.15072E-25   -0.89746E-26
  44    0.12057E-24   -0.71797E-25
  45   -0.14310E-05    0.65688E-06
  46   -0.17360E-32    0.10337E-32
  47   -0.25980E-33    0.15470E-33
  48    0.00000E+00    0.00000E+00
  49    0.58075E-38   -0.34581E-38
  50   -0.19440E-36    0.11576E-36

COUPLED MODE NO.    3


   1    0.21980E+00    0.33267E-01
   2   -0.15446E+00   -0.32104E-01
   3    0.15614E-04   -0.64317E-06
   4    0.82708E-31    0.90993E-32
   5   -0.97207E-31   -0.10694E-31
   6    0.00000E+00    0.00000E+00
   7    0.11669E-31    0.12838E-32
   8    0.99289E-32    0.10924E-32
   9    0.39035E+00   -0.16080E-01
  10    0.82710E-19    0.90996E-20
  11   -0.97214E-19   -0.10695E-19
  12    0.00000E+00    0.00000E+00
  13    0.25161E-26    0.27682E-27
  14    0.21405E-26    0.23549E-27
  15    0.43667E+00   -0.22905E-01
  16    0.59280E-19    0.65218E-20
  17    0.11366E-18    0.12505E-19
  18    0.00000E+00    0.00000E+00
  19    0.15629E-22    0.17195E-23
  20    0.52098E-23    0.57316E-24
  21    0.14585E+00   -0.11039E-01
  22   -0.13506E-18   -0.14858E-19
  23   -0.80634E-19   -0.88712E-20
  24    0.00000E+00    0.00000E+00
  25   -0.52098E-23   -0.57316E-24
  26    0.10420E-22    0.11463E-23
  27   -0.26981E+00    0.97465E-02
  28   -0.43483E-19   -0.47839E-20
  29    0.10421E-18    0.11465E-19
  30    0.00000E+00    0.00000E+00
  31    0.52098E-23    0.57316E-24
  32    0.10991E-31    0.12092E-32
  33   -0.52246E+00    0.21124E-01
  34   -0.17862E-18   -0.19651E-19
  35    0.97262E-19    0.10703E-19
  36    0.00000E+00    0.00000E+00
  37    0.83344E-33    0.91693E-34
  38    0.10420E-22    0.11463E-23
  39   -0.42384E+00    0.14369E-01
  40    0.14999E-18    0.16501E-19
  41    0.22450E-19    0.24699E-20
  42    0.00000E+00    0.00000E+00
  43   -0.13024E-23   -0.14329E-24
  44   -0.10420E-22   -0.11463E-23
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  45    0.16953E-04    0.57472E-06
  46    0.15002E-30    0.16504E-31
  47    0.22451E-31    0.24703E-32
  48    0.00000E+00    0.00000E+00
  49   -0.50166E-36   -0.55213E-37
  50    0.16799E-34    0.18482E-35

COUPLED MODE NO.    4


   1    0.20458E+00   -0.36500E-01
   2   -0.31123E+00    0.34361E-01
   3   -0.12676E-04   -0.12608E-06
   4    0.16638E-30   -0.47799E-31
   5   -0.19554E-30    0.56178E-31
   6    0.00000E+00    0.00000E+00
   7    0.23474E-31   -0.67437E-32
   8    0.19973E-31   -0.57381E-32
   9   -0.31691E+00   -0.31522E-02
  10    0.16638E-18   -0.47800E-19
  11   -0.19556E-18    0.56182E-19
  12    0.00000E+00    0.00000E+00
  13    0.50615E-26   -0.14541E-26
  14    0.43059E-26   -0.12370E-26
  15   -0.45373E+00    0.15813E-01
  16    0.11925E-18   -0.34257E-19
  17    0.22865E-18   -0.65688E-19
  18    0.00000E+00    0.00000E+00
  19    0.31440E-22   -0.90325E-23
  20    0.10480E-22   -0.30108E-23
  21   -0.20979E+00    0.12534E-01
  22   -0.27168E-18    0.78051E-19
  23   -0.16221E-18    0.46600E-19
  24    0.00000E+00    0.00000E+00
  25   -0.10480E-22    0.30108E-23
  26    0.20960E-22   -0.60217E-23
  27    0.22348E+00   -0.85369E-02
  28   -0.87473E-19    0.25130E-19
  29    0.20964E-18   -0.60226E-19
  30    0.00000E+00    0.00000E+00
  31    0.10480E-22   -0.30108E-23
  32    0.22110E-31   -0.63519E-32
  33    0.46007E+00   -0.13324E-01
  34   -0.35932E-18    0.10323E-18
  35    0.19570E-18   -0.56221E-19
  36    0.00000E+00    0.00000E+00
  37    0.16766E-32   -0.48166E-33
  38    0.20960E-22   -0.60217E-23
  39    0.31623E+00    0.40696E-02
  40    0.30172E-19   -0.86680E-19
  41    0.45161E-19   -0.12974E-19
  42    0.00000E+00    0.00000E+00
  43   -0.26200E-23    0.75271E-24
  44   -0.20960E-22    0.60217E-23
  45    0.13649E-04    0.16278E-06
  46    0.30178E-30   -0.86698E-31
  47    0.45163E-31   -0.12975E-31
  48    0.00000E+00    0.00000E+00
  49   -0.10096E-35    0.29003E-36
  50    0.33794E-34   -0.97088E-35

COUPLED MODE NO.    5


   1    0.30158E-02    0.34948E-02
   2    0.33215E-02    0.33162E-02
   3    0.19806E-05    0.11312E-05
   4    0.51096E-33    0.11050E-33
   5   -0.60053E-33   -0.12997E-33
   6    0.00000E+00    0.00000E+00
   7    0.72009E-34    0.15601E-34
   8    0.61340E-34    0.13275E-34
   9    0.49512E-01    0.28281E-01
  10    0.51097E-21    0.11058E-21
  11   -0.60058E-21   -0.12998E-21
  12    0.00000E+00    0.00000E+00
  13    0.15544E-28    0.33641E-29
  14    0.13224E-28    0.28618E-29
  15    0.18911E-01    0.91629E-02
  16    0.36622E-21    0.79258E-22
  17    0.70220E-21    0.15197E-21
  18    0.00000E+00    0.00000E+00
  19    0.96556E-25    0.20896E-25
  20    0.32185E-25    0.69655E-26
  21   -0.44905E-01   -0.28797E-01
  22   -0.83435E-21   -0.18057E-21
  23   -0.49815E-21   -0.10781E-21
  24    0.00000E+00    0.00000E+00
  25   -0.32185E-25   -0.69655E-26
  26    0.64370E-25    0.13931E-25
  27   -0.44374E-01   -0.28672E-01
  28   -0.26864E-21   -0.58138E-22
  29    0.64380E-21    0.13933E-21
  30    0.00000E+00    0.00000E+00
  31    0.32185E-25    0.69655E-26
  32    0.67901E-34    0.14695E-34
  33    0.19947E-01    0.93302E-02
  34   -0.11035E-20   -0.23782E-21
  35    0.60100E-21    0.13007E-21
  36    0.00000E+00    0.00000E+00
  37    0.51489E-35    0.11143E-35
  38    0.64370E-25    0.13931E-25
  39    0.49883E-01    0.28383E-01
  40    0.92660E-21    0.20053E-21
  41    0.13869E-21    0.30016E-22
  42    0.00000E+00    0.00000E+00
  43   -0.80463E-26   -0.17414E-26
  44   -0.64370E-25   -0.13931E-25
  45    0.19952E-05    0.11353E-05
  46    0.92678E-33    0.20057E-33
  47    0.13870E-33    0.30017E-34
  48    0.00000E+00    0.00000E+00
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   49    -0.31004E-38    -0.67090E-39
   50     0.10379E-36     0.22461E-37


 COUPLED MODE NO.    6


    1     0.13873E+00    -0.60490E-02
    2     0.17777E+00    -0.34712E-02
    3    -0.97466E-05    -0.52027E-06
    4    -0.59951E-31     0.10650E-31
    5     0.70460E-31    -0.12516E-31
    6     0.00000E+00     0.00000E+00
    7    -0.84581E-32     0.15025E-32
    8    -0.71969E-32     0.12785E-32
    9    -0.24368E+00    -0.13007E-01
   10    -0.59952E-19     0.10650E-19
   11     0.70465E-19    -0.12517E-19
   12     0.00000E+00     0.00000E+00
   13    -0.18238E-26     0.32398E-27
   14    -0.15515E-26     0.27561E-27
   15    -0.26143E+00    -0.83723E-03
   16    -0.42969E-19     0.76329E-20
   17    -0.82388E-19     0.14635E-19
   18     0.00000E+00     0.00000E+00
   19    -0.11329E-22     0.20124E-23
   20    -0.37763E-23     0.67081E-24
   21    -0.28749E-01     0.49521E-02
   22     0.97894E-19    -0.17390E-19
   23     0.58447E-19    -0.10383E-19
   24     0.00000E+00     0.00000E+00
   25     0.37763E-23    -0.67081E-24
   26    -0.75525E-23     0.13416E-23
   27    -0.79096E-01     0.39222E-01
   28     0.31519E-19    -0.55990E-20
   29    -0.75537E-19     0.13418E-19
   30     0.00000E+00     0.00000E+00
   31    -0.37763E-23     0.67081E-24
   32    -0.79668E-32     0.14152E-32
   33    -0.31958E+00     0.16509E-01
   34     0.12947E-18    -0.22999E-19
   35    -0.70514E-19     0.12526E-19
   36     0.00000E+00     0.00000E+00
   37    -0.60411E-33     0.10731E-33
   38    -0.75525E-23     0.13416E-23
   39    -0.22093E+00    -0.61314E-01
   40    -0.10872E-18     0.19312E-19
   41    -0.16273E-19     0.28907E-20
   42     0.00000E+00     0.00000E+00
   43     0.94407E-24    -0.16770E-24
   44     0.75525E-23    -0.13416E-23
   45    -0.88369E-05    -0.24524E-05
   46    -0.10874E-30     0.19316E-31
   47    -0.16273E-31     0.28908E-32
   48     0.00000E+00     0.00000E+00
   49     0.36377E-36    -0.64619E-37
   50    -0.12177E-34     0.21631E-35


 COUPLED MODE NO.    7


    1     0.10293E-02     0.15166E-03
    2    -0.34584E-02     0.10630E-02
    3    -0.17317E-05    -0.93309E-07
    4     0.90893E-32    -0.21362E-32
    5    -0.10683E-31     0.25107E-32
    6     0.00000E+00     0.00000E+00
    7     0.12824E-32    -0.30139E-33
    8     0.10912E-32    -0.25645E-33
    9    -0.43293E-01    -0.23328E-02
   10     0.90895E-20    -0.21363E-20
   11    -0.10683E-19     0.25109E-20
   12     0.00000E+00     0.00000E+00
   13     0.27651E-27    -0.64988E-28
   14     0.23523E-27    -0.55286E-28
   15     0.19527E-01     0.10308E-03
   16     0.65146E-20    -0.15311E-20
   17     0.12491E-19    -0.29357E-20
   18     0.00000E+00     0.00000E+00
   19     0.17176E-23    -0.40368E-24
   20     0.57253E-24    -0.13456E-24
   21     0.34672E-01     0.14152E-02
   22    -0.14842E-19     0.34883E-20
   23    -0.88614E-20     0.20827E-20
   24     0.00000E+00     0.00000E+00
   25    -0.57253E-24     0.13456E-24
   26     0.11453E-23    -0.26912E-24
   27    -0.33740E-01    -0.19675E-02
   28    -0.47787E-20     0.11231E-20
   29     0.11452E-19    -0.26916E-20
   30     0.00000E+00     0.00000E+00
   31     0.57253E-24    -0.13456E-24
   32     0.12079E-32    -0.28388E-33
   33    -0.14919E-01    -0.24960E-02
   34    -0.19630E-19     0.46135E-20
   35     0.10691E-19    -0.25126E-20
   36     0.00000E+00     0.00000E+00
   37     0.91592E-34    -0.21526E-34
   38     0.11451E-23    -0.26912E-24
   39     0.46174E-01     0.87674E-03
   40     0.16483E-19    -0.38739E-20
   41     0.24672E-20    -0.57984E-21
   42     0.00000E+00     0.00000E+00
   43    -0.14313E-24     0.33640E-25
   44    -0.11451E-23     0.26912E-24
   45     0.18469E-05     0.35068E-07
   46     0.16486E-31    -0.38747E-32
   47     0.24673E-32    -0.57987E-33
   48     0.00000E+00     0.00000E+00
   49    -0.55152E-37     0.12962E-37
   50     0.18462E-35    -0.43390E-36
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 COUPLED MODE NO.    8


    1     0.19659E-02    -0.25123E-02
    2     0.40324E-02    -0.41585E-02
    3    -0.33793E-05    -0.18626E-06
    4    -0.13620E-31     0.11512E-31
    5     0.16007E-31    -0.13530E-31
    6     0.00000E+00     0.00000E+00
    7    -0.19215E-32     0.16241E-32
    8    -0.16350E-32     0.13820E-32
    9    -0.94486E-01    -0.46567E-02
   10    -0.13620E-19     0.11512E-19
   11     0.16008E-19    -0.13531E-19
   12     0.00000E+00     0.00000E+00
   13    -0.41433E-27     0.35020E-27
   14    -0.35248E-27     0.29792E-27
   15     0.99392E-01     0.13607E-01
   16    -0.97617E-20     0.82508E-20
   17    -0.18717E-19     0.15820E-19
   18     0.00000E+00     0.00000E+00
   19    -0.25737E-23     0.21754E-23
   20    -0.85790E-24     0.72512E-24
   21    -0.48713E-01    -0.11032E-02
   22     0.22240E-19    -0.18798E-19
   23     0.13278E-19    -0.11223E-19
   24     0.00000E+00     0.00000E+00
   25     0.85790E-24    -0.72512E-24
   26    -0.17158E-23     0.14502E-23
   27    -0.47099E-01    -0.23947E-02
   28     0.71605E-20    -0.60522E-20
   29    -0.17161E-19     0.14505E-19
   30     0.00000E+00     0.00000E+00
   31    -0.85790E-24     0.72512E-24
   32    -0.18099E-32     0.15298E-32
   33     0.97998E-01     0.14744E-01
   34     0.29414E-19    -0.24861E-19
   35    -0.16020E-19     0.13540E-19
   36     0.00000E+00     0.00000E+00
   37    -0.13724E-33     0.11600E-33
   38    -0.17158E-23     0.14502E-23
   39    -0.87353E-01    -0.24710E-02
   40    -0.24699E-19     0.20876E-19
   41    -0.36969E-20     0.31247E-20
   42     0.00000E+00     0.00000E+00
   43     0.21448E-24    -0.18128E-24
   44     0.17158E-23    -0.14502E-23
   45    -0.34940E-05    -0.98836E-07
   46    -0.24704E-31     0.20880E-31
   47    -0.36970E-32     0.31248E-32
   48     0.00000E+00     0.00000E+00
   49     0.82642E-37    -0.69851E-37
   50    -0.27664E-35     0.23382E-35


 COUPLED MODE NO.    9


    1    -0.33110E-01     0.28656E-03
    2    -0.93446E-01     0.67355E-03
    3     0.29641E-05     0.42903E-06
    4     0.90815E-31    -0.66796E-30
    5    -0.10674E-30     0.78503E-30
    6     0.00000E+00     0.00000E+00
    7     0.12813E-31    -0.94236E-31
    8     0.10902E-31    -0.80185E-31
    9     0.74106E-01     0.10726E-01
   10     0.90818E-19    -0.66796E-18
   11    -0.10674E-18     0.78509E-18
   12     0.00000E+00     0.00000E+00
   13     0.27628E-26    -0.20320E-25
   14     0.23503E-26    -0.17286E-25
   15     0.22554E-01    -0.93397E-02
   16     0.65091E-19    -0.47874E-18
   17     0.12480E-18    -0.91793E-18
   18     0.00000E+00     0.00000E+00
   19     0.17161E-22    -0.12622E-21
   20     0.57204E-23    -0.42073E-22
   21     0.78704E-01    -0.76180E-02
   22    -0.14829E-18     0.10907E-17
   23    -0.88538E-19     0.65119E-18
   24     0.00000E+00     0.00000E+00
   25    -0.57204E-23     0.42073E-22
   26     0.11441E-22    -0.84147E-22
   27     0.63365E-01     0.20615E-01
   28    -0.47746E-19     0.35117E-18
   29     0.11443E-18    -0.84159E-18
   30     0.00000E+00     0.00000E+00
   31     0.57204E-23    -0.42073E-22
   32     0.12068E-31    -0.88762E-31
   33     0.54020E-01    -0.42768E-01
   34    -0.19613E-18     0.14425E-17
   35     0.10682E-18    -0.78564E-18
   36     0.00000E+00     0.00000E+00
   37     0.91513E-33    -0.67307E-32
   38     0.11441E-22    -0.84147E-22
   39     0.14347E+00     0.33971E-01
   40     0.16469E-18    -0.12113E-17
   41     0.24650E-19    -0.18130E-18
   42     0.00000E+00     0.00000E+00
   43    -0.14301E-23     0.10518E-22
   44    -0.11441E-22     0.84147E-22
   45     0.57365E-05     0.13588E-05
   46     0.16472E-30    -0.12115E-29
   47     0.24651E-31    -0.18131E-30
   48     0.00000E+00     0.00000E+00
   49    -0.55105E-36     0.40529E-35
   50     0.18446E-34    -0.13567E-33


 COUPLED MODE NO.   10


    1    -0.31527E-03     0.28411E-03
    2    0.17085E-03     0.91614E-03
    3   -0.27032E-06     0.32529E-06
    4   -0.74938E-30     0.68905E-30
    5    0.88074E-30    -0.80984E-30
    6    0.00000E+00     0.00000E+00
    7   -0.10573E-30     0.97214E-31
    8   -0.89961E-31     0.82719E-31
    9   -0.92584E-02     0.81127E-02
   10   -0.74940E-18     0.68906E-18
   11    0.88081E-18    -0.80990E-18
   12    0.00000E+00     0.00000E+00
   13   -0.22797E-25     0.20962E-25
   14   -0.19394E-25     0.17833E-25
   15    0.17579E-01    -0.16124E-01
   16   -0.53711E-18     0.49386E-18
   17   -0.10298E-17     0.94696E-18
   18    0.00000E+00     0.00000E+00
   19   -0.14161E-21     0.13021E-21
   20   -0.47203E-22     0.43403E-22
   21   -0.21710E-01     0.19200E-01
   22    0.12237E-17    -0.11252E-17
   23    0.73059E-18    -0.67177E-18
   24    0.00000E+00     0.00000E+00
   25    0.47203E-22    -0.43403E-22
   26   -0.94406E-22     0.86806E-22
   27    0.21877E-01    -0.20677E-01
   28    0.39398E-18    -0.36226E-18
   29   -0.94420E-18     0.86819E-18
   30    0.00000E+00     0.00000E+00
   31   -0.47203E-22     0.43403E-22
   32   -0.99584E-31     0.915C7E-31
   33   -0.17522E-01     0.15671E-01
   34    0.16184E-17    -0.14881E-17
   35   -0.88142E-18     0.81046E-18
   36    0.00000E+00     0.00000E+00
   37   -0.75514E-32     0.69434E-32
   38   -0.94406E-22     0.86806E-22
   39    0.95045E-02    -0.10417E-01
   40   -0.13590E-17     0.12495E-17
   41   -0.20341E-18     0.18703E-18
   42    0.00000E+00     0.00000E+00
   43    0.11801E-22    -0.10851E-22
   44    0.94406E-22    -0.86806E-22
   45    0.38017E-06    -0.41666E-06
   46   -0.13592E-29     0.12498E-29
   47   -0.20342E-30     0.18704E-30
   48    0.00000E+00     0.00000E+00
   49    0.45471E-35    -0.41810E-35
   50   -0.15221E-33     0.13996E-33

 COUPLED MODE NO.   11


    1   -0.66562E-01     0.39640E-03
    2    0.36178E-01     0.28490E-04
    3    0.29518E-05     0.12089E-06
    4    0.37237E-30     0.86897E-31
    5   -0.43764E-30    -0.10213E-30
    6    0.00000E+00     0.00000E+00
    7    0.52535E-31     0.12260E-31
    8    0.44702E-31     0.10432E-31
    9    0.73797E-01     0.30224E-02
   10    0.37237E-18     0.86899E-19
   11   -0.43767E-18    -0.10214E-18
   12    0.00000E+00     0.00000E+00
   13    0.11328E-25     0.26435E-26
   14    0.96368E-26     0.22489E-26
   15    0.30292E-01    -0.34305E-02
   16    0.26689E-18     0.62282E-19
   17    0.51173E-18     0.11942E-18
   18    0.00000E+00     0.00000E+00
   19    0.70366E-22     0.16421E-22
   20    0.23455E-22     0.54736E-23
   21    0.24914E-01     0.13367E-02
   22   -0.60804E-18    -0.14189E-18
   23   -0.36303E-18    -0.84718E-19
   24    0.00000E+00     0.00000E+00
   25   -0.23455E-22    -0.54736E-23
   26    0.46910E-22     0.10947E-22
   27    0.61643E-02    -0.15595E-02
   28   -0.19577E-18    -0.45685E-19
   29    0.46917E-18     0.10949E-18
   30    0.00000E+00     0.00000E+00
   31    0.23455E-22     0.54736E-23
   32    0.49483E-31     0.11548E-31
   33   -0.29635E-02     0.17099E-02
   34   -0.80418E-18    -0.18767E-18
   35    0.43798E-18     0.10221E-18
   36    0.00000E+00     0.00000E+00
   37    0.37523E-32     0.87564E-33
   38    0.46910E-22     0.10947E-22
   39   -0.33418E-01    -0.20740E-02
   40    0.67526E-18     0.15758E-18
   41    0.10107E-18     0.23587E-19
   42    0.00000E+00     0.00000E+00
   43   -0.58638E-23    -0.13684E-23
   44   -0.46910E-22    -0.10947E-22
   45   -0.13367E-05    -0.82958E-07
   46    0.67540E-30     0.15761E-30
   47    0.10108E-30     0.23588E-31
   48    0.00000E+00     0.00000E+00
   49   -0.22594E-35    -0.52727E-36
   50    0.75634E-34     0.17650E-34

 COUPLED MODE NO.   12


    1   -0.36027E-01    -0.70765E-04
    2   -0.94918E-02     0.22559E-04
    3    0.16386E-05     0.42124E-07
    4    0.71077E-31     0.97624E-32
    5   -0.83536E-31    -0.11474E-31
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    6    0.00000E+00     0.00000E+00
    7    0.10028E-31     0.13773E-32
    8    0.85326E-32     0.11720E-32
    9    0.40967E-01     0.10532E-02
   10    0.71078E-19     0.97626E-20
   11   -0.83543E-19    -0.11475E-19
   12    0.00000E+00     0.00000E+00
   13    0.21623E-26     0.29699E-27
   14    0.18395E-26     0.25265E-27
   15    0.36432E-01    -0.78067E-03
   16    0.50943E-19     0.69971E-20
   17    0.97679E-19     0.13416E-19
   18    0.00000E+00     0.00000E+00
   19    0.1343[illegible]-22     0.1844[illegible]E-23
   20    0.6477[illegible]-23     0.61493E-24
   21    0.25107E-01     0.140[illegible]E-03
   22   -0.11606E-18    -0.[illegible]E-19
   23   -0.69295E-19    -0.[illegible]E-20
   24    0.00000E+00     0.[illegible]E+00
   25   -0.44771E-23    -0.[illegible]E-26
   26    0.89542E-23     0.[illegible]99E-23
   27    0.20897E-01    -0.[illegible]E-04
   28   -0.37368E-19    -0.51325E-20
[illegible]  0.89556E-19     0.12300E-19
   30    0.00000E+00     0.00000E+00
   31    0.44771E-23     0.61493E-24
   32    0.94453E-32     0.12973E-32
   33    0.16567E-01    -0.22501E-03
   34   -0.15350E-18    -0.21083E-19
   35    0.83601E-19     0.11483E-19
   36    0.00000E+00     0.00000E+00
   37    0.71623E-33     0.98374E-34
   38    0.89542E-23     0.12299E-23
   39    0.15583E-01     0.22012E-03
   40    0.12889E-18     0.17704E-19
   41    0.19253E-19     0.26499E-20
   42    0.00000E+00     0.00000E+00
   43   -0.11193E-23    -0.15373E-24
   44   -0.89542E-23    -0.12299E-23
   45    0.62328E-06     0.88045E-08
   46    0.12892E-30     0.17707E-31
   47    0.19293E-31     0.26500E-32
   48    0.00000E+00     0.00000E+00
   49   -0.43128E-36    -0.59236E-37
   50    0.14437E-34     0.19829E-35

 BASE RESPONSE SPECTRA DATA

 TOTAL NUMBER OF INPUT SPECTRUM CURVE = 11

 MAXIMUM NUMBER OF DEFINITION POINTS IN INPUT SPECTRUM CURVES = 10

 SPECTRUM SCALE FACTOR = 0.38640E+03

 RIGID FREQUENCY = 0.20500E+02



   SPECTRUM PARAMETERS

   CURVE NO   1  F1 =   7.22930  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  1

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.20151E-01

      INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
      POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

          1    0.8405E+01     0.7125E+00           0.7125E+00
          2    0.1168E+02     0.6828E+00           0.7109E+00
          3    0.1847E+02     0.5174E+00           0.3787E+00
          4    0.2580E+02     0.4430E+00           0.2321E+00
          5    0.2941E+02     0.3903E+00           0.1794E+00
          6    0.3049E+02     0.4236E+00           0.1878E+00
          7    0.4666E+02     0.3488E+00           0.1010E+00
          8    0.6128E+02     0.3482E+00           0.7681E-01
          9    0.7253E+02     0.3486E+00           0.6497E-01
         10    0.7577E+02     0.3498E+00           0.5928E-01

   SPECTRUM PARAMETERS

   CURVE NO   2  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  2

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.21093E-01

      INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
      POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

          1    0.8405E+01     0.7100E+00           0.7100E+00
          2    0.1168E+02     0.6808E+00           0.7096E+00
          3    0.1847E+02     0.5121E+00           0.3748E+00
          4    0.2500E+02     0.4399E+00           0.2305E+00
          5    0.2941E+02     0.3888E+00           0.1787E+00
          6    0.3049E+02     0.4216E+00           0.1869E+00
          7    0.4666E+02     0.3488E+00           0.1010E+00
          8    0.6128E+02     0.3483E+00           0.7684E-01
          9    0.7253E+02     0.3487E+00           0.6499E-01
         10    0.7977E+02     0.3498E+00           0.5928E-01

   SPECTRUM PARAMETERS
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  CURVE NO   3  F1 =  7.22830  F2 = 17.22000  FL =  8.40590  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  3

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.29183E-01

     INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01    0.6801E+00           0.6801E+00
        2    0.1168E+02    0.6565E+00           0.6897E+00
        3    0.1847E+02    0.4644E+00           0.3399E+00
        4    0.2580E+02    0.4090E+00           0.2143E+00
        5    0.2941E+02    0.3749E+00           0.1723E+00
        6    0.3049E+02    0.4024E+00           0.1784E+00
        7    0.4666E+02    0.3485E+00           0.1010E+00
        8    0.6128E+02    0.3485E+00           0.7688E-01
        9    0.7253E+02    0.3490E+00           0.6504E-01
       10    0.7977E+02    0.3498E+00           0.5928E-01

  SPECTRUM PARAMETERS

  CURVE NO   4  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  4

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.37682E-01

     INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01    0.6495E+00           0.6495E+00
        2    0.1168E+02    0.6296E+00           0.6658E+00
        3    0.1847E+02    0.4112E+00           0.3156E+00
        4    0.2580E+02    0.3844E+00           0.2014E+00
        5    0.2941E+02    0.3643E+00           0.1674E+00
        6    0.3049E+02    0.3875E+00           0.1718E+00
        7    0.4666E+02    0.3485E+00           0.1010E+00
        8    0.6128E+02    0.3485E+00           0.7685E-01
        9    0.7253E+02    0.3491E+00           0.6506E-01
       10    0.7977E+02    0.3498E+00           0.5928E-01

  SPECTRUM PARAMETERS

  CURVE NO   5  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51776

 INPUT SPECTRUM CURVE NUMBER =  5

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.47921E-01

     INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01    0.6265E+00           0.6265E+00
        2    0.1168E+02    0.5987E+00           0.6373E+00
        3    0.1847E+02    0.4152E+00           0.3039E+00
        4    0.2580E+02    0.3630E+00           0.1906E+00
        5    0.2941E+02    0.3581E+00           0.1646E+00
        6    0.3049E+02    0.3749E+00           0.1662E+00
        7    0.4666E+02    0.3486E+00           0.1010E+00
        8    0.6128E+02    0.3486E+00           0.7690E-01
        9    0.7253E+02    0.3492E+00           0.6508E-01
       10    0.7977E+02    0.3497E+00           0.5926E-01

  SPECTRUM PARAMETERS

  CURVE NO   6  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  6

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.58319E-01

     INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01    0.6037E+00           0.6037E+00
        2    0.1168E+02    0.5703E+00           0.6104E+00
        3    0.1847E+02    0.4063E+00           0.2974E+00
        4    0.2580E+02    0.3606E+00           0.1889E+00
        5    0.2941E+02    0.3545E+00           0.1629E+00
        6    0.3049E+02    0.3660E+00           0.1623E+00
        7    0.4666E+02    0.3487E+00           0.1010E+00
        8    0.6128E+02    0.3487E+00           0.7692E-01
        9    0.7253E+02    0.3492E+00           0.6508E-01
       10    0.7977E+02    0.3496E+00           0.5924E-01

  SPECTRUM PARAMETERS

  CURVE NO   7  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  7

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69036E-01
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     INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01    0.5802E+00           0.5802E+00
        2    0.1168E+02    0.5444E+00           0.5856E+00
        3    0.1847E+02    0.4021E+00           0.2943E+00
        4    0.2580E+02    0.3576E+00           0.1873E+00
        5    0.2941E+02    0.3532E+00           0.1623E+00
        6    0.3049E+02    0.3594E+00           0.1593E+00
        7    0.4666E+02    0.3488E+00           0.1015E+00
        8    0.6128E+02    0.3487E+00           0.7692E-01
        9    0.7253E+02    0.3492E+00           0.6508E-01
       10    0.7977E+02    0.3495E+00           0.5922E-01

  SPECTRUM PARAMETERS

  CURVE NO   8  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  8

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69702E-01

     INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01    0.5788E+00           0.5788E+00
        2    0.1168E+02    0.5430E+00           0.5842E+00
        3    0.1847E+02    0.4022E+00           0.2944E+00
        4    0.2580E+02    0.3574E+00           0.1872E+00
        5    0.2941E+02    0.3532E+00           0.1623E+00
        6    0.3049E+02    0.3590E+00           0.1592E+00
        7    0.4666E+02    0.3488E+00           0.1010E+00
        8    0.6128E+02    0.3487E+00           0.7692E-01
        9    0.7253E+02    0.3492E+00           0.6508E-01
       10    0.7977E+02    0.3495E+00           0.5923E-01

  SPECTRUM PARAMETERS

  CURVE NO   9  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  9

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69721E-01

     INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01    0.5788E+00           0.5788E+00
        2    0.1168E+02    0.5429E+00           0.5841E+00
        3    0.1847E+02    0.4022E+00           0.2944E+00
        4    0.2580E+02    0.3574E+00           0.1872E+00
        5    0.2941E+02    0.3532E+00           0.1623E+00
        6    0.3049E+02    0.3590E+00           0.1592E+00
        7    0.4666E+02    0.3488E+00           0.1010E+00
        8    0.6128E+02    0.3487E+00           0.7692E-01
        9    0.7253E+02    0.3492E+00           0.6508E-01
       10    0.7977E+02    0.3495E+00           0.5922E-01

  SPECTRUM PARAMETERS

  CURVE NO  10  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER = 10

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69726E-01

     INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01    0.5787E+00           0.5787E+00
        2    0.1168E+02    0.5429E+00           0.5841E+00
        3    0.1847E+02    0.4022E+00           0.2944E+00
        4    0.2580E+02    0.3574E+00           0.1872E+00
        5    0.2941E+02    0.3532E+00           0.1623E+00
        6    0.3049E+02    0.3590E+00           0.1592E+00
        7    0.4666E+02    0.3488E+00           0.1010E+00
        8    0.6128E+02    0.3487E+00           0.7692E-01
        9    0.7253E+02    0.3492E+00           0.6508E-01
       10    0.7977E+02    0.3495E+00           0.5922E-01

  SPECTRUM PARAMETERS

  CURVE NO  11  F1 =  7.22830  F2 = 17.32000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER = 11

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.70000E-01

     INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01    0.5782E+00           0.5782E+00
        2    0.1168E+02    0.5423E+00           0.5836E+00
        3    0.1847E+02    0.4022E+00           0.2944E+00
        4    0.2580E+02    0.3574E+00           0.1872E+00
        5    0.2941E+02    0.3531E+00           0.1623E+00
        6    0.3049E+02    0.3589E+00           0.1591E+00
        7    0.4666E+02    0.3488E+00           0.1010E+00
       8    0.6120E+02     0.3487E+00            0.7692E-01
       9    0.7253E+02     0.3492E+00            0.6500E-01
      10    0.7977E+02     0.3495E+00            0.5922E-01


 INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS


     FREQUENCY    DAMPING RATIO          SPECTRAL ACCELERATIONS
       (HZ)           (%)                   SAD          SAV

   0.87186E+01     0.54654E+01          0.6082E+00    0.6136E+00
   0.16401E+02     0.36729E+01          0.4793E+00    0.3858E+00
   0.25258E+02     0.33925E+01          0.3983E+00    0.2132E+00
   0.32348E+02     0.51692E+01          0.3604E+00    0.1539E+00
   0.39227E+02     0.24132E+01          0.3741E+00    0.1289E+00
   0.47528E+02     0.65853E+01          0.3488E+00    0.9919E-01
   0.50053E+03     0.21505E+01          0.3487E+00    0.9416E-01
   0.57451E+02     0.22316E+01          0.3484E+00    0.8198E-01
   0.61634E+02     0.68607E+01          0.3487E+00    0.7648E-01
   0.62068E+02     0.20412E+01          0.3483E+00    0.7585E-01
   0.73029E+02     0.69143E+01          0.3492E+00    0.6464E-01
   0.79752E+02     0.69228E+01          0.3495E+00    0.5924E-01


 DISPLACEMENT RESPONSE UD (FROM SD)

   MODE NO.     1
  0.4309E-01  0.8809E-01  0.4309E-01 -0.9948E-33  0.1169E-32  0.0000E+00
 -0.1404E-33 -0.1194E-33  0.7122E-01 -0.9949E-21  0.1169E-20  0.0000E+00
 -0.3026E-28 -0.2575E-28  0.9401E-01 -0.7130E-21 -0.1367E-20  0.0000E+00
 -0.1880E-24 -0.6266E-25  0.1098E+00  0.1624E-20  0.9699E-21  0.0000E+00
  0.6266E-25 -0.1253E-24  0.1173E+00  0.5230E-21 -0.1253E-20  0.0000E+00
 -0.6266E-25 -0.1322E-33  0.1160E+00  0.2149E-20 -0.1170E-20  0.0000E+00
 -0.1902E-34 -0.1253E-24  0.1060E+00 -0.1804E-20 -0.2700E-21  0.0000E+00
  0.1567E-25  0.1253E-24  0.8810E-01 -0.1804E-32 -0.2700E-33  0.0000E+00
  0.6036E-38 -0.2021E-36
   MODE NO.     2
  0.9102E-04  0.3012E-03  0.9100E-04 -0.1669E-34  0.1962E-34  0.0000E+00
 -0.2355E-35 -0.2004E-35 -0.5601E-03 -0.1669E-22  0.1962E-22  0.0000E+00
 -0.5078E-30 -0.4320E-30 -0.1079E-02 -0.1196E-22 -0.2294E-22  0.0000E+00
 -0.3154E-26 -0.1051E-26 -0.1343E-02  0.2726E-22  0.1627E-22  0.0000E+00
  0.1051E-26 -0.2103E-26 -0.1288E-02  0.8775E-23 -0.2103E-22  0.0000E+00
 -0.1051E-26 -0.2218E-35 -0.9288E-03  0.3605E-22 -0.1963E-22  0.0000E+00
 -0.1682E-36 -0.2103E-26 -0.3531E-03 -0.3027E-22 -0.4531E-23  0.0000E+00
  0.2628E-27  0.2103E-26  0.3012E-03 -0.3027E-34 -0.4531E-35  0.0000E+00
  0.1013E-39 -0.3390E-38
   MODE NO.     3
  0.1343E-02 -0.9561E-03  0.1343E-02  0.5054E-33 -0.5940E-33  0.0000E+00
  0.7131E-34  0.6067E-34  0.3600E-02  0.5054E-21 -0.5941E-21  0.0000E+00
  0.1538E-28  0.1308E-28  0.3355E-02  0.3623E-21  0.6946E-21  0.0000E+00
  0.9551E-25  0.3184E-25  0.1249E-02 -0.8253E-21 -0.4927E-21  0.0000E+00
 -0.3184E-25  0.6367E-25 -0.1619E-02 -0.2657E-21  0.6368E-21  0.0000E+00
  0.3184E-25  0.6716E-34 -0.3492E-02 -0.1092E-20  0.5945E-21  0.0000E+00
  0.5093E-35  0.6367E-25 -0.3218E-02  0.9166E-21  0.1372E-21  0.0000E+00
 -0.7959E-26 -0.6367E-25 -0.9562E-03  0.9167E-33  0.1372E-33  0.0000E+00
 -0.3067E-38  0.1027E-36
   MODE NO.     4
  0.7049E-03 -0.7278E-03  0.7049E-03  0.5733E-33 -0.6738E-33  0.0000E+00
  0.8088E-34  0.6882E-34 -0.5917E-03  0.5733E-21 -0.6738E-21  0.0000E+00
  0.1744E-28  0.1488E-28 -0.1268E-02  0.4109E-21  0.7879E-21  0.0000E+00
  0.1083E-24  0.3611E-25 -0.6320E-03 -0.9361E-21 -0.5589E-21  0.0000E+00
 -0.3611E-25  0.7222E-25  0.6562E-03 -0.3014E-21  0.7223E-21  0.0000E+00
  0.3611E-25  0.7618E-34  0.1267E-02 -0.1238E-20  0.6743E-21  0.0000E+00
  0.5777E-35  0.7222E-25  0.5665E-03  0.1040E-20  0.1556E-21  0.0000E+00
 -0.9028E-26 -0.7222E-25 -0.7278E-03  0.1040E-32  0.1556E-33  0.0000E+00
 -0.3479E-38  0.1164E-36
   MODE NO.     5
  0.7176E-05  0.5524E-05  0.7181E-05  0.1216E-35 -0.1429E-35  0.0000E+00
  0.1715E-36  0.1460E-36  0.1248E-03  0.1216E-23 -0.1429E-23  0.0000E+00
  0.3699E-31  0.3147E-31  0.5170E-04  0.8715E-24  0.1671E-23  0.0000E+00
  0.2298E-27  0.7659E-28 -0.1004E-03 -0.1985E-23 -0.1185E-23  0.0000E+00
 -0.7659E-26  0.1532E-27 -0.9936E-04 -0.6392E-24  0.1532E-23  0.0000E+00
  0.7659E-28  0.1616E-36  0.5322E-04 -0.2626E-23  0.1430E-23  0.0000E+00
  0.1225E-37  0.1532E-27  0.1245E-03  0.2205E-23  0.3300E-24  0.0000E+00
 -0.1915E-28 -0.1532E-27  0.5529E-05  0.2205E-35  0.3300E-36  0.0000E+00
 -0.7378E-41  0.2470E-39
   MODE NO.     6
  0.2096E-03  0.2686E-03  0.2096E-03 -0.9059E-34  0.1065E-33  0.0000E+00
 -0.1278E-34 -0.1088E-34 -0.1502E-03 -0.9060E-22  0.1065E-21  0.0000E+00
 -0.2756E-29 -0.2345E-29 -0.1686E-03 -0.6493E-22 -0.1245E-21  0.0000E+00
 -0.1712E-25 -0.5706E-26  0.1915E-03  0.1479E-21  0.8812E-22  0.0000E+00
  0.5706E-26 -0.1141E-25  0.1238E-03  0.4763E-22 -0.1141E-21  0.0000E+00
 -0.5706E-26 -0.1204E-34 -0.2311E-03  0.1957E-21 -0.1066E-21  0.0000E+00
 -0.9129E-36 -0.1141E-25 -0.7365E-04 -0.1643E-21 -0.2459E-22  0.0000E+00
  0.1427E-26  0.1141E-25  0.2686E-03 -0.1643E-33 -0.2459E-34  0.0000E+00
  0.5457E-39 -0.1940E-37
   MODE NO.     7
  0.1402E-05 -0.4711E-05  0.1400E-05  0.1238E-34 -0.1455E-34  0.0000E+00
  0.1747E-35  0.1486E-35 -0.5844E-04  0.1238E-22 -0.1455E-22  0.0000E+00
  0.3766E-30  0.3204E-30  0.2625E-04  0.8874E-23  0.1701E-22  0.0000E+00
  0.2340E-26  0.7799E-27  0.4601E-04 -0.2022E-22 -0.1207E-22  0.0000E+00
 -0.7799E-27  0.1560E-26 -0.4805E-04 -0.6509E-23  0.1560E-22  0.0000E+00
  0.7799E-27  0.1645E-35 -0.2329E-04 -0.2674E-22  0.1456E-22  0.0000E+00
  0.1248E-36  0.1560E-26  0.5906E-04  0.2245E-22  0.3361E-23  0.0000E+00
 -0.1950E-27 -0.1560E-26 -0.4708E-05  0.2246E-34  0.3361E-35  0.0000E+00
 -0.7512E-40  0.2515E-38
   MODE NO.     8
  0.1928E-05  0.4166E-05  0.1924E-05 -0.1407E-34  0.1654E-34  0.0000E+00
 -0.1985E-35 -0.1689E-35 -0.8505E-04 -0.1407E-22  0.1654E-22  0.0000E+00
 -0.4281E-30 -0.3642E-30  0.1053E-03 -0.1009E-22 -0.1934E-22  0.0000E+00
 -0.2659E-26 -0.8864E-27 -0.4744E-04  0.2298E-22  0.1372E-22  0.0000E+00
  0.8864E-27 -0.1773E-26 -0.4546E-04  0.7399E-23 -0.1773E-22  0.0000E+00
 -0.8864E-27 -0.1870E-35  0.1048E-03  0.3039E-22 -0.1655E-22  0.0000E+00
 -0.1418E-36 -0.1773E-26 -0.8641E-04 -0.2552E-22 -0.3820E-23  0.0000E+00
  0.2216E-27  0.1773E-26  0.4163E-05 -0.2552E-34 -0.3820E-35  0.0000E+00
  0.8539E-40 -0.2858E-38
   MODE NO.     9
 -0.2975E-04 -0.8396E-04 -0.2975E-04  0.8160E-34 -0.9590E-34  0.0000E+00
  0.1151E-34  0.9796E-35  0.2909E-04  0.8160E-22 -0.9591E-22  0.0000E+00
  0.2482E-29  0.2112E-29 -0.2497E-04  0.5849E-22  0.1121E-21  0.0000E+00
  0.1542E-25  0.5140E-26  0.1773E-04 -0.1332E-21 -0.7955E-22  0.0000E+00
 -0.5140E-26  0.1028E-25 -0.3794E-05 -0.4290E-22  0.1028E-21  0.0000E+00
  0.5140E-26  0.1084E-34 -0.1993E-04 -0.1762E-21  0.9598E-22  0.0000E+00
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  0.8322E-36  0.1028E-25  0.5269E-04  0.1480E-21  0.2215E-22  0.0000E+00
 -0.1285E-26 -0.1028E-25 -0.8396E-04  0.1480E-33  0.2215E-34  0.0000E+00
 -0.4951E-39  0.1657E-37
   MODE NO.    10
 -0.2789E-06  0.1512E-06 -0.2793E-06 -0.6631E-33  0.7793E-33  0.0000E+00
 -0.8355E-34 -0.7960E-34 -0.8609E-05 -0.6631E-21  0.7793E-21  0.0000E+00
 -0.2017E-28 -0.1716E-28  0.1549E-04 -0.4752E-21 -0.9112E-21  0.0000E+00
 -0.1253E-24 -0.4177E-25 -0.1930E-04  0.1083E-20  0.6464E-21  0.0000E+00
  0.4177E-25 -0.8353E-25  0.1932E-04  0.3486E-21 -0.8354E-21  0.0000E+00
 -0.4177E-25 -0.8811E-34 -0.1548E-04  0.1432E-20 -0.7799E-21  0.0000E+00
 -0.6682E-35 -0.8353E-25  0.9499E-05 -0.1202E-20 -0.1800E-21  0.0000E+00
  0.1044E-25  0.8352E-25  0.1515E-06 -0.1203E-32 -0.1800E-33  0.0000E+00
  0.4023E-38 -0.1347E-36
   MODE NO.    11
 -0.4266E-04  0.2319E-04 -0.4266E-04  0.2386E-33 -0.2805E-33  0.0000E+00
  0.3367E-34  0.2865E-34  0.1404E-04  0.2387E-21 -0.2805E-21  0.0000E+00
  0.7260E-29  0.6176E-29 -0.4432E-05  0.1710E-21  0.3280E-21  0.0000E+00
  0.4510E-25  0.1503E-25  0.1527E-05 -0.3897E-21 -0.2327E-21  0.0000E+00
 -0.1503E-25  0.3006E-25 -0.1083E-05 -0.1255E-21  0.3007E-21  0.0000E+00
  0.1503E-25  0.3171E-34  0.2474E-05 -0.5154E-21  0.2807E-21  0.0000E+00
  0.2405E-35  0.3006E-25 -0.7630E-05  0.4328E-21  0.6478E-22  0.0000E+00
 -0.3758E-26 -0.3006E-25  0.2310E-04  0.4329E-33  0.6478E-34  0.0000E+00
 -0.1448E-38  0.4847E-37
   MODE NO.    12
 -0.1938E-04 -0.5105E-05 -0.1938E-04  0.3823E-34 -0.4493E-34  0.0000E+00
  0.5393E-35  0.4589E-35  0.4696E-05  0.3823E-22 -0.4493E-22  0.0000E+00
  0.1163E-29  0.9893E-30 -0.1083E-05  0.2740E-22  0.5253E-22  0.0000E+00
  0.7324E-26  0.2408E-26  0.2432E-06 -0.6242E-22 -0.3727E-22  0.0000E+00
 -0.2408E-26  0.4816E-26  0.1751E-07 -0.2010E-22  0.4917E-22  0.0000E+00
  0.2408E-26  0.5080E-35 -0.2725E-06 -0.8256E-22  0.4496E-22  0.0000E+00
  0.3852E-36  0.4816E-26  0.1237E-05  0.6932E-22  0.1038E-22  0.0000E+00
 -0.6020E-27 -0.4816E-26 -0.5105E-05  0.6934E-34  0.1038E-34  0.0000E+00
 -0.2320E-39  0.7765E-38


 DISPLACEMENT RESPONSE UV (FROM SV)

   MODE NO.     1
  0.8499E-03  0.1781E-02  0.8498E-03  0.8548E-34 -0.1005E-33  0.0000E+00
  0.1206E-34  0.1026E-34 -0.1561E-02  0.8548E-22 -0.1005E-21  0.0000E+00
  0.2600E-29  0.2212E-29 -0.3378E-02  0.6127E-22  0.1175E-21  0.0000E+00
  0.1615E-25  0.5384E-26 -0.6349E-02 -0.1396E-21 -0.8334E-22  0.0000E+00
 -0.5384E-26  0.1077E-25 -0.4311E-02 -0.4490E-22  0.1077E-21  0.0000E+00
  0.5384E-26  0.1136E-34 -0.3216E-02 -0.1046E-21  0.1005E-21  0.0000E+00
  0.8614E-36  0.1077E-25 -0.1128E-02  0.1550E-21  0.2320E-22  0.0000E+00
 -0.1346E-26 -0.1077E-25  0.1781E-02  0.1550E-33  0.2320E-34  0.0000E+00
 -0.5187E-39  0.1736E-37
   MODE NO.     2
 -0.3710E-04 -0.1234E-03 -0.3709E-04  0.8001E-35 -0.9403E-35  0.0000E+00
  0.1129E-35  0.9605E-36  0.2089E-03  0.8001E-23 -0.9404E-23  0.0000E+00
  0.2434E-30  0.2071E-30  0.4047E-03  0.5735E-23  0.1100E-22  0.0000E+00
  0.1512E-26  0.5040E-27  0.5023E-03 -0.1306E-22 -0.7800E-23  0.0000E+00
 -0.5040E-27  0.1008E-26  0.4778E-03 -0.4206E-23  0.1008E-22  0.0000E+00
  0.5040E-27  0.1063E-35  0.3382E-03 -0.1728E-22  0.9411E-23  0.0000E+00
  0.8062E-37  0.1008E-26  0.1194E-03  0.1451E-22  0.2172E-23  0.0000E+00
 -0.1260E-27 -0.1008E-26 -0.1333E-03  0.1451E-34  0.2172E-35  0.0000E+00
 -0.4855E-40  0.1625E-38
   MODE NO.     3
  0.1088E-03 -0.1050E-03  0.1088E-03  0.2976E-34 -0.3498E-34  0.0000E+00
  0.4198E-35  0.3572E-35  0.2567E-04  0.2976E-22 -0.3498E-22  0.0000E+00
  0.9053E-30  0.7702E-30 -0.2720E-04  0.2133E-22  0.4090E-22  0.0000E+00
  0.5623E-26  0.1874E-26 -0.1893E-04 -0.4859E-22 -0.2901E-22  0.0000E+00
 -0.1874E-26  0.3749E-26  0.1851E-04 -0.1565E-22  0.3750E-22  0.0000E+00
  0.1874E-26  0.3955E-35  0.2517E-04 -0.6427E-22  0.3500E-22  0.0000E+00
  0.2999E-36  0.3749E-26 -0.2746E-04  0.5397E-22  0.8078E-23  0.0000E+00
 -0.4686E-27 -0.3749E-26 -0.1050E-03  0.5398E-34  0.8078E-35  0.0000E+00
 -0.1806E-39  0.6044E-38
   MODE NO.     4
 -0.5256E-04  0.4948E-04 -0.5256E-04 -0.6882E-34  0.8089E-34  0.0000E+00
 -0.9710E-35 -0.8262E-35 -0.4252E-04 -0.6883E-22  0.8090E-22  0.0000E+00
 -0.2094E-29 -0.1781E-29 -0.6359E-06 -0.4933E-22 -0.9458E-22  0.0000E+00
 -0.1301E-25 -0.4335E-26  0.9219E-05  0.1124E-21  0.6710E-22  0.0000E+00
  0.4335E-26 -0.8670E-26 -0.7121E-05  0.3618E-22 -0.8672E-22  0.0000E+00
 -0.4335E-26 -0.9146E-35  0.1139E-05  0.1406E-21 -0.8095E-22  0.0000E+00
 -0.6935E-36 -0.8670E-26  0.4076E-06 -0.1248E-21 -0.1868E-22  0.0000E+00
  0.1084E-36  0.8670E-26  0.4968E-04 -0.1248E-33 -0.1868E-34  0.0000E+00
  0.4176E-39 -0.1398E-37
   MODE NO.     5
  0.2866E-05  0.2719E-05  0.2867E-05  0.9068E-37 -0.1066E-36  0.0000E+00
  0.1279E-37  0.1089E-37  0.2604E-04  0.9068E-25 -0.1066E-24  0.0000E+00
  0.2759E-32  0.2347E-32  0.1029E-04  0.6499E-25  0.1246E-24  0.0000E+00
  0.1714E-28  0.5712E-29 -0.2081E-04 -0.1481E-24 -0.8841E-25  0.0000E+00
 -0.5712E-29  0.1142E-28 -0.2073E-04 -0.4767E-25  0.1143E-24  0.0000E+00
  0.5712E-29  0.1205E-37  0.1041E-04 -0.1950E-24  0.1067E-24  0.0000E+00
  0.9138E-39  0.1142E-28  0.2602E-04  0.1644E-24  0.2461E-25  0.0000E+00
 -0.1428E-29 -0.1142E-28  0.2720E-05  0.1645E-36  0.2461E-37  0.0000E+00
 -0.5502E-42  0.1842E-40
   MODE NO.     6
 -0.2599E-05 -0.1492E-05 -0.2600E-05  0.4577E-35 -0.5379E-35  0.0000E+00
  0.6450E-36  0.5495E-36 -0.8032E-05  0.4577E-23 -0.5380E-23  0.0000E+00
  0.1392E-30  0.1185E-30 -0.2643E-05  0.3281E-23  0.6290E-23  0.0000E+00
  0.8649E-27  0.2883E-27  0.3623E-08 -0.7474E-23 -0.4462E-23  0.0000E+00
 -0.2883E-27  0.5766E-27  0.1489E-04 -0.2406E-23  0.5767E-23  0.0000E+00
  0.2883E-27  0.6082E-36  0.5287E-05 -0.9885E-23  0.5384E-23  0.0000E+00
  0.4612E-37  0.5766E-27 -0.2900E-04  0.8300E-23  0.1242E-23  0.0000E+00
 -0.7208E-28 -0.5766E-27 -0.1493E-05  0.8302E-35  0.1242E-35  0.0000E+00
 -0.2777E-40  0.9297E-39
   MODE NO.     7
  0.5579E-07  0.3913E-06  0.5576E-07 -0.7858E-36  0.9236E-36  0.0000E+00
 -0.1109E-36 -0.9434E-37 -0.7545E-06 -0.7859E-24  0.9237E-24  0.0000E+00
 -0.2391E-31 -0.2034E-31  0.1895E-06 -0.5632E-24 -0.1080E-23  0.0000E+00
 -0.1485E-27 -0.4950E-28  0.7201E-06  0.1263E-23  0.7661E-24  0.0000E+00
  0.4950E-28 -0.9900E-28 -0.4396E-06  0.4132E-24 -0.9902E-24  0.0000E+00
 -0.4950E-28 -0.1044E-36 -0.6222E-06  0.1697E-23 -0.9243E-24  0.0000E+00
 -0.7919E-38 -0.9900E-28  0.6657E-06 -0.1425E-23 -0.2133E-24  0.0000E+00
  0.1238E-28  0.9900E-28  0.3911E-06 -0.1425E-35 -0.2133E-36  0.0000E+00
  0.4768E-41 -0.1596E-39
   MODE NO.     8
 -0.6108E-06 -0.1011E-05 -0.6108E-06  0.2799E-35 -0.3289E-35  0.0000E+00
  0.3948E-36  0.3360E-36 -0.1600E-05  0.2799E-23 -0.3290E-23  0.0000E+00
  0.8514E-31  0.7243E-31  0.2583E-05  0.2006E-23  0.3846E-23  0.0000E+00
  0.5299E-27  0.1763E-27 -0.3051E-05 -0.4570E-23 -0.2728E-23  0.0000E+00
 -0.1763E-27  0.3526E-27 -0.1422E-05 -0.1471E-23  0.3526E-23  0.0000E+00
  0.1763E-27  0.3719E-36  0.2688E-05 -0.6044E-23  0.3292E-23  0.0000E+00
 0.2820E-37  0.3526E-27 -0.1555E-05  0.5075E-23  0.7597E-24  0.0000E+00
-0.4407E-28 -0.3526E-27 -0.1011E-05  0.5076E-35  0.7597E-36  0.0000E+00
-0.1698E-40  0.5685E-39
   MODE NO.    9
 0.5647E-07  0.1327E-06  0.5655E-07 -0.1316E-33  0.1547E-33  0.0000E+00
-0.1857E-34 -0.1580E-34  0.2181E-05 -0.1316E-21  0.1547E-21  0.0000E+00
-0.4024E-29 -0.3406E-29 -0.1762E-05 -0.9434E-22 -0.1809E-21  0.0000E+00
-0.2487E-25 -0.8291E-26 -0.1412E-05  0.2149E-21  0.1283E-21  0.0000E+00
 0.8291E-26 -0.1658E-25  0.5345E-05  0.6920E-22 -0.1658E-21  0.0000E+00
-0.8291E-26 -0.1769E-34 -0.8316E-05  0.2843E-21 -0.1548E-21  0.0000E+00
-0.1326E-35 -0.1656E-25  0.6816E-05 -0.2387E-21 -0.3573E-22  0.0000E+00
 0.2073E-26  0.1658E-25  0.1330E-06 -0.2387E-33 -0.3573E-34  0.0000E+00
 0.7987E-39 -0.2674E-37
   MODE NO.   10
 0.5475E-07  0.1765E-06  0.5481E-07  0.1328E-33 -0.1561E-33  0.0000E+00
 0.1873E-34  0.1594E-34  0.1639E-05  0.1328E-21 -0.1561E-21  0.0000E+00
 0.4539E-29  0.3436E-29 -0.3017E-05  0.9517E-22  0.1825E-21  0.0000E+00
 0.2509E-25  0.8364E-26  0.3808E-05 -0.2168E-21 -0.1295E-21  0.0000E+00
-0.8364E-26  0.1673E-25 -0.3860E-05 -0.6981E-22  0.1673E-21  0.0000E+00
 0.8364E-26  0.1765E-34  0.3162E-05 -0.2868E-21  0.1562E-21  0.0000E+00
 0.1338E-35  0.1673E-25 -0.1848E-05  0.2408E-21  0.3604E-22  0.0000E+00
-0.2091E-26 -0.1673E-25  0.1765E-06  0.2408E-33  0.3604E-34  0.0000E+00
-0.8057E-39  0.2697E-37
   MODE NO.   11
 0.4702E-07  0.3380E-08  0.4704E-07  0.1031E-34 -0.1212E-34  0.0000E+00
 0.1454E-35  0.1238E-35  0.3993E-06  0.1031E-22 -0.1212E-22  0.0000E+00
 0.3136E-30  0.2668E-30 -0.3724E-06  0.7389E-23  0.1417E-22  0.0000E+00
 0.1948E-26  0.6493E-27  0.1869E-06 -0.1683E-22 -0.1005E-22  0.0000E+00
-0.6493E-27  0.1299E-26 -0.1629E-06 -0.5430E-23  0.1299E-22  0.0000E+00
 0.6493E-27  0.1370E-35  0.2187E-06 -0.2226E-22  0.1213E-22  0.0000E+00
 0.1039E-36  0.1299E-26 -0.2364E-06  0.1869E-22  0.2798E-23  0.0000E+00
-0.1623E-27 -0.1299E-26  0.3370E-08  0.1870E-34  0.2798E-35  0.0000E+00
-0.6255E-40  0.2094E-38
   MODE NO.   12
-0.6451E-08  0.2056E-08 -0.6447E-08  0.8859E-36 -0.1046E-35  0.0000E+00
 0.1256E-36  0.1068E-36  0.9077E-07  0.8900E-24 -0.1046E-23  0.0000E+00
 0.2707E-31  0.3303E-31 -0.7519E-07  0.6376E-24  0.1223E-23  0.0000E+00
 0.1682E-27  0.5606E-28  0.9961E-08 -0.1453E-23 -0.8676E-24  0.0000E+00
-0.5606E-28  0.1121E-27 -0.9514E-08 -0.4679E-24  0.1121E-23  0.0000E+00
 0.5606E-28  0.1183E-36 -0.2089E-07 -0.1522E-23  0.3047E-23  0.0000E+00
 0.8968E-38  0.1121E-27  0.2091E-07  0.1614E-23  0.2416E-24  0.0000E+00
-0.1401E-28 -0.1121E-27  0.2057E-08  0.1614E-35  0.2416E-36  0.0000E+00
-0.5400E-41  0.1808E-39


  CORRELATION EPSD

   MODE NO.    1
 0.1000E+01  0.2707E+00  0.2796E+00  0.2796E+00  0.2796E+00  0.2796E+00
 0.2796E+00  0.2796E+00  0.2796E+00  0.2796E+00  0.2796E+00  0.2796E+00
   MODE NO.    2
 0.2707E+00  0.1000E+01  0.9512E+00  0.9512E+00  0.9512E+00  0.9512E+00
 0.9512E+00  0.9512E+00  0.9512E+00  0.9512E+00  0.9512E+00  0.9512E+00
   MODE NO.    3
 0.2796E+00  0.9512E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    4
 0.2796E+00  0.9512E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    5
 0.2796E+00  0.9512E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    6
 0.2796E+00  0.9512E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    7
 0.2796E+00  0.9512E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    8
 0.2796E+00  0.9512E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    9
 0.2796E+00  0.9512E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.   10
 0.2796E+00  0.9512E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.   11
 0.2796E+00  0.9512E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.   12
 0.2796E+00  0.9512E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION EPSV

   MODE NO.    1
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    2
 0.0000E+00  0.1000E+01  0.5959E-01  0.5959E-01  0.5959E-01  0.5959E-01
 0.5959E-01  0.5959E-01  0.5959E-01  0.5959E-01  0.5959E-01  0.5959E-01
   MODE NO.    3
 0.0000E+00  0.5959E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    4
 0.0000E+00  0.5959E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    5
 0.0000E+00  0.5959E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    6
 0.0000E+00  0.5959E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    7
 0.0000E+00  0.5959E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    8
 0.0000E+00  0.5959E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    9
 0.0000E+00  0.5959E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
```

```
   MODE NO.   10
 0.0000E+00  0.5959E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.   11
 0.0000E+00  0.5959E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.   12
 0.0000E+00  0.5959E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION MU (FOR CROSS TERM OF RD AND RV)

   MODE NO.    1
 0.0000E+00  0.8400E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    2
-0.8400E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    3
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    4
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    5
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    6
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    7
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    8
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    9
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.   10
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.   11
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.   12
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


  COMBINED VALUES OF COUPLED MODAL DISPLACEMENTS

  DISPLACEMENTS AT PRIMARY SYSTEM CONNETING DOF

  DOF #      DISPLACEMENT


   2         0.4378E-01

   6         0.8778E-01

  DISPLACEMENTS AT SECONDARY SYSTEM DOF

  NODE       DX           DY           DZ          ROT-X        ROT-Y        ROT-Z


   1     0.4378E-01  0.1034E-32  0.1216E-32  0.0000E+00  0.1460E-33  0.1242E-33

   2     0.7188E-01  0.1035E-20  0.1216E-20  0.0000E+00  0.3147E-28  0.2677E-28

   3     0.9460E-01  0.7415E-21  0.1422E-20  0.0000E+00  0.1955E-24  0.6516E-25

   4     0.1097E+00  0.1689E-20  0.1009E-20  0.0000E+00  0.6516E-25  0.1303E-24

   5     0.1168E+00  0.5439E-21  0.1303E-20  0.0000E+00  0.6516E-25  0.1375E-33

   6     0.1152E+00  0.2234E-20  0.1217E-20  0.0000E+00  0.1042E-34  0.1303E-24

   7     0.1053E+00  0.1876E-20  0.2808E-21  0.0000E+00  0.1629E-25  0.1303E-24

   8     0.8778E-01  0.1876E-32  0.2808E-33  0.0000E+00  0.6277E-38  0.2101E-36

  COMBINED VALUES OF COUPLED MEMEBER FORCES


  NODE       FX           FY           FZ           MX           MY           MZ


   1     0.1129E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   2     0.1129E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   2     0.9040E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   3     0.9040E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   3     0.6162E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   4     0.6162E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   4     0.2892E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   5     0.2892E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   5     0.8576E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   6     0.8576E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   6     0.4050E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   7     0.4050E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 7    0.7117E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

 8    0.7117E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

COMBINED VALUES OF COUPLED SUPPORT REACTIONS

TYPE     NODE      SUPPORT REACTION

FX        1        0.1129E+03

FX        8        0.7117E+02
```

```
IDEN JB=1111 IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL SU=1 CV=2 TI=/CASE-3, 6-DOF PROBLEM/
FREQ FR=65 LO=1 MX=4 TI=/INCLUDING ALL MODES /
RCAS CA=1 EV=1 TY=1 SU=3 LO=0 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 SU=1 FX=1 FY=1 FZ=1
SPEC EV=1 ME=1 FP=0 SH=0
     LV=1 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=2 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=3 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=4 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=5 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=6 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=7 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=8 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
MATL CD=3 EC=28.0 SC=75 SH=75 KL=1
ANCH PT=1 LV=1
SPRS PT=2 DX=1.0 AZ=4000.0
LUMP PT=2 MA=38.64
MULR PT=2 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=2
SPRS PT=3 DX=1.0 AZ=4000.0
LUMP PT=3 MA=38.64
MULR PT=3 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=3
SPRS PT=4 DX=1.0 AZ=4000.0
LUMP PT=4 MA=38.64
MULR PT=4 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=4
SPRS PT=5 DX=1.0 AZ=4000.0
LUMP PT=5 MA=38.64
MULR PT=5 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=5
SPRS PT=6 DX=1.0 AZ=4000.0
LUMP PT=6 MA=38.64
MULR PT=6 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=6
SPRS PT=7 DX=1.0 AZ=4000.0
LUMP PT=7 MA=38.64
MULR PT=7 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=7
SPRS PT=8 DX=1.0 AZ=4000.0
ANCH PT=8 LV=8
ENDP
```

```
CREST/ PIPESTRESS RUN FOR CASE-3, TRUNCATED MODES OF S.S.
    6     2     2  6  4   1     0  11  1    1    0    1    1
  900    11    10     1.0E-6       20.5      386.4 0.10
       0.07        0.07        0.07        0.07        0.07        0.07
       0.02        0.02        0.02        0.02
    2     6
    1    22
100000000. 0.0
0.0       100000000.
1 8
9.85694300 28.9980000 46.4514500 61.2094000 72.4091330 79.3992200
0.36456 -0.77874  0.52020  -0.18773 -0.73349 -0.64560
 0.77874 0.73349 0.64560 -0.52020 0.36456 -0.18773
   0.1615E+01 -0.5171E+00  0.2841E+00  0.1737E+00  0.1029E+00  0.4834E-01
   10  0.020151
 8.4050.712511.6820.682818.4690.517425.8030.443029.4140.390330.4910.4236
46.6630.348861.2760.348272.5310.348679.7720.3498
   10  0.021093
 8.4050.710011.6820.680818.4690.512125.8030.439929.4140.388830.4910.4216
46.6630.348861.2760.348372.5310.348779.7720.3498
   10  0.029183
 8.4050.680111.6820.656518.4690.464425.8030.409029.4140.374930.4910.4024
46.6630.348561.2760.348572.5310.349079.7720.3498
   10  0.037682
 8.4050.649511.6820.629618.4690.431225.8030.384429.4140.364330.4910.3875
46.6630.348561.2760.348572.5310.349179.7720.3498
   10  0.047921
 8.4050.626511.6820.598718.4690.415225.8030.363829.4140.358130.4910.3749
46.6630.348661.2760.348672.5310.349279.7720.3497
   10  0.058319
 8.4050.603711.6820.570318.4690.406325.8030.360629.4140.354530.4910.3660
46.6630.348761.2760.348772.5310.349279.7720.3496
   10  0.069036
 8.4050.580211.6820.544418.4690.402125.8030.357629.4140.353230.4910.3594
46.6630.348861.2760.348772.5310.349279.7720.3495
   10  0.069702
 8.4050.578811.6820.543018.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.7720.3495
   10  0.069721
 8.4050.578811.6820.542918.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.7720.3495
   10  0.069726
 8.4050.578711.6820.542918.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.7720.3495
   10  0.070000
 8.4050.578211.6820.542318.4690.402225.8030.357429.4140.353130.4910.3589
46.6630.348861.2760.348772.5310.349279.7720.3495
```

```
CREST/ PIPESTRESS RUN FOR CASE-3. TRUNCATED MODES OF S.S.

  NUMBER OF PRIMARY DOF                NP=    6

  NUMBER OF CONNECTING DOF             NC=    2

  NUMBER OF PIPING ANCHORS             NA=    2

  NUMBER OF PRIMARY MODES             NPM=    6

  NUMBER OF SECONDARY MODES           NSM=    4

  NORMALIZATION INDEX FOR P.S.      NORMP=    1

  NORMALIZATION INDEX FOR S.S.      NORMS=    0

  OUTPUT TYPE INDICATOR            IPRINT=    1

  OUTPUT TYPE INDICATOR           IPRINTS=    1

  PRIMARY RESIDUAL MODE KEY         KRESP=    0

  SECONDARY RESIDUAL MODE KEY       KRESS=    1

  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX       NONZP=   11

  GLOBAL EARTHQUAKE DIRECTION  X=1  Y=2(VERTICAL)  Z=3       KFLG=    1

  NUMBER OF ITERATIONS             NITER=  900

  NUMBER OF SPECTRA CURVES        NCURVE=   11

  NUMBER OF SPECTRUM POINTS         MXLP=   10

  ITERATION TOLERANCE                TOL=  0.1000E-05

  RIGID FREQUENCY                     FR=  20.500

  SPECTRUM FACTOR                   SPTR= 386.400

  CORRELATION TOLERANCE               ET=   0.100


  TOTAL STORAGE REQUIRED   =     36015
  ACTUAL PROVIDED STORAGE  = 550000000

  PRIMARY DAMPING RATIOS

  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01

  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01

  CONECTING DOF # OF PRIMARY SYSTEM

    2    6

  CONECTING DOF # OF PIPING SUPPORTS

    1   22

  STIFFNESS OF CONNECTING DOF OF S.S.

  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09

  NODE # OF PIPING ANCHORS

    1    8

  MASS OF EACH SECONDARY DOF

  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00

  ADDRESS OF DIAGONAL ELEMENTS IN S.S. STIFFNESS MATRIX (JDG MATRIX)

    1    3    6   10   15   21   28   36   45   55   66   78   85   93  102  112
  123  135  142  150  159  169  180  192  199  207  216  226  237  249  256  264
  273  283  294  306  313  321  330  340  351  363  370  378  387  397  408  420

  LOWER TRIANGULAR STIFFNESS MATRIX OF SECONDARY SYSTEM

  0.1000E+09  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.4000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.8000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
```

```
 -0.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.4000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.8000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
 -0.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.4000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
 -0.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.4000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10

  SECONDARY FREQUENCIES (HZ)

  14.1659802  27.6216628  39.6923483  49.7727571

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        2

  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8571E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.7143E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5714E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4286E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2857E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1429E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5714E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        6

  0.5714E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1429E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2857E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4286E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5714E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.7143E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8571E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  UNNORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.1780E-04  0.3208E-04  0.4000E-04 -0.4000E-04
  0.55[illegible]E-68 -0.2230E-74  0.1330E-84 -0.1244E-92
  0.25[illegible]E-68 -0.1039E-74  0.6198E-85 -0.5793E-93
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.3119E-69  0.1247E-75 -0.7440E-86  0.6954E-94
  0.6694E-69 -0.2677E-75  0.1597E-85 -0.1493E-93
  0.4451E+00  0.8020E+00  0.1000E+01 -0.1000E+01
  0.5575E-56 -0.2230E-62  0.1330E-72 -0.1243E-80
  0.2598E-56 -0.1039E-62  0.6197E-73 -0.5793E-81
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.6723E-64  0.2689E-70  0.4524E-77  0.2652E-85
  0.3324E-60 -0.5772E-70  0.3443E-86  0.1060E-84
  0.8019E+00  0.1000E+01  0.4450E+00  0.4451E+00
  0.7984E-57 -0.3193E-63  0.1905E-73 -0.1781E-81
  0.3883E-56 -0.1553E-62  0.9246E-73 -0.8562E-81
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3323E-60 -0.3012E-66 -0.3683E-86 -0.5301E-85
 -0.5735E-69  0.2294E-75 -0.2263E-77  0.1988E-85
  0.1000E+01  0.4450E+00 -0.8019E+00  0.8019E+00
  0.3797E-56 -0.1518E-62  0.9058E-73 -0.8467E-81
 -0.8513E-57  0.2605E-63 -0.1554E-73  0.1453E-81
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.4153E-61 -0.2178E-75  0.1299E-85  0.1325E-85
  0.3599E-69 -0.1439E-75  0.4525E-77 -0.8027E-94
 0.1000E+01 -0.4450E+00 -0.8019E+00 -0.8019E+00
-0.4012E-56  0.1605E-62 -0.9571E-73  0.8940E-81
 0.6293E-56 -0.2517E-62  0.1501E-72 -0.1403E-80
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.6645E-60  0.3334E-75 -0.9050E-77  0.1060E-84
-0.9374E-69 -0.1506E-66  0.9050E-77  0.2491E-93
 0.8019E+00 -0.1000E+01  0.4450E+00 -0.4451E+00
-0.9638E-56  0.3856E-62 -0.2299E-72  0.2150E-80
-0.3823E-56  0.1529E-63 -0.9121E-73  0.8526E-81
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1661E-60 -0.4857E-75  0.9050E-77  0.1060E-94
 0.1329E-59 -0.1506E-66  0.9050E-77  0.1060E-86
 0.4451E+00 -0.8020E+00  0.1000E+01  0.1000E+01
 0.1307E-56 -0.5227E-63  0.3117E-73 -0.2915E-81
-0.3260E-57  0.1304E-63 -0.7779E-74  0.7273E-82
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.2077E-61  0.1679E-75 -0.1002E-85  0.6627E-86
 0.1314E-68 -0.3765E-67 -0.2263E-77  0.1325E-85
 0.1780E-04 -0.3209E-04  0.4000E-04  0.4000E-04
-0.1307E-68 -0.5227E-75  0.3110E-85 -0.2914E-93
-0.3261E-69  0.1304E-75 -0.7779E-86  0.7272E-94
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.8984E-74 -0.8902E-80  0.1383E-89  0.1535E-97
-0.5812E-73  0.9383E-79  0.1928E-89 -0.1109E-97


NORMALIZED MODE SHAPE OF SECONDARY SYSTEM

 0.2934E-04  0.5206E-04  0.6591E-04 -0.6591E-04
 0.9169E-68 -0.3675E-74  0.2192E-84 -0.2049E-92
 0.4281E-68 -0.1712E-74  0.1021E-84 -0.9547E-93
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.5139E-69  0.2055E-75 -0.1226E-85  0.1146E-93
 0.1103E-68 -0.4411E-75  0.2632E-85 -0.2460E-93
 0.7334E+00  0.1322E+01  0.1648E+01 -0.1648E+01
 0.9107E-56 -0.3675E-62  0.2192E-72 -0.2049E-80
 0.4281E-56 -0.1712E-62  0.1021E-72 -0.9547E-81
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.1108E-63  0.4431E-70  0.7455E-77  0.4371E-85
 0.5478E-60 -0.9512E-70  0.5674E-80  0.1747E-84
 0.1322E+01  0.1648E+01  0.7334E+00  0.7334E+00
 0.1316E-56 -0.5263E-63  0.3139E-73 -0.2935E-81
 0.6398E-56 -0.2559E-62  0.1527E-72 -0.1427E-80
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.5475E-60 -0.4963E-66 -0.6670E-86 -0.8736E-85
-0.9451E-69  0.3780E-75 -0.3729E-77  0.3276E-85
 0.1648E+01  0.7334E+00 -0.1322E+01  0.1322E+01
 0.6257E-56 -0.2502E-62  0.1493E-72 -0.1395E-80
-0.1073E-56  0.4293E-63 -0.2561E-73  0.2394E-81
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.6844E-61 -0.3588E-75  0.2141E-85  0.2184E-85
 0.5931E-69 -0.2372E-75  0.7457E-77 -0.1323E-93
 0.1648E+01 -0.7334E+00 -0.1322E+01 -0.1322E+01
-0.6612E-56  0.2644E-62 -0.1577E-72  0.1475E-80
 0.1037E-55 -0.4148E-62  0.2474E-72 -0.2313E-80
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1095E-59  0.5495E-75 -0.1491E-76  0.1747E-84
-0.1545E-68 -0.2482E-66  0.1491E-76  0.3445E-93
 0.1322E+01 -0.1648E+01  0.7334E+00 -0.7334E+00
-0.1588E-55  0.6354E-62 -0.3789E-72  0.3543E-80
-0.6300E-56  0.2520E-62 -0.1503E-72  0.1405E-80
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.2738E-60 -0.8005E-75  0.1491E-76  0.1747E-84
 0.2190E-59 -0.2482E-66  0.1491E-76  0.1747E-84
 0.7334E+00 -0.1322E+01  0.1648E+01  0.1648E+01
 0.2154E-56 -0.8614E-63  0.5137E-73 -0.4803E-81
-0.5372E-57  0.2149E-63 -0.1282E-73  0.1199E-81
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.3422E-61  0.2767E-75 -0.1651E-85  0.1092E-85
 0.2166E-68 -0.6204E-67 -0.3729E-77  0.2184E-85
 0.2934E-04 -0.5206E-04  0.6591E-04  0.6591E-04
 0.2154E-68 -0.8614E-75  0.5139E-85 -0.4803E-93
-0.5373E-69  0.2149E-75 -0.1282E-85  0.1198E-93
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.1481E-73 -0.1467E-79  0.2280E-89  0.2529E-97
-0.9577E-73  0.1546E-78  0.3178E-89 -0.1828E-97


PRIMARY FREQUENCIES (HZ)

  9.8569430  28.9980000  46.4514500  61.2094000  72.4091336  75.3992200


MODE SHAPE OF P.S. AT CONNECTING DOF        2

 0.3646E+00 -0.7787E+00  0.5202E+00 -0.1877E+00 -0.7335E+00 -0.6456E+00


MODE SHAPE OF P.S. AT CONNECTING DOF        6

 0.7787E+00  0.7335E+00  0.6456E+00 -0.5202E+00  0.3646E+00 -0.1877E+00


BASE INFLUENCE VECTOR FOR S.S.---UBS

 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


PARTICIPATION FACTOR FOR P.S.---GAMAP

 0.1615E+01 -0.5171E+00  0.2841E+00  0.1737E+00  0.1029E+00  0.4834E-01


INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10
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DAMPING RATIO FOR THIS CURVE =    0.20151E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
         1      0.8405E+01      0.7125E+00
         2      0.1168E+02      0.6028E+00
         3      0.1847E+02      0.5174E+00
         4      0.2580E+02      0.4439E+00
         5      0.2941E+02      0.3903E+00
         6      0.3049E+02      0.4236E+00
         7      0.4666E+02      0.3488E+00
         8      0.6128E+02      0.3482E+00
         9      0.7253E+02      P.3486E+00
        10      0.7977E+02      0.3498E+00


INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.21093E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
         1      0.8405E+01      0.7100E+00
         2      0.1168E+02      0.6008E+00
         3      0.1847E+02      0.5121E+00
         4      0.2580E+02      0.4399E+00
         5      0.2941E+02      0.7888E+00
         6      0.3049E+02      0.4216E+00
         7      0.4666E+03      0.3488E+00
         8      0.6128E+02      0.3483E+00
         9      0.7253E+02      0.3487E+00
        10      0.7977E+02      0.3498E+00


INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.29183E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
         1      0.8405E+01      0.6801E+00
         2      0.1168E+02      0.6565E+00
         3      0.1847E+02      0.4664E+00
         4      0.2580E+02      0.4090E+00
         5      0.2941E+02      0.3749E+00
         6      0.3049E+02      0.4024E+00
         7      0.4666E+02      0.3485E+00
         8      0.6128E+02      0.3485E+00
         9      0.7253E+03      0.3490E+00
        10      0.7977E+02      0.3498E+00


INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.37682E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
         1      0.8405E+01      0.6495E+00
         2      0.1168E+02      0.6296E+00
         3      0.1847E+03      0.4312E+00
         4      0.2580E+02      0.3844E+00
         5      0.2941E+02      0.3643E+00
         6      0.3049E+02      0.3875E+00
         7      0.4666E+02      0.3485E+00
         8      0.6128E+02      0.3485E+00
         9      0.7253E+02      0.3491E+00
        10      0.7977E+02      0.3498E+00


INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.47921E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
         1      0.8405E+01      0.6265E+00
         2      0.1168E+02      0.5987E+00
         3      0.1847E+02      0.4152E+00
         4      0.2580E+02      0.3638E+00
         5      0.2941E+02      0.3561E+00
         6      0.3049E+02      0.3749E+00
         7      0.4666E+02      0.3486E+00
         8      0.6128E+02      0.3486E+00
         9      0.7253E+02      0.3492E+00
        10      0.7977E+02      0.3497E+00


INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.58319E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
         1      0.8405E+01      0.6037E+00
         2      0.1168E+02      0.5703E+00
         3      0.1847E+02      0.4063E+00
         4      0.2580E+02      0.3606E+00
         5      0.2941E+02      0.3545E+00
         6      0.3049E+02      0.3640E+00
         7      0.4666E+02      0.3487E+00
         8      0.6128E+02      0.3487E+00
         9      0.7253E+02      0.3492E+00
        10      0.7977E+02      0.3496E+00
```

```
INPUT SPECTRUM CURVE NUMBER =  7

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69036E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
        1     0.8405E+01     0.5802E+00
        2     0.1168E+02     0.5444E+00
        3     0.1847E+02     0.4021E+00
        4     0.2580E+02     0.3576E+00
        5     0.2941E+02     0.3532E+00
        6     0.3049E+02     0.3594E+00
        7     0.4666E+02     0.3488E+00
        8     0.6128E+02     0.3487E+00
        9     0.7253E+02     0.3492E+00
       10     0.7977E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER =  8

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69702E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
        1     0.8405E+01     0.5788E+00
        2     0.1168E+02     0.5430E+00
        3     0.1847E+02     0.4022E+00
        4     0.2580E+02     0.3574E+00
        5     0.2941E+02     0.3532E+00
        6     0.3049E+02     0.3590E+00
        7     0.4666E+02     0.3488E+00
        8     0.6128E+02     0.3487E+00
        9     0.7253E+02     0.3492E+00
       10     0.7977E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER =  9

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69721E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
        1     0.8405E+01     0.5788E+00
        2     0.1168E+02     0.5429E+00
        3     0.1847E+02     0.4022E+00
        4     0.2580E+02     0.3574E+00
        5     0.2941E+02     0.3532E+00
        6     0.3049E+02     0.3590E+00
        7     0.4666E+02     0.3488E+00
        8     0.6128E+02     0.3487E+00
        9     0.7253E+02     0.3492E+00
       10     0.7977E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER = 10

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69726E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
        1     0.8405E+01     0.5787E+00
        2     0.1168E+02     0.5429E+00
        3     0.1847E+02     0.4023E+00
        4     0.2580E+02     0.3574E+00
        5     0.2941E+02     0.3532E+00
        6     0.3049E+02     0.3590E+00
        7     0.4666E+02     0.3488E+00
        8     0.6128E+02     0.3487E+00
        9     0.7253E+02     0.3492E+00
       10     0.7977E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER = 11

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.70000E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
        1     0.8405E+01     0.5782E+00
        2     0.1168E+02     0.5423E+00
        3     0.1947E+02     0.4022E+00
        4     0.2580E+02     0.357.E+00
        5     0.2941E+02     0.3531E+00
        6     0.3049E+02     0.3589E+00
        7     0.4666E+02     0.3488E+00
        8     0.6128E+02     0.3487E+00
        9     0.7253E+02     0.3492E+00
       10     0.7977E+02     0.3495E+00



        ***********************************************************
        *                                                         *
        *                                                         *
        *                                                         *
        *                  A COMPUTER PROGRAM FOR                 *
        *                                                         *
        *                                                         *
        *   COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS *
        *                                                         *
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        *                      " C R E S T "                      *
        *                                                         *
        *                                                         *
        *                      DEVELOPED BY                       *
        *                                                         *
        *                    AJAYA KUMAR GUPTA                    *
        *              JING-WEN JAW    ABHINAV GUPTA       *      *
        *                                                         *
        *            NORTH CAROLINA STATE UNIVERSITY              *
        *               RALEIGH, NORTH CAROLINA                   *
        *                                                         *
        *                     REVISION-1.0                       **
        *                                                         *
        *                                                         *
        ***********************************************************


PARTICIPATION FACTOR FOR S.S.---GAMAS
0.7406E+00  0.1057E-06  0.2120E+00  0.3451E-09


MASS RATIOS

  PRIMARY SYSTEM MODE     1
0.1792E+00  0.5283E-02  0.1468E-01  0.7792E-03

  PRIMARY SYSTEM MODE     2
0.2807E-03  0.7043E-01  0.2300E-04  0.1039E-01

  PRIMARY SYSTEM MODE     3
0.1863E+00  0.4843E-03  0.1526E-01  0.7143E-04

  PRIMARY SYSTEM MODE     4
0.6872E-01  0.3404E-02  0.5629E-02  0.5021E-03

  PRIMARY SYSTEM MODE     5
0.1866E-01  0.3713E-01  0.1529E-02  0.5477E-02

  PRIMARY SYSTEM MODE     6
0.9522E-01  0.6457E-02  0.7799E-02  0.9523E-03

C O U P L E D   F R E Q U E N C I E S   A N D   M O D E   S H A P E S   E X T R A C T I O N

NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION   NITER =  900

CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                        TOL = 0.10000E-05

COUPLED  FREQUENCY  DAMPING RATIO
 MODE       (HZ)        (%)

  1     0.87253E+01    0.54673E+01
  2     0.16201E+02    0.36661E+01
  3     0.25350E+02    0.31912E+01
  4     0.32361E+02    0.51775E+01
  5     0.39227E+02    0.24126E+01
  6     0.47677E+02    0.66840E+01
  7     0.50053E+02    0.21504E+01
  8     0.61516E+02    0.69319E+01
  9     0.72976E+02    0.69077E+01
 10     0.79699E+02    0.69250E+01

UNIT DISPLACEMENT & UNIT VELOCITY*W RESPONSE


COUPLED MODE NO.    1


  1     0.55035E+00    0.10860E-01
  2     0.11252E+01    0.22759E-01
  3     0.11114E-04   -0.12850E-05
  4     0.13187E-68   -0.44066E-69
  5     0.61441E-69   -0.20902E-69
  6     0.00000E+00    0.00000E+00
  7    -0.73761E-70    0.25093E-70
  8     0.15831E-69   -0.53861E-70
  9     0.27786E+00   -0.32126E-01
 10     0.13181E-56   -0.44840E-57
 11     0.61436E-57   -0.20902E-57
 12     0.00000E+00    0.00000E+00
 13     0.35446E-61    0.72267E-63
 14     0.17438E-60   -0.24779E-61
 15     0.48746E+00   -0.57373E-01
 16     0.18877E-57   -0.64239E-58
 17     0.91795E-57   -0.31241E-57
 18     0.00000E+00    0.00000E+00
 19    -0.37470E-62   -0.28387E-61
 20    -0.22066E-61   -0.44417E-63
 21     0.60664E+00   -0.71067E-01
 22     0.89825E-57   -0.30550E-57
 23    -0.15402E-57    0.52409E-58
 24     0.00000E+00    0.00000E+00
 25    -0.21597E-61    0.31042E-62
 26     0.85143E-70   -0.28959E-70
 27     0.62054E+00   -0.72202E-01
 28    -0.94925E-57    0.32285E-57
 29     0.14886E-56   -0.50629E-57
 30     0.00000E+00    0.00000E+00
 31     0.41492E-60   -0.48299E-61
 32     0.34680E-61    0.68434E-63
 33     0.52202E+00   -0.60438E-01
 34    -0.22788E-56    0.77553E-57
 35    -0.90426E-57    0.30762E-57
 36     0.00000E+00    0.00000E+00
 37     0.67486E-61   -0.13825E-61
 38     0.75735E-60   -0.98098E-61
 39     0.31187E+00   -0.35035E-01
 40     0.30926E-57   -0.10518E-57
 41    -0.77071E-58    0.26232E-58
 42     0.00000E+00    0.00000E+00
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   43    -0.19566E-61    0.13769E-62
   44     0.26401E-61    0.52972E-63
   45     0.12474E-04   -0.14014E-05
   46     0.30911E-69   -0.10516E-69
   47    -0.77126E-70    0.26235E-70
   48     0.00000E+00    0.00000E+00
   49    -0.22020E-73    0.32374E-75
   50    -0.72154E-73    0.35043E-74

 COUPLED MODE NO.    2

    1     0.53367E-02   -0.27779E-02
    2     0.17634E-01   -0.92239E-02
    3    -0.15971E-05    0.77275E-06
    4    -0.59538E-69    0.29060E-69
    5    -0.27737E-69    0.13539E-69
    6     0.00000E+00    0.00000E+00
    7     0.33298E-70   -0.16253E-70
    8    -0.71474E-70    0.34886E-70
    9    -0.39630E-01    0.19320E-01
   10    -0.59530E-57    0.29056E-57
   11    -0.27737E-57    0.13538E-57
   12     0.00000E+00    0.00000E+00
   13     0.19709E-62   -0.10304E-62
   14    -0.28883E-61    0.13863E-61
   15    -0.72105E-01    0.34874E-01
   16    -0.85247E-58    0.41609E-58
   17    -0.41458E-57    0.20236E-57
   18     0.00000E+00    0.00000E+00
   19    -0.39464E-61    0.19400E-61
   20    -0.11301E-62    0.59088E-63
   21    -0.89304E-01    0.43111E-01
   22    -0.40539E-57    0.19787E-57
   23     [illegible]   -0.33946E-58
   24     0.00000E+00    0.00000E+00
   25     0.38[illegible]29E-62   -0.18341E-62
   26    -0.38428E-70    0.18756E-70
   27    -0.87851E-01    0.42209E-01
   28     0.42842E-57   -0.20911E-57
   29    -0.67184E-57    0.32792E-57
   30     0.00000E+00    0.00000E+00
   31    -0.58475E-61    0.28109E-61
   32     0.11859E-62   -0.61847E-63
   33    -0.68571E-01    0.32669E-01
   34     0.10292E-56   -0.50232E-57
   35     0.40321E-57   -0.19525E-57
   36     0.00000E+00    0.00000E+00
   37    -0.17360E-61    0.84632E-62
   38    -0.12243E-60    0.59091E-61
   39    -0.36600E-01    0.17254E-01
   40    -0.13957E-57    0.68122E-58
   41     0.34811E-58   -0.16991E-58
   42     0.00000E+00    0.00000E+00
   43     0.15078E-62   -0.71137E-63
   44     0.12783E-62   -0.66819E-63
   45    -0.14640E-05    0.69013E-06
   46    -0.13955E-69    0.68112E-70
   47     0.34014E-70   -0.16992E-70
   48     0.00000E+00    0.00000E+00
   49    -0.39879E-77    0.35287E-76
   50     0.33772E-74   -0.15505E-74

 COUPLED MODE NO.    3

    1     0.21963E+00    0.33227E-01
    2    -0.15634E+00   -0.32060E-01
    3     0.15587E-04   -0.64087E-06
    4    -0.99875E-69   -0.17911E-70
    5    -0.46512E-69   -0.83179E-71
    6     0.00000E+00    0.00000E+00
    7     0.55830E-70    0.99750E-72
    8    -0.11990E-69   -0.21501E-71
    9     0.38970E+00   -0.16022E-01
   10    -0.99871E-57   -0.17910E-58
   11    -0.46512E-57   -0.83179E-59
   12     0.00000E+00    0.00000E+00
   13    -0.41274E-61   -0.84664E-62
   14    -0.44931E-60   -0.69897E-61
   15     0.43686E+00   -0.23061E-01
   16    -0.14297E-57   -0.25581E-59
   17    -0.69553E-57   -0.12473E-58
   18     0.00000E+00    0.00000E+00
   19    -0.85572E-61   -0.15477E-62
   20     0.61433E-62    0.20396E-62
   21     0.14523E+00   -0.10948E-01
   22    -0.67997E-57   -0.12194E-58
   23     0.11663E-57    0.20858E-59
   24     0.00000E+00    0.00000E+00
   25     0.16840E-61    0.22331E-62
   26    -0.64457E-70   -0.11559E-71
   27    -0.26926E+00    0.97021E-02
   28     0.71827E-57    0.12835E-58
   29    -0.11269E-55   -0.20209E-58
   30     0.00000E+00    0.00000E+00
   31    -0.37444E-61   -0.63029E-63
   32     0.11600E-60    0.17549E-61
   33    -0.52218E+00    0.21155E-01
   34     0.17265E-56    0.30963E-58
   35     0.68475E-57    0.12280E-58
   36     0.00000E+00    0.00000E+00
   37     0.18921E-60    0.34325E-61
   38     0.32225E-60    0.67705E-61
   39    -0.42347E+00    0.14408E-01
   40    -0.23410E-57   -0.41981E-59
   41     0.58403E-58    0.10473E-59
   42     0.00000E+00    0.00000E+00
   43    -0.91895E-63   -0.18822E-64
   44     0.83562E-62    0.15408E-63
   45    -0.16938E-04    0.57628E-06
   46    -0.23414E-69   -0.42073E-71
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   47     0.58410E-70    0.10496E-71
   48     0.00000E+00    0.00000E+00
   49    -0.46893E-74   -0.87495E-76
   50    -0.80841E-74   -0.15520E-75

 COUPLED MODE NO.    4

    1     0.20477E+00   -0.36245E-01
    2    -0.21136E+00    0.34084E-01
    3    -0.12671E-04   -0.13133E-06
    4     0.14469E-69    0.47539E-70
    5     0.67676E-70    0.22100E-70
    6     0.00000E+00    0.00000E+00
    7    -0.81350E-71   -0.26512E-71
    8     0.17370E-70    0.57070E-71
    9    -0.31679E+00   -0.32835E-02
   10     0.14469E-57    0.47539E-58
   11     0.67675E-58    0.22100E-58
   12     0.00000E+00    0.00000E+00
   13    -0.91619E-61    0.14774E-61
   14    -0.71415E-60    0.12436E-60
   15    -0.45222E+00    0.16508E-01
   16     0.20786E-58    0.67956E-59
   17     0.10077E-57    0.33107E-58
   18     0.00000E+00    0.00000E+00
   19     0.13075E-61    0.62931E-62
   20     0.23618E-61   -0.34595E-62
   21    -0.21081E+00    0.13054E-01
   22     0.98507E-58    0.32365E-58
   23    -0.16970E-58   -0.55419E-59
   24     0.00000E+00    0.00000E+00
   25     0.21984E-61   -0.39961E-62
   26     0.93379E-71    0.30680E-71
   27     0.22444E+00   -0.94133E-02
   28    -0.10464E-57   -0.34111E-58
   29     0.16326E-57    0.53639E-58
   30     0.00000E+00    0.00000E+00
   31     0.33008E-62    0.10934E-62
   32     0.17752E-60   -0.31422E-61
   33     0.45034E+00   -0.12073E-01
   34    -0.25014E-57   -0.82183E-58
   35    -0.99201E-58   -0.32593E-58
   36     0.00000E+00    0.00000E+00
   37     0.36158E-60   -0.60698E-61
   38     0.72812E-60   -0.11976E-60
   39     0.31422E+00    0.41870E-02
   40     0.33913E-58    0.11142E-58
   41    -0.84615E-59   -0.27799E-59
   42     0.00000E+00    0.00000E+00
   43     0.25380E-63    0.82905E-64
   44    -0.14281E-62   -0.46830E-63
   45     0.12644E-04    0.16767E-06
   46     0.33815E-70    0.11159E-70
   47    -0.84355E-71   -0.27838E-71
   48     0.00000E+00    0.00000E+00
   49     0.84048E-75    0.27674E-75
   50     0.16412E-74    0.54238E-75

 COUPLED MODE NO.    5

    1     0.30212E-02    0.34840E-02
    2     0.23276E-02    0.33066E-02
    3     0.19755E-05    0.11205E-05
    4    -0.16073E-69   -0.20354E-69
    5    -0.74877E-70   -0.94017E-70
    6     0.00000E+00    0.00000E+00
    7     0.89886E-71    0.11382E-70
    8    -0.19296E-70   -0.24434E-70
    9     0.49389E-01    0.28012E-01
   10    -0.16073E-57   -0.20356E-57
   11    -0.74876E-58   -0.94816E-58
   12     0.00000E+00    0.00000E+00
   13     0.14847E-62    0.21088E-62
   14    -0.98456E-62   -0.10677E-61
   15     0.19079E-01    0.92318E-02
   16    -0.23015E-58   -0.29144E-58
   17    -0.11194E-57   -0.14175E-57
   18     0.00000E+00    0.00000E+00
   19    -0.14890E-61   -0.18872E-61
   20    -0.12224E-62   -0.16079E-62
   21    -0.45002E-01   -0.20754E-01
   22    -0.10943E-57   -0.13857E-57
   23     0.18776E-58    0.23776E-58
   24     0.00000E+00    0.00000E+00
   25     0.63882E-63    0.75113E-63
   26    -0.10373E-70   -0.13135E-70
   27    -0.44459E-01   -0.20628E-01
   28     0.11564E-57    0.14643E-57
   29    -0.18135E-57   -0.22965E-57
   30     0.00000E+00    0.00000E+00
   31    -0.25248E-62   -0.31429E-62
   32     0.38482E-62    0.44376E-62
   33     0.20004E-01    0.94559E-02
   34     0.27787E-57    0.35187E-57
   35     0.11020E-57    0.13954E-57
   36     0.00000E+00    0.00000E+00
   37     0.25148E-63   -0.56087E-63
   38    -0.32843E-62   -0.58361E-62
   39     0.49765E-01    0.28115E-01
   40    -0.37673E-58   -0.47705E-58
   41     0.93994E-57    0.11902E-58
   42     0.00000E+00    0.00000E+00
   43    -0.34695E-63   -0.44243E-63
   44     0.17034E-62    0.21626E-62
   45     0.19905E-05    0.11246E-05
   46    -0.37673E-70   -0.47705E-70
   47     0.93980E-71    0.11901E-76
   48     0.00000E+00    0.00000E+00
   49    -0.10247E-74   -0.13017E-74
   50    -0.20935E-74   -0.26633E-74
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COUPLED MODE NO.    6


   1     0.16071E+00    -0.62144E-02
   2     0.17978E+00    -0.34228E-02
   3    -0.10663E-04     0.23259E-07
   4    -0.13531E-67     0.40749E-69
   5    -0.63033E-68     0.18983E-69
   6     0.00000E+00     0.00000E+00
   7     0.75669E-69    -0.22787E-70
   8    -0.16243E-68     0.48919E-70
   9    -0.24659E+00     0.58151E-03
  10    -0.13531E-55     0.40749E-57
  11    -0.63033E-56     0.18982E-57
  12     0.00000E+00     0.00000E+00
  13     0.16934E-60    -0.32260E-62
  14    -0.52515E-60     0.30797E-61
  15    -0.33491E+00    -0.15853E-01
  16    -0.19375E-56     0.58348E-58
  17    -0.94232E-56     0.28379E-57
  18     0.00000E+00     0.00000E+00
  19    -0.12759E-59     0.38420E-61
  20    -0.11759E-60     0.30722E-62
  21    -0.43210E-01     0.96833E-02
  22    -0.92116E-56     0.27742E-57
  23     0.15806E-56    -0.47600E-58
  24     0.00000E+00     0.00000E+00
  25     0.41896E-61    -0.17303E-62
  26    -0.87321E-69     0.26298E-70
  27    -0.95682E-01     0.47522E-01
  28     0.97346E-56    -0.29316E-57
  29    -0.15267E-55     0.45977E-57
  30     0.00000E+00     0.00000E+00
  31    -0.14236E-60     0.42991E-62
  32     0.26399E-60    -0.11693E-61
  33    -0.29172E+00     0.23360E-02
  34     0.23392E-55    -0.70446E-57
  35     0.92767E-56    -0.27938E-57
  36     0.00000E+00     0.00000E+00
  37    -0.10995E-60    -0.41761E-62
  38    -0.43345E-60    -0.19037E-62
  39    -0.24493E+00    -0.51235E-01
  40    -0.31713E-56     0.95507E-58
  41     0.79127E-57    -0.23830E-58
  42     0.00000E+00     0.00000E+00
  43    -0.33197E-61     0.99911E-63
  44     0.15058E-60    -0.45330E-62
  45    -0.97970E-05    -0.20493E-05
  46    -0.31713E-68     0.95509E-70
  47     0.79112E-69    -0.23826E-70
  48     0.00000E+00     0.00000E+00
  49    -0.91675E-73     0.27600E-74
  50    -0.19214E-72     0.57840E-74


COUPLED MODE NO.    7


   1     0.10174E-02     0.14753E-03
   2    -0.34507E-02     0.30647E-02
   3    -0.17144E-05    -0.94308E-07
   4     0.11233E-69    -0.56052E-70
   5     0.52334E-70    -0.26113E-70
   6     0.00000E+00     0.00000E+00
   7    -0.62827E-71     0.31348E-71
   8     0.13485E-70    -0.67290E-71
   9    -0.42861E-01    -0.23570E-02
  10     0.11233E-57    -0.56053E-58
  11     0.52334E-58    -0.26113E-58
  12     0.00000E+00     0.00000E+00
  13    -0.35800E-62     0.11049E-62
  14    -0.12952E-61     0.10177E-62
  15     0.19205E-01     0.33263E-03
  16     0.16086E-58    -0.80265E-59
  17     0.78228E-58    -0.39037E-58
  18     0.00000E+00     0.00000E+00
  19     0.10628E-61    -0.53001E-62
  20     0.15255E-62    -0.59032E-63
  21     0.34526E-01     0.12637E-02
  22     0.76471E-58    -0.38160E-58
  23    -0.13123E-56     0.65481E-59
  24     0.00000E+00     0.00000E+00
  25     0.19704E-63     0.72197E-64
  26     0.72490E-71    -0.36173E-71
  27    -0.33247E-01    -0.19065E-02
  28    -0.80825E-58     0.40329E-58
  29     0.12674E-57    -0.63243E-58
  30     0.00000E+00     0.00000E+00
  31     0.10684E-62    -0.54349E-63
  32     0.21105E-62     0.30583E-63
  33    -0.15345E-01    -0.21886E-02
  34    -0.19419E-57     0.96902E-58
  35    -0.77011E-58     0.38430E-58
  36     0.00000E+00     0.00000E+00
  37     0.95350E-62    -0.20384E-62
  38     0.20672E-61    -0.48920E-62
  39     0.46359E-01     0.55963E-03
  40     0.26327E-58    -0.13137E-58
  41    -0.65688E-59     0.32779E-59
  42     0.00000E+00     0.00000E+00
  43     0.28204E-63    -0.14015E-63
  44    -0.12617E-62     0.62855E-63
  45     0.18547E-05     0.22384E-07
  46     0.26325E-70    -0.13137E-70
  47    -0.65670E-71     0.32772E-71
  48     0.00000E+00     0.00000E+00
  49     0.76974E-75    -0.38333E-75
  50     0.16205E-74    -0.80638E-75


COUPLED MODE NO.    8
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   1    -0.33508E-01     0.84403E-04
   2    -0.91174E-01    -0.17624E-03
   3     0.12501E-05    -0.58655E-07
   4     0.86512E-68     0.51860E-71
   5     0.40303E-68     0.24164E-71
   6     0.00000E+00     0.00000E+00
   7    -0.48362E-69    -0.29010E-72
   8     0.10386E-68     0.62257E-72
   9     0.31254E-01    -0.14664E-02
  10     0.86513E-56     0.51862E-59
  11     0.40303E-56     0.24165E-59
  12     0.00000E+00     0.00000E+00
  13    -0.14763E-60    -0.27300E-63
  14     0.47362E-61    -0.13735E-62
  15     0.77467E-01     0.19125E-02
  16     0.12388E-56     0.74275E-50
  17     0.60250E-56     0.36118E-59
  18     0.00000E+00     0.00000E+00
  19     0.82736E-60     0.52866E-63
  20     0.96883E-61     0.10342E-63
  21     0.54593E-01     0.63810E-03
  22     0.58896E-56     0.35304E-59
  23    -0.10106E-56    -0.60596E-60
  24     0.00000E+00     0.00000E+00
  25    -0.16537E-61     0.37362E-64
  26     0.55030E-69     0.33466E-72
  27     0.60602E-01    -0.42096E-02
  28    -0.62242E-56    -0.37320E-59
  29     0.97610E-56     0.58510E-59
  30     0.00000E+00     0.00000E+00
  31     0.54689E-61    -0.68913E-64
  32    -0.10495E-60     0.26444E-63
  33     0.10788E+00    -0.20152E-03
  34    -0.14956E-55    -0.89657E-59
  35    -0.59317E-56    -0.35555E-59
  36     0.00000E+00     0.00000E+50
  37     0.20178E-60     0.79309E-63
  38     0.48959E-60     0.14828E-62
  39     0.10181E+00     0.55503E-02
  40     0.20276E-56     0.12154E-59
  41    -0.50592E-57    -0.30329E-60
  42     0.00000E+00     0.00000E+00
  43     0.23291E-61     0.19744E-64
  44    -0.10000E-60    -0.70362E-64
  45     0.40722E-05     0.22200E-06
  46     0.20276E-68     0.12153E-71
  47    -0.50581E-69    -0.30316E-72
  48     0.00000E+00     0.00000E+00
  49     0.61418E-73     0.04661E-76
  50     0.13108E-72     0.10160E-75


COUPLED MODE NO.    9


   1    -0.66587E-01     0.82817E-03
   2     0.36159E-01    -0.18846E-03
   3     0.24116E-05     0.41517E-07
   4     0.28551E-68    -0.60310E-70
   5     0.13297E-68    -0.28092E-70
   6     0.00000E+00     0.00000E+00
   7    -0.15961E-69     0.33721E-71
   8     0.34275E-69    -0.72401E-71
   9     0.60293E-01     0.10380E-02
  10     0.28552E-56    -0.60310E-58
  11     0.13297E-56    -0.28092E-58
  12     0.00000E+00     0.00000E+00
  13     0.79669E-61    -0.41466E-63
  14     0.10466E-59    -0.11937E-61
  15     0.51038E-01    -0.11634E-02
  16     0.40875E-57    -0.86350E-59
  17     0.19894E-56    -0.42002E-58
  18     0.00000E+00     0.00000E+00
  19     0.27672E-60    -0.57925E-62
  20    -0.31569E-62    -0.24870E-63
  21     0.58307E-02    -0.14849E-02
  22     0.19437E-56    -0.41058E-58
  23    -0.33344E-57     0.70443E-59
  24     0.00000E+00     0.00000E+00
  25    -0.37497E-61     0.47536E-63
  26     0.18425E-69    -0.38921E-71
  27     0.17773E-01     0.55993E-03
  28    -0.20534E-56     0.43382E-58
  29     0.32214E-56    -0.68046E-58
  30     0.00000E+00     0.00000E+00
  31     0.12826E-61    -0.30366E-63
  32    -0.29356E-60     0.36510E-62
  33    -0.67837E-02     0.32902E-03
  34    -0.49359E-56     0.10426E-57
  35    -0.19575E-56     0.41348E-58
  36     0.00000E+00     0.00000E+00
  37    -0.44976E-60     0.44059E-62
  38    -0.88028E-60     0.83562E-62
  39    -0.33377E-01    -0.12425E-02
  40     0.66917E-57    -0.14135E-58
  41    -0.16697E-57     0.35269E-59
  42     0.00000E+00     0.00000E+00
  43     0.79837E-62    -0.16676E-63
  44    -0.33538E-61     0.70508E-63
  45    -0.13350E-05    -0.49698E-07
  46     0.66931E-69    -0.14137E-70
  47    -0.16697E-69     0.35265E-71
  48     0.00000E+00     0.00000E+00
  49     0.20676E-73    -0.43419E-75
  50     0.44457E-73    -0.93152E-75


COUPLED MODE NO.   10


   1    -0.35942E-01    -0.11146E-03
   2    -0.94595E-02     0.11857E-04
   3     0.11869E-05     0.20321E-07
   4    0.50492E-68    0.10627E-70
   5    0.23520E-68    0.49499E-71
   6    0.00000E+00    0.00000E+00
   7   -0.28235E-69   -0.59419E-72
   8    0.60615E-69    0.12757E-71
   9    0.29673E-01    0.50803E-03
  10    0.50493E-56    0.10627E-58
  11    0.23520E-56    0.49499E-59
  12    0.00000E+00    0.00000E+00
  13   -0.24940E-61    0.31031E-64
  14    0.52684E-60    0.18149E-62
  15    0.41195E-01    0.60415E-04
  16    0.72298E-57    0.15215E-59
  17    0.35165E-56    0.74009E-59
  18    0.00000E+00    0.00000E+00
  19    0.48700E-60    0.10416E-62
  20    0.36063E-61    0.57683E-64
  21    0.16225E-01   -0.38075E-03
  22    0.34374E-56    0.72344E-59
  23   -0.58980E-57   -0.12412E-59
  24    0.00000E+00    0.00000E+00
  25   -0.24812E-61   -0.72513E-64
  26    0.32585E-69    0.68578E-72
  27    0.18920E-01   -0.27478E-04
  28   -0.36323E-56   -0.76441E-59
  29    0.56969E-56    0.11990E-58
  30    0.00000E+00    0.00000E+00
  31    0.19018E-61   -0.11987E-64
  32   -0.18899E-60   -0.58610E-63
  33    0.25822E-01    0.13660E-03
  34   -0.87290E-56   -0.18372E-58
  35   -0.34617E-56   -0.72856E-59
  36    0.00000E+00    0.00000E+00
  37   -0.13447E-60   -0.6514[illegible]
  38   -0.24042E-60   -0.132[illegible]
  39    0.73964E-02   -0.95025E-04
  40    0.11834E-56    0.24906E-59
  41   -0.29528E-57   -0.62146E-60
  42    0.00000E+00    0.00000E+00
  43    0.14327E-61    0.33111E-64
  44   -0.59686E-61   -0.13094E-63
  45    0.29585E-06   -0.38009E-08
  46    0.11835E-68    0.24909E-71
  47   -0.29523E-69   -0.62137E-72
  48    0.00000E+00    0.00000E+00
  49    0.36844E-73    0.81559E-76
  50    0.79432E-73    0.17897E-75

BASE RESPONSE SPECTRA DATA

TOTAL NUMBER OF INPUT SPECTRUM CURVE = 11

MAXIMUM NUMBER OF DEFINITION POINTS IN INPUT SPECTRUM CURVES = 10

SPECTRUM SCALE FACTOR = 0.38640E-03

RIGID FREQUENCY = 0.20500E+02



  SPECTRUM PARAMETERS

  CURVE NO   1  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20151E-01

     INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

        1     0.8405E+01     0.7125E+00          0.7125E+00
        2     0.1168E+02     0.6828E+00          0.7109E+00
        3     0.1847E+02     0.5174E+00          0.3787E+00
        4     0.2580E+02     0.4430E+00          0.2321E+00
        5     0.2941E+02     0.3903E+00          0.1794E+00
        6     0.3049E+02     0.4236E+00          0.1878E+00
        7     0.4666E+02     0.3688E+00          0.1010E+00
        8     0.6128E+02     0.3482E+00          0.7681E-01
        9     0.7253E+02     0.3486E+00          0.6497E-01
       10     0.7977E+02     0.3490E+00          0.5928E-01

  SPECTRUM PARAMETERS

  CURVE NO   2  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.21093E-01

     INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

        1     0.8405E+01     0.7100E+00          0.7100E+00
        2     0.1168E+02     0.6808E+00          0.7096E+00
        3     0.1847E+02     0.5121E+00          0.3748E+00
        4     0.2580E+02     0.4399E+00          0.2305E+00
        5     0.2941E+02     0.3886E+00          0.1787E+00
        6     0.3049E+02     0.4216E+00          0.1869E+00
        7     0.4666E+02     0.3488E+00          0.1010E+00
        8     0.6128E+02     0.3483E+00          0.7684E-01
        9     0.7253E+02     0.3487E+00          0.6499E-01
       10     0.7977E+02     0.3498E+00          0.5928E-01
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  SPECTRUM PARAMETERS

  CURVE NO   3  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.29183E-01

     INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

        1     0.8405E+01     0.6801E+00          0.6801E+00
        2     0.1168E+02     0.6565E+00          0.6897E+00
        3     0.1847E+02     0.4644E+00          0.3399E+00
        4     0.2580E+02     0.4090E+00          0.2143E+00
        5     0.2941E+02     0.3749E+00          0.1723E+00
        6     0.3049E+02     0.4024E+00          0.1784E+00
        7     0.4666E+02     0.3485E+00          0.1010E+00
        8     0.6128E+02     0.3485E+00          0.7688E-01
        9     0.7253E+02     0.3490E+00          0.6504E-01
       10     0.7977E+02     0.3498E+00          0.5929E-01

  SPECTRUM PARAMETERS

  CURVE NO   4  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.37682E-01

     INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

        1     0.8405E+01     0.6495E+00          0.6495E+00
        2     0.1168E+02     0.6296E+00          0.6658E+00
        3     0.1847E+02     0.4312E+00          0.3156E+00
        4     0.2580E+02     0.3844E+00          0.2014E+00
        5     0.2941E+02     0.3643E/00          0.1674E+00
        6     0.3049E+02     0.3875E+00          0.1718E+00
        7     0.4666E+02     0.3485P+00          0.1010E+00
        8     0.6128E+02     0.3485E+00          0.7689E-01
        9     0.7253E+02     0.3491E+00          0.6506E-01
       10     0.7977E+02     0.3496E+00          0.5928E-01

  SPECTRUM PARAMETERS

  CURVE NO   5  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.47921E-01

     INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

        1     0.8405E+01     0.6265E+00          0.6265E+00
        2     0.1168E+02     0.5987E+00          0.6373E+00
        3     0.1847E+02     0.4152E+00          0.3039E+00
        4     0.2580E+02     0.3639E+00          0.1906E+00
        5     0.2941E+02     0.3581E+00          0.1646E+00
        6     0.3049E+02     0.3749E+00          0.1662E+00
        7     0.4666E+02     0.3486E+00          0.1010E+00
        8     0.6128E+02     0.3486E+00          0.7690E-01
        9     0.7253E+02     0.3492E+00          0.6508E-01
       10     0.7977E+02     0.3497E+00          0.5926E-01

  SPECTRUM PARAMETERS

  CURVE NO   6  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.58319E-01

     INPUT      FREQUENCY    INPUT SPECTRAL    CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION      SPECTRAL ACCELERATION

        1     0.8405E+01     0.6037E+00          0.6037E+00
        2     0.1168E+02     0.5703E+00          0.6104E+00
        3     0.1847E+02     0.4063E+00          0.2974E+00
        4     0.2580E+02     0.3606E+00          0.1889E+00
        5     0.2941E+02     0.3545E+00          0.1629E+00
        6     0.3049E+02     0.3660E+00          0.1623E+00
        7     0.4666E+02     0.3487E+00          0.1010E+00
        8     0.6128E+02     0.3487E+00          0.7692E-01
        9     0.7253E+02     0.3492E+00          0.6508E-01
       10     0.7977E+02     0.3496E+00          0.5924E-01

  SPECTRUM PARAMETERS

  CURVE NO   7  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  7

NUMBER OF DEFINITION POINTS = 10
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DAMPING RATIO FOR THIS CURVE =     0.69036E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.5802E+00           0.5802E+00
        2     0.1168E+02     0.5444E+00           0.5856E+00
        3     0.1847E+02     0.4021E+00           0.2943E+00
        4     0.2580E+02     0.3576E+00           0.1873E+00
        5     0.2941E+02     0.3532E+00           0.1623E+00
        6     0.3049E+02     0.3594E+00           0.1593E+00
        7     0.4666E+02     0.3488E+00           0.1010E+00
        8     0.6128E+02     0.3487E+00           0.7692E-01
        9     0.7253E+02     0.3492E+00           0.6508E-01
       10     0.7977E+02     0.3495E+00           0.5922E-01

  SPECTRUM PARAMETERS

  CURVE NO    8  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  8

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69702E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.5788E+00           0.5788E+00
        2     0.1168E+02     0.5430E+00           0.5842E+00
        3     0.1847E+02     0.4022E+00           0.2944E+00
        4     0.2580E+02     0.3574E+00           0.1872E+00
        5     0.2941E+02     0.3532E+00           0.1623E+00
        6     0.3049E+02     0.3590E+00           0.1592E+00
        7     0.4666E+02     0.3488E+00           0.1010E+00
        8     0.6128E+02     0.3487E+00           0.7692E-01
        9     0.7253E+02     0.3492E+00           0.6508E-01
       10     0.7977E+02     0.3495E+00           0.5922E-01

  SPECTRUM PARAMETERS

  CURVE NO    9  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  9

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69721E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.5788E+00           0.5788E+00
        2     0.1168E+02     0.5429E+00           0.5841E+00
        3     0.1847E+02     0.4022E+00           0.2944E+00
        4     0.2580E+02     0.3574E+00           0.1872E+00
        5     0.2941E+02     0.3532E+00           0.1623E+00
        6     0.3049E+02     0.3590E+00           0.1592E+00
        7     0.4666E+02     0.3488E+00           0.1010E+00
        8     0.6128E+02     0.3487E+00           0.7692E-01
        9     0.7253E+02     0.3492E+00           0.6508E-01
       10     0.7977E+02     0.3495E+00           0.5922E-01

  SPECTRUM PARAMETERS

  CURVE NO   10  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER = 10

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69726E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.5787E+00           0.5787E+00
        2     0.1168E+02     0.5429E+00           0.5841E+00
        3     0.1847E+02     0.4022E+00           0.2944E+00
        4     0.2580E+02     0.3574E+00           0.1872E+00
        5     0.2941E+02     0.3532E+00           0.1623E+00
        6     0.3049E+02     0.3590E+00           0.1592E+00
        7     0.4666E+02     0.3488E+00           0.1010E+00
        8     0.6128E+02     0.3487E+00           0.7692E-01
        9     0.7253E+02     0.3492E+00           0.6508E-01
       10     0.7977E+02     0.3495E+00           0.5922E-01

  SPECTRUM PARAMETERS

  CURVE NO   11  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51776

INPUT SPECTRUM CURVE NUMBER = 11

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.70000E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.5782E+00           0.5782E+00
        2     0.1168E+02     0.5423E+00           0.5836E+00
        3     0.1847E+02     0.4022E+00           0.2944E+00
        4     0.2580E+02     0.3574E+00           0.1872E+00
        5     0.2941E+02     0.3531E+00           0.1623E+00
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        6     0.3049E+02     0.3589E+00           0.1591E+00
        7     0.4666E+02     0.3488E+00           0.1010E+00
        8     0.6128E+02     0.3487E+00           0.7692E-01
        9     0.7253E+02     0.3492E+00           0.6508E-01
       10     0.7977E+02     0.3495E+00           0.5922E-01

INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS

     FREQUENCY     DAMPING RATIO            SPECTRAL ACCELERATIONS
       (HZ)             (%)                   SAD           SAV

   0.87253E+01      0.54673E+01           0.6080E+00    0.6126E+00
   0.16401E+02      0.36661E+01           0.4795E+00    0.3860E+00
   0.25258E+02      0.33912E+01           0.3984E+00    0.2132E+00
   0.32361E+02      0.51775E+01           0.3683E+00    0.1538E+00
   0.39227E+02      0.24126E+01           0.3741E+00    0.1209E+00
   0.47677E+02      0.66848E+01           0.3488E+00    0.9809E-01
   0.50053E+02      0.21504E+01           0.3487E+00    0.9416E-01
   0.61516E+02      0.69319E+01           0.3487E+00    0.7663E-01
   0.72976E+02      0.69077E+01           0.3492E+00    0.6469E-01
   0.79699E+02      0.69250E+01           0.3495E+00    0.5928E-01

DISPLACEMENT RESPONSE UD (FROM SD)

   MODE NO.     1
 0.4302E-01  0.8796E-01  0.4302E-01  0.1031E-69  0.4803E-70  0.0000E+00
-0.5766E-71  0.1230E-70  0.7116E-01  0.1030E-57  0.4803E-58  0.0000E+00
 0.2771E-62  0.1363E-61  0.9397E-01  0.1476E-58  0.7176E-58  0.0000E+00
-0.3929E-63 -0.1725E-62  0.1097E+00  0.7022E-58 -0.1204E-58  0.0000E+00
-0.1608E-62  0.6656E-71  0.1172E+00 -0.7420E-58  0.1164E-57  0.0000E+00
 0.3243E-61  0.2711E-62  0.1159E+00 -0.1781E-57 -0.7069E-58  0.0000E+00
 0.5275E-62  0.5920E-61  0.1059E+00  0.2418E-58 -0.6025E-59  0.0000E+00
-0.1530E-62  0.2064E-62  0.8796E-01  0.2416E-70 -0.6029E-71  0.0000E+00
-0.1721E-74 -0.5640E-76
   MODE NO.     2
 0.9294E-04  0.3077E-03  0.9292E-04 -0.1039E-70 -0.4840E-71  0.0000E+00
 0.5810E-72 -0.1247E-71 -0.5731E-03 -0.1039E-58 -0.4840E-59  0.0000E+00
 0.3439E-64 -0.5040E-63 -0.1104E-02 -0.1487E-59 -0.7234E-59  0.0000E+00
-0.6086E-63 -0.1972E-64 -0.1373E-02 -0.7073E-59  0.1213E-59  0.0000E+00
 0.6635E-64 -0.6705E-72 -0.1317E-03  0.7475E-59 -0.1172E-58  0.0000E+00
-0.1020E-62  0.2069E-64 -0.9501E-03  0.1796E-58  0.7123E-59  0.0000E+00
-0.3029E-63 -0.2136E-62 -0.3616E-03 -0.2435E-59  0.6074E-60  0.0000E+00
 0.2631E-64  0.2230E-64  0.3077E-03 -0.2435E-71  0.6074E-72  0.0000E+00
-0.6958E-79  0.5893E-76
   MODE NO.     3
 0.1342E-02 -0.9555E-03  0.1342E-02 -0.6104E-71 -0.2843E-71  0.0000E+00
 0.3412E-72 -0.7320E-72  0.3396E-02 -0.6104E-59 -0.2843E-59  0.0000E+00
-0.2532E-63 -0.3746E-62  0.3356E-02 -0.8730E-60 -0.4251E-59  0.0000E+00
-0.5230E-63  0.3754E-64  0.1245E-02 -0.4156E-59  0.7128E-60  0.0000E+00
 0.1029E-63 -0.3939E-72 -0.1616E-02  0.4390E-59 -0.6087E-59  0.0000E+00
-0.2288E-63  0.7089E-63 -0.3490E-02  0.1055E-58  0.4185E-59  0.0000E+00
 0.1156E-62  0.1969E-62 -0.3215E-02 -0.1631E-59  0.3569E-60  0.0000E+00
-0.5616E-65  0.5107E-64 -0.9556E-03 -0.1471E-71  0.3570E-72  0.0000E+00
-0.2066E-76 -0.4941E-76
   MODE NO.     4
 0.7049E-03 -0.7275E-03  0.7048E-03  0.4981E-72  0.2330E-72  0.0000E+00
-0.2800E-73  0.5979E-73 -0.5903E-03  0.4981E-60  0.2330E-60  0.0000E+00
-0.3154E-63 -0.2458E-63 -0.1261E-02  0.7155E-61  0.3469E-60  0.0000E+00
 0.4501E-64  0.8110E-64 -0.6347E-03  0.3391E-60 -0.5841E-61  0.0000E+00
 0.7568E-64  0.3214E-73  0.6589E-03 -0.3602E-60  0.5620E-60  0.0000E+00
 0.1136E-64  0.6111E-63  0.1259E-02 -0.8610E-60 -0.3415E-60  0.0000E+00
 0.1245E-62  0.2506E-62  0.5656E-03  0.1167E-60 -0.2913E-61  0.0000E+00
 0.8739E-66 -0.4916E-65 -0.7275E-03  0.1164E-72 -0.2904E-73  0.0000E+00
 0.2893E-77  0.5649E-77
   MODE NO.     5
 0.7189E-05  0.5539E-05  0.7194E-05 -0.3825E-73 -0.1782E-72  0.0000E+00
 0.3139E-73 -0.4592E-73  0.1245E-03 -0.3825E-60 -0.1782E-60  0.0000E+00
 0.3533E-65 -0.2343E-64  0.5212E-04 -0.5477E-61 -0.2664E-60  0.0000E+00
-0.3543E-64 -0.2909E-65 -0.1006E-03 -0.2604E-60  0.4468E-61  0.0000E+00
 0.1520E-65 -0.2460E-73 -0.9955E-04  0.2752E-60 -0.4316E-60  0.0000E+00
-0.6008E-65  0.9157E-65  0.5361E-04  0.6612E-60  0.2622E-60  0.0000E+00
 0.5984E-66 -0.7815E-65  0.1242E-03 -0.0965E-61  0.2237E-61  0.0000E+00
-0.8256E-66  0.4054E-65  0.5544E-05 -0.8965E-73  0.2236E-73  0.0000E+00
-0.2438E-77 -0.4982E-77
   MODE NO.     6
 0.2107E-03  0.2700E-03  0.2107E-03 -0.2032E-70 -0.9466E-71  0.0000E+00
 0.1136E-71 -0.2439E-71 -0.1812E-03 -0.2032E-58 -0.9466E-59  0.0000E+00
 0.2543E-63 -0.7887E-63 -0.1251E-03 -0.2910E-59 -0.1415E-58  0.0000E+00
-0.1916E-62 -0.1766E-63  0.1712E-03 -0.1383E-58  0.2374E-59  0.0000E+00
 0.8292E-64 -0.1311E-71  0.1009E-03  0.1462E-58 -0.2293E-58  0.0000E+00
-0.2130E-63  0.3965E-63 -0.1851E-03  0.3513E-58  0.1393E-58  0.0000E+00
-0.1651E-63 -0.6509E-63 -0.1063E-03 -0.4763E-59  0.1188E-59  0.0000E+00
-0.4986E-64  0.2261E-63  0.2700E-03 -0.4763E-71  0.1188E-71  0.0000E+00
-0.1377E-75 -0.2805E-75
   MODE NO.     7
 0.1386E-05 -0.4700E-05  0.1383E-05  0.1530E-72  0.7129E-73  0.0000E+00
-0.8550E-74  0.1837E-73 -0.5787E-04  0.1530E-60  0.7129E-61  0.0000E+00
-0.4876E-65 -0.1764E-64  0.2581E-04  0.2191E-61  0.1066E-60  0.0000E+00
 0.1449E-64  0.2078E-65  0.4501E-04  0.1042E-60 -0.1788E-61  0.0000E+00
 0.2684E-64  0.9874E-74 -0.4738E-04 -0.1101E-60  0.1726E-60  0.0000E+00
 0.1455E-65  0.2875E-65 -0.2389E-04 -0.2645E-60 -0.1049E-60  0.0000E+00
 0.1299E-64  0.2816E-64  0.5933E-04  0.3586E-61 -0.8948E-62  0.0000E+00
 0.3862E-66 -0.1719E-65 -0.4690E-05  0.3586E-73 -0.8945E-74  0.0000E+00
 0.1048E-77  0.2207E-77
   MODE NO.     8
-0.3022E-04 -0.8494E-04 -0.3022E-04  0.7803E-71  0.3635E-71  0.0000E+00
-0.4364E-72  0.9367E-72 -0.9850E-05  0.7803E-59  0.3635E-59  0.0000E+00
-0.1332E-63  0.4272E-64  0.2401E-04  0.1117E-59  0.5434E-59  0.0000E+00
 0.7463E-63  0.7836E-64 -0.4433E-05  0.5312E-59 -0.9115E-60  0.0000E+00
-0.1491E-64  0.5035E-72 -0.2487E-04 -0.5614E-59  0.8804E-59  0.0000E+00
 0.4933E-64 -0.9466E-64  0.2799E-04 -0.1349E-58 -0.5350E-59  0.0000E+00
 0.1838E-63  0.4416E-63  0.1470E-04  0.1829E-59 -0.4563E-60  0.0000E+00
 0.2101E-64 -0.9019E-64  0.8493E-04  0.1829E-71 -0.4562E-72  0.0000E+00
 0.5539E-76  0.1182E-75
   MODE NO.     9
-0.4274E-04  0.2321E-04 -0.4274E-04  0.1833E-71  0.8534E-72  0.0000E+00
-0.1024E-72  0.2200E-72  0.5381E-05  0.1833E-59  0.8534E-60  0.0000E+00
 0.5113E-64  0.6717E-63  0.8861E-05  0.2623E-60  0.1276E-59  0.0000E+00
 0.1763E-63 -0.2026E-65 -0.1073E-04  0.1248E-59 -0.2140E-60  0.0000E+00
-0.2407E-64  0.1183E-72  0.6353E-05 -0.1318E-59  0.2068E-59  0.0000E+00
 0.8233E-65 -0.1884E-63  0.1204E-07 -0.3168E-59 -0.1256E-59  0.0000E+00
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-0.2887E-63 -0.5650E-63 -0.7636E-05  0.4295E-60 -0.1072E-60  0.0000E+00
 0.5124E-65 -0.2153E-64  0.2321E-04  0.4296E-72 -0.1072E-72  0.0000E+00
 0.1327E-76  0.2853E-76
   MODE NO.    10
-0.1936E-04 -0.5094E-05 -0.1936E-04  0.2719E-71  0.1267E-71  0.0000E+00
-0.1521E-72  0.3264E-72 -0.1339E-05  0.2719E-59  0.1267E-59  0.0000E+00
-0.1343E-64  0.2837E-63  0.6904E-05  0.3894E-60  0.1854E-59  0.0000E+00
 0.2623E-63  0.1942E-64 -0.4506E-05  0.1851E-59 -0.3176E-60  0.0000E+00
-0.1376E-64  0.1755E-72 -0.1017E-05 -0.1956E-59  0.3068E-59  0.0000E+00
 0.1024E-64 -0.1018E-63  0.4737E-05 -0.4701E-59 -0.1864E-59  0.0000E+00
-0.7242E-64 -0.1295E-63 -0.3148E-05  0.6373E-60 -0.1590E-60  0.0000E+00
 0.7716E-65 -0.3214E-64 -0.5094E-05  0.6373E-72 -0.1590E-72  0.0000E+00
 0.1984E-76  0.4278E-76


  DISPLACEMENT RESPONSE UV (FROM SV)

   MODE NO.     1
 0.8553E-03  0.1792E-02  0.8552E-03 -0.3534E-70 -0.1646E-70  0.0000E+00
 0.1976E-71 -0.4242E-71 -0.1541E-02 -0.3533E-58 -0.1646E-58  0.0000E+00
 0.5692E-64 -0.1952E-62 -0.3396E-02 -0.5059E-59 -0.2461E-58  0.0000E+00
-0.2236E-62 -0.3498E-64 -0.4340E-02 -0.2406E-58  0.4128E-59  0.0000E+00
 0.2445E-63 -0.2281E-71 -0.4296E-02  0.2543E-58 -0.3988E-58  0.0000E+00
-0.3804E-62  0.5390E-64 -0.3235E-02  0.6108E-58  0.2423E-58  0.0000E+00
-0.1010E-62 -0.7726E-62 -0.1101E-02 -0.8284E-59  0.2066E-59  0.0000E+00
 0.1084E-63  0.4172E-64  0.1792E-02 -0.8282E-71  0.2066E-71  0.0000E+00
 0.2550E-76  0.2760E-75
   MODE NO.     2
-0.3902E-04 -0.1296E-03 -0.3901E-04  0.4082E-71  0.1902E-71  0.0000E+00
-0.2283E-72  0.4900E-72  0.2194E-03  0.4081E-59  0.1902E-59  0.0000E+00
-0.1448E-64  0.1947E-63  0.4249E-03  0.5844E-60  0.2842E-59  0.0000E+00
 0.2725E-63  0.8299E-65  0.5277E-03  0.2779E-59 -0.4768E-60  0.0000E+00
-0.2576E-64  0.2635E-72  0.5021E-03 -0.2937E-59  0.4606E-59  0.0000E+00
 0.3948E-63 -0.8687E-65  0.3552E-03 -0.7056E-59 -0.2798E-59  0.0000E+00
 0.1108E-61  0.9300E-63  0.1257E-03  0.9568E-60 -0.2387E-60  0.0000E+00
-0.9992E-65 -0.9385E-65 -0.1295E-03  0.9567E-72 -0.2387E-72  0.0000E+00
 0.4956E-78 -0.2178E-76
   MODE NO.     3
 0.1087E-03 -0.1049E-03  0.1087E-03 -0.5858E-73 -0.2721E-73  0.0000E+00
 0.3263E-74 -0.7033E-74  0.2577E-04 -0.5858E-61 -0.2721E-61  0.0000E+00
-0.2769E-64 -0.2286E-63 -0.2776E-04 -0.8367E-62 -0.4080E-61  0.0000E+00
-0.5062E-65  0.6671E-65 -0.1865E-04 -0.3988E-61  0.6822E-62  0.0000E+00
 0.7304E-65 -0.3781E-74  0.1939E-04  0.4198E-61 -0.6610E-61  0.0000E+00
-0.2062E-65  0.5740E-64  0.2534E-04  0.1013E-60  0.4016E-61  0.0000E+00
 0.1123E-63  0.2214E-63 -0.2723E-04 -0.1373E-61  0.3426E-62  0.0000E+00
-0.6156E-67  0.5039E-66 -0.1049E-03 -0.1376E-73  0.3433E-74  0.0000E+00
-0.2062E-78 -0.5076E-78
   MODE NO.     4
-0.5212E-04  0.4901E-04 -0.5212E-04  0.6836E-73  0.3178E-73  0.0000E+00
-0.3812E-74  0.8206E-74 -0.4239E-04  0.6836E-61  0.3178E-61  0.0000E+00
 0.2124E-64  0.1788E-63 -0.2247E-05  0.9771E-62  0.4761E-61  0.0000E+00
 0.6173E-65 -0.4974E-65  0.9993E-05  0.4654E-61 -0.7969E-62  0.0000E+00
-0.5746E-65  0.4412E-74 -0.7066E-05 -0.4905E-61  0.7713E-61  0.0000E+00
 0.1572E-65 -0.4518E-64  0.2756E-05 -0.1182E-60 -0.4687E-61  0.0000E+00
-0.8728E-64 -0.1722E-63  0.4058E-04  0.1602E-61 -0.3997E-62  0.0000E+00
 0.1192E-66 -0.6734E-66  0.4901E-04  0.1605E-73 -0.4003E-74  0.0000E+00
 0.3979E-78  0.7799E-78
   MODE NO.     5
 0.2857E-05  0.2712E-05  0.2859E-05 -0.1669E-72 -0.7775E-73  0.0000E+00
 0.9334E-74 -0.2004E-73  0.2581E-04 -0.1669E-60 -0.7775E-61  0.0000E+00
 0.1729E-65 -0.8755E-65  0.1039E-04 -0.2390E-61 -0.1162E-60  0.0000E+00
-0.1548E-64 -0.1319E-65 -0.2078E-04 -0.1136E-60  0.1950E-61  0.0000E+00
 0.6160E-66 -0.1077E-73 -0.2070E-04  0.1201E-60 -0.1883E-60  0.0000E+00
-0.2577E-65  0.3639E-65  0.1051E-04  0.2985E-60  0.1144E-60  0.0000E+00
-0.4599E-66 -0.4706E-65  0.2579E-04 -0.3912E-61  0.9761E-62  0.0000E+00
-0.3628E-66  0.1773E-65  0.2712E-05 -0.3912E-73  0.9759E-74  0.0000E+00
-0.1067E-77 -0.2104E-77
   MODE NO.     6
-0.2646E-05 -0.1457E-05 -0.2646E-05  0.1735E-72  0.8081E-73  0.0000E+00
-0.9703E-74  0.2063E-73 -0.2229E-05  0.1735E-60  0.8083E-61  0.0000E+00
-0.1374E-65  0.1311E-64 -0.9057E-05  0.2484E-61  0.1208E-60  0.0000E+00
 0.1636E-64  0.1308E-65  0.1987E-05  0.1181E-60 -0.2027E-61  0.0000E+00
-0.7368E-66  0.1120E-73  0.1827E-04 -0.1248E-60  0.1958E-60  0.0000E+00
 0.1831E-65 -0.4979E-65 -0.8024E-06 -0.3090E-60 -0.1190E-60  0.0000E+00
-0.1778E-65 -0.8106E-66 -0.2344E-04  0.4067E-61 -0.1015E-61  0.0000E+00
 0.4254E-66 -0.1531E-65 -0.1458E-05  0.4067E-73 -0.1015E-73  0.0000E+00
 0.1175E-77  0.2463E-77
   MODE NO.     7
 0.5427E-07  0.3917E-06  0.5424E-07 -0.2062E-73 -0.9606E-74  0.0000E+00
 0.1153E-74 -0.2475E-74 -0.7649E-06 -0.2062E-61 -0.9606E-62  0.0000E+00
 0.8064E-66  0.3744E-66  0.2362E-06 -0.2953E-62 -0.1436E-61  0.0000E+00
-0.1950E-65 -0.2172E-66  0.6637E-06 -0.1404E-61  0.2409E-62  0.0000E+00
 0.2656E-67 -0.1331E-74 -0.4543E-06  0.1484E-61 -0.2326E-61  0.0000E+00
-0.1999E-66  0.1125E-66 -0.5099E-06  0.3565E-61  0.1414E-61  0.0000E+00
-0.7499E-66 -0.1800E-65  0.5493E-06 -0.4833E-62  0.1206E-62  0.0000E+00
-0.5156E-67  0.2312E-66  0.3917E-06 -0.4833E-74  0.1206E-74  0.0000E+00
-0.1410E-78 -0.2966E-78
   MODE NO.     8
 0.1673E-07 -0.3453E-07  0.1672E-07  0.1028E-74  0.4789E-75  0.0000E+00
-0.5750E-76  0.1234E-75 -0.2812E-06  0.1028E-62  0.4789E-63  0.0000E+00
-0.5411E-67 -0.2722E-66  0.3811E-06  0.1472E-63  0.7158E-63  0.0000E+00
 0.1047E-66  0.2050E-67  0.1212E-06  0.6997E-63 -0.1201E-63  0.0000E+00
 0.7405E-68  0.6613E-76 -0.8469E-06 -0.7397E-63  0.1160E-62  0.0000E+00
-0.1366E-67  0.5241E-67 -0.5983E-07 -0.1777E-62 -0.7047E-63  0.0000E+00
 0.1572E-66  0.2939E-66  0.1073E-05  0.2409E-63 -0.6011E-64  0.0000E+00
 0.3913E-68 -0.1395E-67 -0.3449E-07  0.2409E-75 -0.6008E-76  0.0000E+00
 0.8852E-80  0.2014E-79
   MODE NO.     9
 0.9846E-07 -0.2241E-07  0.9847E-07 -0.7170E-74 -0.3340E-74  0.0000E+00
 0.4009E-75 -0.8608E-75  0.2046E-06 -0.7170E-62 -0.3340E-62  0.0000E+00
-0.4930E-67 -0.1419E-65 -0.7403E-07 -0.1027E-62 -0.4994E-62  0.0000E+00
-0.6887E-66 -0.2957E-67 -0.1299E-06 -0.4881E-62  0.8375E-63  0.0000E+00
 0.5652E-67 -0.4627E-75  0.9596E-07  0.5158E-62 -0.8090E-62  0.0000E+00
-0.3610E-67  0.4341E-66  0.5124E-07  0.1240E-61  0.4916E-62  0.0000E+00
 0.5238E-66  0.9935E-66 -0.1529E-06 -0.1681E-62  0.4193E-63  0.0000E+00
-0.1983E-67  0.8383E-67 -0.2241E-07 -0.1681E-74  0.4193E-75  0.0000E+00
-0.5162E-79 -0.1107E-78
   MODE NO.    10
-0.1018E-07  0.1083E-08 -0.1018E-07  0.9707E-75  0.4521E-75  0.0000E+00
-0.5427E-76  0.1165E-75  0.3783E-07  0.9707E-63  0.4521E-63  0.0000E+00
 0.2834E-68  0.1650E-66 -0.1444E-08  0.1390E-63  0.6760E-63  0.0000E+00
 0.9514E-67  0.5269E-68 -0.4013E-07  0.6608E-63 -0.1134E-63  0.0000E+00
-0.6623E-66  0.6264E-76 -0.6254E-08 -0.6982E-63  0.1095E-62  0.0000E+00
-0.1095E-68 -0.5354E-67  0.1034E-07 -0.1678E-62 -0.6655E-63  0.0000E+00
```

```
-0.5950E-67 -0.1206E-66 -0.9206E-08  0.2275E-63 -0.5676E-64  0.0000E+00
 0.3024E-68 -0.1196E-67  0.1083E-08  0.2275E-75 -0.5676E-76  0.0000E+00
 0.7450E-80  0.1635E-79


  CORRELATION RPSD

   MODE NO.     1
 0.1000E+01  0.2718E+00  0.2807E+00  0.2807E+00  0.2807E+00  0.2807E+00
 0.2807E+00  0.2807E+00  0.2807E+00  0.2807E+00
   MODE NO.     2
 0.2718E+00  0.1000E+01  0.9511E+00  0.9511E+00  0.9511E+00  0.9511E+00
 0.9511E+00  0.9511E+00  0.9511E+00  0.9511E+00
   MODE NO.     3
 0.2807E+00  0.9511E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     4
 0.2807E+00  0.9511E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     5
 0.2807E+00  0.9511E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     6
 0.2807E+00  0.9511E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.2807E+00  0.9511E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     8
 0.2807E+00  0.9511E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.2807E+00  0.9511E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    10
 0.2807E+00  0.9511E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION RPSV

   MODE NO.     1
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
 0.0000E+00  0.1000E+01  0.5951E-01  0.5951E-01  0.5951E-01  0.5951E-01
 0.5951E-01  0.5951E-01  0.5951E-01  0.5951E-01
   MODE NO.     3
 0.0000E+00  0.5951E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     4
 0.0000E+00  0.5951E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     5
 0.0000E+00  0.5951E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     6
 0.0000E+00  0.5951E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.0000E+00  0.5951E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     8
 0.0000E+00  0.5951E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.0000E+00  0.5951E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    10
 0.0000E+00  0.5951E-01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION RU (FOR CROSS TERM OF RD AND RV)

   MODE NO.     1
 0.0000E+00  0.8403E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
-0.8403E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     4
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     9
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    10
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


  COMBINED VALUES OF COUPLED MODAL DISPLACEMENTS

  DISPLACEMENTS AT PRIMARY SYSTEM CONNETING DOF

  DOF #     DISPLACEMENT
  2        0.4372E-01
  4        0.8764E-01

DISPLACEMENTS AT SECONDARY SYSTEM DOF

NODE      DX           DY           DZ         ROT-X        ROT-Y        ROT-Z

  1    0.4372E-01  0.1057E-69  0.4925E-70  0.0000E+00  0.5912E-71  0.1269E-70
  2    0.7182E-01  0.1057E-57  0.4924E-58  0.0000E+00  0.2699E-62  0.1335E-61
  3    0.9436E-01  0.1513E-58  0.7358E-58  0.0000E+00  0.3023E-62  0.1720E-62
  4    0.1097E+00  0.7200E-58  0.1235E-58  0.0000E+00  0.1656E-62  0.6824E-71
  5    0.1167E+00  0.7608E-58  0.1193E-57  0.0000E+00  0.3235E-61  0.3359E-62
  6    0.1151E+00  0.1827E-57  0.7240E-58  0.0000E+00  0.6119E-62  0.6023E-61
  7    0.1052E+00  0.2479E-58  0.6178E-59  0.0000E+00  0.1533E-62  0.2111E-62
  8    0.8764E-01  0.2478E-70  0.6182E-71  0.0000E+00  0.1744E-74  0.5675E-74

COMBINED VALUES OF COUPLED MEMBER FORCES

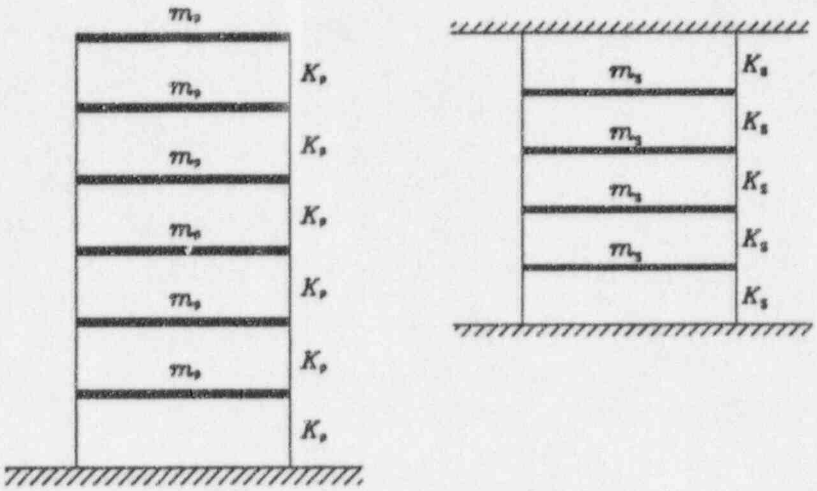
NODE      FX           FY           FZ          MX           MY           MZ

  1    0.1129E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  2    0.1129E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  2    0.9046E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  3    0.9046E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  3    0.6158E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  4    0.6158E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  4    0.2886E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  5    0.2886E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  5    0.8505E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  6    0.8505E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  6    0.4067E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  7    0.4067E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  7    0.7126E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  8    0.7126E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

COMBINED VALUES OF COUPLED SUPPORT REACTIONS

TYPE     NODE       SUPPORT REACTION

FX        1        0.1129E+03
FX        8        0.7126E+02
```



Secondary System

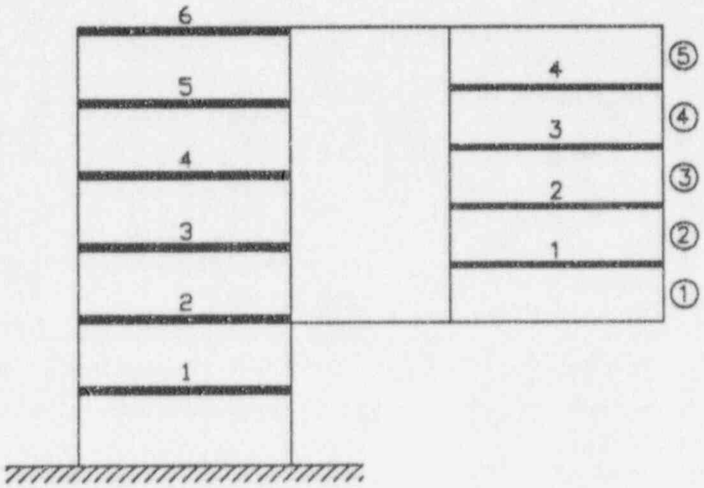
m_s = 0.1 Kip-s^2/in

K_s = 1000 Kips/in

Primary System

m_p = 0.7 Kip-s^2/in

K_p = 25000 Kips/in


6
5
4
3
2
1
4
3
2
1
⑤
④
③
②
①

Coupled System

Figure 4: Primary, Secondary and Coupled Systems, Case 4

Table 10: Frequencies and Damping Ratios - Case 4

6-DOF Primary System			4-DOF Secondary System		
Mode No.	Freq. (Hz.)	Damping Ratio	Mode No.	Freq. (Hz.)	Damping Ratio
1	7.25094	0.07	1	9.83625	0.02
2	21.33154	0.07	2	18.71025	0.02
3	34.17216	0.07	3	25.75100	0.02
4	45.02652	0.07	4	30.27286	0.02
5	53.31372	0.07			
6	58.40668	0.07			

Table 11: Comparison of Nodal Displacements (inches) for Secondary System - Case 4

Node no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	0.1380	0.1377	0.1380
2	0.1878	0.1878	0.1878
3	0.2032	0.2031	0.2032
4	0.1821	0.1816	0.1822

Table 12: Comparison of Spring Forces (kips) for Secondary System - Case 4

Element no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	76.41	76.41	76.42
2	50.75	51.03	50.81
3	16.55	16.51	16.51
4	24.35	24.79	24.52
5	56.86	56.92	56.78

c4.dat

```
IDEN JB=1111 IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL SU=1 CV=2 TI=/CASE-4, 4-DOF PROBLEM/
FREQ FR=33 LO=1 MX=4 TI=/INCLUDING ALL MODES /
RCAS CA=1 EV=1 TY=1 SU=3 LO=1 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 SU=1 FX=1 FY=1 FZ=1
SPEC EV=1 ME=1 FP=0 SH=0
     LV=1 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=2 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=3 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=4 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=5 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=6 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
MATL CD=3 EC=28.0 SC=75 SH=75 KL=1
ANCH PT=1 LV=1
SPRS PT=2 DX=1.0 AZ=1000.0
LUMP PT=2 MA=38.64
RSUP PT=2 DY=1 LV=2
RSUP PT=2 DZ=1 LV=2
ROTR PT=2 RX=1
ROTR PT=2 RY=1
ROTR PT=2 RZ=1
SPRS PT=3 DX=1.0 AZ=1000.0
LUMP PT=3 MA=38.64
RSUP PT=3 DY=1 LV=3
RSUP PT=3 DZ=1 LV=3
ROTR PT=3 RX=1
ROTR PT=3 RY=1
ROTR PT=3 RZ=1
SPRS PT=4 DX=1.0 AZ=1000.0
LUMP PT=4 MA=38.64
RSUP PT=4 DY=1 LV=4
RSUP PT=4 DZ=1 LV=4
ROTR PT=4 RX=1
ROTR PT=4 RY=1
ROTR PT=4 RZ=1
SPRS PT=5 DX=1.0 AZ=1000.0
LUMP PT=5 MA=38.64
RSUP PT=5 DY=1 LV=5
RSUP PT=5 DZ=1 LV=5
ROTR PT=5 RX=1
ROTR PT=5 RY=1
ROTR PT=5 RZ=1
SPRS PT=6 DX=1.0 AZ=1000.0
ANCH PT=6 LV=6
ENDP
```

```
CREST/ PIPESTRESS RUN FOR CASE-4, WITH ALL THE S.S. MODES
    6    2    2    6    4    1    0   11   1    1    0    0    1
  900   11   10     1.0E-6      20.5       386.4 0.10
      0.07        0.07        0.07        0.07        0.07        0.07
      0.02        0.02        0.02        0.02
    2    6
    1   16
100000000. 0.0
0.0      100000000.
1 6
7.25094000 21.3315400 34.1721600 45.0265250 53.3137200 58.4066800
0.30811 -0.65816 0.43965 -0.15866 -0.61911 -0.54563
0.65816  0.61991 0.54563 -0.43965  0.30811 -0.15866
   0.1911E+01 -0.6119E+00  0.3362E+00  0.2056E+00  0.1223E+00  0.5720E-01
   10  0.020337
 6.7360.834310.6270.627218.0510.577822.2840.442625.7170.444730.3190.4293
34.4250.416445.0970.349353.4380.351758.4820.3493
   10  0.020594
 6.7360.831610.6270.625718.0510.575622.2840.441325.7170.443530.3190.4285
34.4250.415845.0970.349353.4380.351758.4820.3493
   10  0.027041
 6.7360.765610.6270.591518.0510.526322.2840.415125.7170.416530.3190.4102
34.4250.402045.0970.348653.4380.351358.4820.3490
   10  0.031606
 6.7360.722610.6270.570818.0510.498322.2840.400825.7170.401330.3190.3999
34.4250.394045.0970.348453.4380.351158.4820.3490
   10  0.058645
 6.7360.535710.6270.493418.0510.408622.2840.369525.7170.360430.3190.3659
34.4250.366045.0970.348453.4380.350358.4820.3491
   10  0.061902
 6.7360.521710.6270.491218.0510.406422.2840.367525.7170.359530.3190.3636
34.4250.363945.0970.348453.4380.350358.4820.3491
   10  0.069086
 6.7360.508910.6270.486518.0510.401622.2840.363125.7170.357730.3190.3592
34.4250.359845.0970.348553.4380.350158.4820.3491
   10  0.069662
 6.7360.507810.6270.486118.0510.401222.2840.362725.7170.357530.3190.3589
34.4250.359545.0970.348553.4380.350158.4820.3491
   10  0.069700
 6.7360.507710.6270.486118.0510.401222.2840.362725.7170.357530.3190.3589
34.4250.359545.0970.348553.4380.350158.4820.3491
   10  0.069703
 6.7360.507710.6270.486118.0510.401222.2840.362725.7170.357530.3190.3589
34.4250.359545.0970.348553.4380.350158.4820.3491
   10  0.070000
 6.7360.507210.6270.485918.0510.401022.2840.362525.7170.357430.3190.3588
34.4250.359445.0970.348553.4380.350158.4820.3491
```

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CREST/ PIPESTRESS RUN FOR CASE-4. WITH ALL THE S.S. MODES

  NUMBER OF PRIMARY DOF               NP=    6

  NUMBER OF CONNECTING DOF            NC=    2

  NUMBER OF PIPING ANCHORS            NA=    2

  NUMBER OF PRIMARY MODES            NPM=    6

  NUMBER OF SECONDARY MODES          NSM=    4

  NORMALIZATION INDEX FOR P.S.     NORMP=    1

  NORMALIZATION INDEX FOR S.S.     NORMS=    0

  OUTPUT TYPE INDICATOR           IPRINT=    1

  OUTPUT TYPE INDICATOR          IPRINTS=    1

  PRIMARY RESIDUAL MODE KEY        KRESP=    0

  SECONDARY RESIDUAL MODE KEY      KRESS=    0

  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX       NONZP=   11

  GLOBAL EARTHQUAKE DIRECTION  X=1  Y=2(VERTICAL)  Z=3       KFLG=    1

  NUMBER OF ITERATIONS            NITER=  900

  NUMBER OF SPECTRA CURVES       NCURVE=   11

  NUMBER OF SPECTRUM POINTS        NXLP=   10

  ITERATION TOLERANCE               TOL=  0.1000E-05

  RIGID FREQUENCY                    FR=  20.500

  SPECTRUM FACTOR                  SPTR= 386.400

  CORRELATION TOLERANCE              ET=   0.100


  TOTAL STORAGE REQUIRED  =      27055
  ACTUAL PROVIDED STORAGE  = 550000000

  PRIMARY DAMPING RATIOS

  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01

  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01

  CONNECTING DOF # OF PRIMARY SYSTEM

    2    6

  CONNECTING DOF # OF PIPING SUPPORTS

    1   16

  STIFFNESS OF CONNECTING DOF OF S.S.

  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09

  NODE # OF PIPING ANCHORS

    1    6

  MASS OF EACH SECONDARY DOF

  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00

  ADDRESS OF DIAGONAL ELEMENTS IN S.S. STIFFNESS MATRIX (JDG MATRIX)

    1    3    6   10   15   21   28   36   45   55   66   78   85   93  102  112
  123  135  142  150  159  169  180  192  199  207  216  226  237  249  256  264
  273  281  294  306

  LOWER TRIANGULAR STIFFNESS MATRIX OF SECONDARY SYSTEM

  0.1000E+09  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.2000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.1000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
```

```
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.2000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.1000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10

  SECONDARY FREQUENCIES (HZ)

   9.8362888  18.7097518  25.7517959  30.3730820

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF       2

  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF       6

  0.2000E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  UNNORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.6180E-05  0.1000E-04  0.1000E-04 -0.6180E-05
 -0.8759E-31  0.7474E-24  0.1115E-26  0.1288E-20
 -0.4080E-31  0.4754E-24 -0.7232E-27 -0.1960E-21
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4899E-32 -0.5707E-25  0.8682E-28  0.3233E-22
 -0.1051E-31  0.8972E-25  0.1339E-27  0.1547E-21
  0.6180E+00  0.1000E+01  0.1000E+01 -0.6180E+00
 -0.8759E-19  0.7474E-12  0.1115E-14  0.1288E-08
 -0.4080E-19  0.4754E-12 -0.7232E-15 -0.1960E-09
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5770E-31  0.1577E-20 -0.1458E-23  0.2630E-21
 -0.4160E-27 -0.1577E-20  0.2921E-23  0.1822E-20
  0.1000E+01  0.6181E+00 -0.6180E+00  0.1000E+01
 -0.1254E-19  0.1070E-11 -0.7769E-15 -0.1420E-08
 -0.6100E-19 -0.2997E-13 -0.8064E-15  0.2692E-08
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4159E-27 -0.9855E-22 -0.2919E-23 -0.3454E-21
 -0.5198E-28 -0.3156E-20  0.4378E-23  0.4230E-17
  0.1000E+01 -0.6179E+00 -0.6180E+00 -0.1000E+01
 -0.5963E-19  0.5151E-12  0.9987E-15  0.2244E-08
  0.1023E-19 -0.3489E-12 -0.8497E-15  0.3299E-08
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.8548E-32 -0.1578E-20 -0.2919E-23 -0.1692E-16
  0.2079E-27 -0.1578E-20  0.3131E-27 -0.4230E-17
  0.6180E+00 -0.9999E+00  0.1000E+01  0.6180E+00
  0.6302E-19 -0.7852E-12  0.5184E-15 -0.1254E-08
 -0.9885E-19 -0.7367E-14  0.5795E-16 -0.4316E-09
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1309E-31  0.2461E-22  0.1823E-24  0.1058E-17
  0.1472E-31  0.4733E-20 -0.1460E-23 -0.4230E-17
  0.6180E-05 -0.9999E-05  0.1000E-04  0.6180E-05
  0.6303E-31 -0.7851E-24  0.5184E-27 -0.1254E-20
 -0.9885E-31 -0.7366E-26  0.5794E-28 -0.4315E-21
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2999E-37 -0.8723E-30  0.1576E-31  0.1796E-25
 -0.2032E-35  0.7951E-28 -0.1160E-31 -0.2750E-24

  NORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.1176E-04  0.1902E-04  0.1902E-04 -0.1176E-04
 -0.1666E-30  0.1422E-23  0.2121E-26  0.2451E-20
 -0.7762E-31  0.9042E-24 -0.1376E-26 -0.3531E-21
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9318E-32 -0.1086E-24  0.1651E-27  0.4247E-22
 -0.2000E-31  0.1707E-24  0.2547E-27  0.2942E-21
  0.1176E+01  0.1902E+01  0.1902E+01 -0.1176E+01
 -0.1666E-18  0.1422E-11  0.2121E-14  0.2451E-08
 -0.7762E-19  0.9042E-12 -0.1376E-14 -0.3530E-09
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1098E-30  0.3000E-20 -0.2774E-23  0.5003E-21
-0.7913E-27 -0.2999E-20  0.5555E-23  0.3466E-20
 0.1902E+01  0.1176E+01 -0.1176E+01  0.1902E+01
-0.2386E-19  0.2036E-11 -0.1478E-14 -0.2702E-08
-0.1160E-18 -0.5700E-11 -0.1530E-14  0.5121E-08
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.7911E-27 -0.1875E-21 -0.5552E-23 -0.5569E-21
-0.9887E-28 -0.6002E-25  0.8328E-23  0.8045E-17
 0.1902E+01 -0.1175E+01 -0.1176E+01 -0.1902E+01
-0.1134E-18  0.9798E-12  0.1900E-14  0.4268E-08
 0.1944E-19 -0.6637E-12 -0.1616E-14  0.6275E-08
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.1626E-31 -0.3001E-20 -0.5552E-23 -0.3218E-16
 0.3955E-27 -0.3001E-20  0.4053E-27 -0.8045E-17
 0.1176E+01 -0.1902E+01  0.1902E+01  0.1176E+01
 0.1199E-18 -0.1493E-11  0.9861E-15 -0.2385E-08
-0.1880E-18 -0.1401E-13  0.1102E-15 -0.8210E-09
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.2490E-31  0.4682E-22  0.3468E-24  0.2612E-17
 0.2800E-31  0.9003E-20 -0.2776E-23 -0.8047E-17
 0.1176E-04 -0.1902E-04  0.1902E-04  0.1176E-04
 0.1199E-30 -0.1493E-23  0.9861E-27 -0.2385E-20
-0.1880E-30 -0.1401E-25  0.1102E-27 -0.8208E-21
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.5704E-37 -0.1659E-29  0.2998E-31  0.3416E-25
-0.3865E-35  0.1512E-27 -0.2207E-31 -0.5231E-24

PRIMARY FREQUENCIES (HZ)

 7.2509400  21.3315400  34.1721600  45.0265250  53.3137200  58.4066800

MODE SHAPE OF P.S. AT CONNECTING DOF       2

0.3081E+00 -0.6582E+00  0.4396E+00 -0.1587E+00 -0.6191E+00 -0.5456E+00

MODE SHAPE OF P.S. AT CONNECTING DOF       6

0.6582E+00  0.6199E+00  0.5456E+00 -0.4396E+00  0.3081E+00 -0.1587E+00

BASE INFLUENCE VECTOR FOR S.S.---UBS

0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

PARTICIPATION FACTOR FOR P.S.---GAMAP

0.1912E+01 -0.6119E+00  0.3362E+00  0.2056E+00  0.1223E+00  0.5720E-01

INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20337E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)       ACCELERATION
         1     0.6736E+01     0.8343E+00
         2     0.1063E+02     0.6272E+00
         3     0.1805E+02     0.5770E+00
         4     0.2228E+02     0.4426E+00
         5     0.2572E+02     0.4447E+00
         6     0.3032E+02     0.4293E+00
         7     0.3442E+02     0.4164E+00
         8     0.4510E+02     0.3493E+00
         9     0.5344E+02     0.3517E+00
        10     0.5848E+02     0.3493E+00

INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20594E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)       ACCELERATION
         1     0.6736E+01     0.8316E+00
         2     0.1063E+02     0.6257E+00
         3     0.1805E+02     0.5756E+00
         4     0.2228E+02     0.4413E+00
         5     0.2572E+02     0.4435E+00
         6     0.3032E+02     0.4285E+00
         7     0.3442E+02     0.4158E+00
         8     0.4510E+02     0.3493E+00
         9     0.5344E+02     0.3517E+00
        10     0.5848E+02     0.3493E+00

INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.27041E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)       ACCELERATION
         1     0.6736E+01     0.7656E+00
         2     0.1063E+02     0.5915E+00
         3     0.1805E+02     0.5263E+00
         4     0.2228E+02     0.4151E+00
         5     0.2572E+02     0.4165E+00
         6     0.3032E+02     0.4102E+00
         7     0.3442E+02     0.4020E+00
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         8     0.4510E+02     0.3486E+00
         9     0.5344E+02     0.3513E+00
        10     0.5848E+02     0.3490E+05

INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.31606E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)       ACCELERATION
         1     0.6736E+01     0.7226E+00
         2     0.1063E+02     0.5708E+00
         3     0.1805E+02     0.4983E+00
         4     0.2228E+02     0.4006E+00
         5     0.2572E+02     0.4013E+00
         6     0.3032E+02     0.3999E+00
         7     0.3442E+02     0.3940E+00
         8     0.4510E+02     0.3484E+00
         9     0.5344E+02     0.3511E+00
        10     0.5848E+02     0.3490E+00

INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.58645E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)       ACCELERATION
         1     0.6736E+01     0.5357E+00
         2     0.1063E+02     0.4934E+00
         3     0.1805E+02     0.4086E+00
         4     0.2228E+02     0.3695E+00
         5     0.2572E+02     0.3604E+00
         6     0.3032E+02     0.3659E+00
         7     0.3442E+02     0.3660E+00
         8     0.4510E+02     0.3484E+00
         9     0.5344E+02     0.3503E+00
        10     0.5848E+02     0.3491E+00

INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.61902E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)       ACCELERATION
         1     0.6736E+01     0.5217E+00
         2     0.1063E+02     0.4912E+00
         3     0.1805E+02     0.4044E+00
         4     0.2228E+02     0.3675E+00
         5     0.2572E+02     0.3595E+00
         6     0.3032E+02     0.3636E+00
         7     0.3442E+02     0.3639E+00
         8     0.4510E+02     0.3484E+00
         9     0.5344E+02     0.3503E+00
        10     0.5848E+02     0.3491E+00

INPUT SPECTRUM CURVE NUMBER =  7

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69086E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)       ACCELERATION
         1     0.6736E+01     0.5089E+00
         2     0.1063E+02     0.4865E+00
         3     0.1805E+02     0.4016E+00
         4     0.2228E+02     0.3631E+00
         5     0.2572E+02     0.3577E+00
         6     0.3032E+02     0.3592E+00
         7     0.3442E+02     0.3598E+00
         8     0.4510E+02     0.3485E+00
         9     0.5344E+02     0.3501E+00
        10     0.5848E+02     0.3491E+00

INPUT SPECTRUM CURVE NUMBER =  8

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69662E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)       ACCELERATION
         1     0.6736E+01     0.5078E+00
         2     0.1063E+02     0.4861E+00
         3     0.1805E+02     0.4012E+00
         4     0.2228E+02     0.3627E+00
         5     0.2572E+02     0.3575E+00
         6     0.3032E+02     0.3589E+00
         7     0.3442E+02     0.3595E+00
         8     0.4510E+02     0.3485E+00
         9     0.5344E+02     0.3501E+00
        10     0.5848E+02     0.3491E+00

INPUT SPECTRUM CURVE NUMBER =  9

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69700E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)       ACCELERATION
         1     0.6736E+01     0.5077E+00
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          2     0.1063E+02      0.4861E+00
          3     0.1805E+02      0.4012E+00
          4     0.2228E+02      0.3627E+00
          5     0.2572E+02      0.3575E+00
          6     0.3032E+02      0.3589E+00
          7     0.3442E+02      0.3595E+00
          8     0.4510E+02      0.3485E+00
          9     0.5344E+02      0.3501E+00
         10     0.5848E+02      0.3491E+00

 INPUT SPECTRUM CURVE NUMBER = 10

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =     0.69703E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)        ACCELERATION
          1     0.6736E+01      0.5077E+00
          2     0.1063E+02      0.4861E+00
          3     0.1805E+02      0.4012E+00
          4     0.2228E+02      0.3627E+00
          5     0.2572E+02      0.3575E+00
          6     0.3032E+02      0.3589E+00
          7     0.3442E+02      0.3595E+00
          8     0.4510E+02      0.3485E+00
          9     0.5344E+02      0.3501E+00
         10     0.5848E+02      0.3491E+00

 INPUT SPECTRUM CURVE NUMBER = 11

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =     0.70000E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)        ACCELERATION
          1     0.6736E+01      0.5072E+00
          2     0.1063E+02      0.4859E+00
          3     0.1805E+02      0.4010E+00
          4     0.2228E+02      0.3625E+00
          5     0.2572E+02      0.3574E+00
          6     0.3032E+02      0.3588E+00
          7     0.3442E+02      0.3594E+00
          8     0.4510E+02      0.3485E+00
          9     0.5344E+02      0.3501E+00
         10     0.5848E+02      0.3491E+00



     ********************************************************************
     *                                                                  *
     *                                                                  *
     *                                                                  *
     *                      A COMPUTER PROGRAM FOR                      *
     *                                                                  *
     *                                                                  *
     *     COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS      *
     *                                                                  *
     *                          " C R E S T "                           *
     *                                                                  *
     *                                                                  *
     *                          DEVELOPED BY                            *
     *                                                                  *
     *                       AJAYA KUMAR GUPTA                          *
     *                 JING-WEN JAW    ABHINAV GUPTA                    *
     *                                                                  *
     *                 NORTH CAROLINA STATE UNIVERSITY                  *
     *                    RALEIGH, NORTH CAROLINA                       *
     *                                                                  *
     *                          REVISION-1.0                            *
     *                                                                  *
     *                                                                  *
     ********************************************************************


PARTICIPATION FACTOR FOR S.S.---GAMAS
0.6155E+00  0.5509E-04  0.1453E+00 -0.3461E-08

MASS RATIOS

  PRIMARY SYSTEM MODE     1
0.8844E-01  0.2319E-02  0.4928E-02  0.1294E-03

  PRIMARY SYSTEM MODE     2
0.1386E-03  0.3094E-01  0.7723E-05  0.1726E-02

  PRIMARY SYSTEM MODE     3
0.9195E-01  0.2120E-03  0.5124E-02  0.1186E-04

  PRIMARY SYSTEM MODE     4
0.3391E-01  0.1494E-02  0.1890E-02  0.8335E-04

  PRIMARY SYSTEM MODE     5
0.9162E-02  0.1629E-01  0.5105E-03  0.9076E-03

  PRIMARY SYSTEM MODE     6
0.4498E-01  0.2839E-02  0.2618E-02  0.1581E-03

C O U P L E D   F R E Q U E N C I E S   A N D   M O D E   S H A P E S   E X T R A C T I O N

NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION    NITER =  900

CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                    TOL = 0.10000E-05

COUPLED  FREQUENCY  DAMPING RATIO
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 MODE        (HZ)          (%)

   1     0.67360E+01    0.58445E+01
   2     0.10627E+02    0.31606E+01
   3     0.19051E+02    0.27039E+01
   4     0.22208E+02    0.61904E+01
   5     0.25718E+02    0.20595E+01
   6     0.30319E+02    0.20338E+01
   7     0.34425E+02    0.69086E+01
   8     0.45097E+02    0.69703E+01
   9     0.53438E+02    0.69662E+01
  10     0.58481E+02    0.69700E+01

UNIT DISPLACEMENT & UNIT VELOCITY*W RESPONSE


COUPLED MODE NO.    1


   1     0.54377E+00    0.13204E-01
   2     0.11333E+01    0.28461E-01
   3     0.52628E-05   -0.76293E-06
   4     0.24363E-23   -0.21491E-24
   5    -0.36514E-24    0.32266E-25
   6     0.00000E+00    0.00000E+00
   7     0.43834E-25   -0.30735E-26
   8     0.29247E-24   -0.25800E-25
   9     0.52629E+00   -0.76293E-01
  10     0.24363E-11   -0.21491E-12
  11    -0.36514E-12    0.32266E-13
  12     0.00000E+00    0.00000E+00
  13    -0.35863E-22    0.31161E-23
  14     0.39849E-22   -0.36678E-23
  15     0.84021E+00   -0.12248E+00
  16    -0.27393E-11    0.24094E-12
  17     0.51272E-11   -0.45244E-12
  18     0.00000E+00    0.00000E+00
  19     0.15636E-23   -0.14737E-24
  20     0.81270E-20   -0.71745E-21
  21     0.86480E+00   -0.12477E+00
  22     0.42613E-11   -0.37598E-12
  23     0.62897E-11   -0.55505E-12
  24     0.00000E+00    0.00000E+00
  25    -0.32183E-19    0.28390E-20
  26    -0.80177E-20    0.70735E-21
  27     0.57472E+00   -0.80760E-01
  28    -0.23701E-11    0.20907E-12
  29    -0.82173E-12    0.72511E-13
  30     0.00000E+00    0.00000E+00
  31     0.20140E-20   -0.17772E-21
  32    -0.81647E-20    0.72093E-21
  33     0.57472E-05   -0.80759E-06
  34    -0.23700E-23    0.20906E-24
  35    -0.82153E-24    0.72493E-25
  36     0.00000E+00    0.00000E+00
  37     0.34218E-28   -0.30196E-29
  38    -0.52548E-27    0.46370E-28

COUPLED MODE NO.    2


   1     0.44397E-01   -0.16643E-01
   2     0.10904E+00   -0.39411E-01
   3    -0.43982E-05    0.11031E-05
   4     0.70356E-24   -0.29215E-24
   5    -0.10617E-24    0.44104E-25
   6     0.00000E+00    0.00000E+00
   7     0.12745E-25   -0.52945E-26
   8     0.84461E-25   -0.35072E-25
   9    -0.43983E+00    0.11031E+00
  10     0.70356E-12   -0.29215E-12
  11    -0.10617E-12    0.44104E-13
  12     0.00000E+00    0.00000E+00
  13    -0.12303E-22    0.51619E-23
  14     0.13454E-22   -0.56401E-23
  15    -0.71220E+00    0.17881E+00
  16    -0.79051E-12    0.32831E-12
  17     0.14826E-11   -0.61569E-12
  18     0.00000E+00    0.00000E+00
  19     0.57853E-24   -0.24176E-24
  20     0.23539E-20   -0.97760E-21
  21    -0.70355E+00    0.17518E+00
  22     0.12315E-11   -0.51141E-12
  23     0.18191E-11   -0.75546E-12
  24     0.00000E+00    0.00000E+00
  25    -0.93041E-20    0.38637E-20
  26    -0.23164E-20    0.96190E-21
  27    -0.42337E+00    0.10341E+00
  28    -0.68436E-13    0.28417E-12
  29    -0.23760E-12    0.98669E-13
  30     0.00000E+00    0.00000E+00
  31     0.58233E-21   -0.24183E-21
  32    -0.23667E-20    0.98299E-21
  33    -0.42337E-05    0.10341E-05
  34    -0.68433E-24    0.28416E-24
  35    -0.23754E-24    0.98645E-25
  36     0.00000E+00    0.00000E+00
  37     0.98956E-29   -0.41094E-29
  38    -0.15204E-27    0.43143E-28

COUPLED MODE NO.    3


   1     0.90226E-01    0.23431E-01
   2    -0.65969E-01   -0.21631E-01
   3     0.54895E-05    0.29904E-06
   4    -0.65423E-23   -0.16310E-23
   5     0.12680E-23    0.25286E-24
   6     0.00000E+00    0.00000E+00
   7    -0.15222E-24   -0.30255E-25
   8    -0.78519E-24   -0.19580E-24
   9     0.54896E+00    0.29905E-01
  10    -0.65423E-11   -0.16310E-11
  11     0.12680E-11    0.25286E-12
  12     0.00000E+00    0.00000E+00
  13     0.87364E-21    0.46758E-22
  14    -0.85466E-21   -0.49422E-22
  15     0.31533E+00    0.15795E-01
  16     0.82630E-11    0.19545E-11
  17    -0.14553E-10   -0.34554E-11
  18     0.00000E+00    0.00000E+00
  19    -0.52826E-22   -0.24999E-23
  20    -0.24589E-19   -0.55216E-20
  21    -0.35968E+00   -0.18549E-01
  22    -0.11831E-10   -0.28641E-11
  23    -0.18006E-10   -0.42434E-11
  24     0.00000E+00    0.00000E+00
  25     0.90484E-19    0.21664E-19
  26     0.21962E-19    0.53801E-20
  27    -0.56739E+00   -0.31403E-01
  28     0.63361E-11    0.15858E-11
  29     0.23264E-11    0.55362E-12
  30     0.00000E+00    0.00000E+00
  31    -0.56987E-20   -0.13568E-20
  32     0.25468E-19    0.55697E-20
  33    -0.56738E-05   -0.31402E-06
  34     0.63358E-23    0.15858E-23
  35     0.23259E-23    0.55349E-24
  36     0.00000E+00    0.00000E+00
  37    -0.97853E-28   -0.23071E-28
  38     0.15289E-26    0.35524E-27

COUPLED MODE NO.    4

   1     0.31353E+00   -0.28441E-01
   2    -0.30657E+00    0.25440E-01
   3    -0.50333E-05   -0.57260E-06
   4    -0.56791E-22    0.16653E-22
   5     0.78892E-23   -0.24322E-23
   6     0.00000E+00    0.00000E+00
   7    -0.94708E-24    0.29198E-24
   8    -0.68177E-23    0.19991E-23
   9    -0.50334E+00   -0.57260E-01
  10    -0.56791E-10    0.16653E-10
  11     0.78892E-11   -0.24322E-11
  12     0.00000E+00    0.00000E+00
  13    -0.84658E-21   -0.73152E-22
  14     0.75512E-21    0.10014E-21
  15    -0.37750E+00   -0.13656E-01
  16     0.61601E-10   -0.18449E-10
  17    -0.11782E-09    0.34872E-10
  18     0.00000E+00    0.00000E+00
  19     0.67292E-22    0.31651E-24
  20    -0.18346E-18    0.54939E-19
  21     0.36450E+00    0.20441E-01
  22    -0.98493E-10    0.29041E-10
  23    -0.14420E-09    0.42746E-10
  24     0.00000E+00    0.00000E+00
  25     0.74142E-18   -0.21908E-18
  26     0.18596E-18   -0.54707E-19
  27     0.50150E+00    0.55837E-01
  28     0.55309E-10   -0.16206E-10
  29     0.18896E-10   -0.55903E-11
  30     0.00000E+00    0.00000E+00
  31    -0.46319E-19    0.13702E-19
  32     0.18266E-18   -0.55025E-19
  33     0.50149E-05    0.55837E-06
  34     0.55307E-22   -0.16206E-22
  35     0.18891E-22   -0.55889E-23
  36     0.00000E+00    0.00000E+00
  37     0.78560E-27    0.23266E-27
  38     0.11994E-25   -0.35658E-26

COUPLED MODE NO.    5

   1     0.21246E-03    0.38520E-03
   2     0.66919E-04    0.23987E-03
   3     0.25171E-06    0.20740E-06
   4    -0.30881E-25   -0.29266E-25
   5     0.43956E-26    0.41663E-26
   6     0.00000E+00    0.00000E+00
   7    -0.52768E-27   -0.50016E-27
   8    -0.37072E-26   -0.35133E-26
   9     0.25171E-01    0.20741E-01
  10    -0.30881E-13   -0.29266E-13
  11     0.43956E-14    0.41663E-14
  12     0.00000E+00    0.00000E+00
  13    -0.17302E-24   -0.16233E-24
  14     0.16015E-24    0.14581E-24
  15    -0.15945E-01   -0.13520E-01
  16     0.33897E-13    0.32120E-13
  17    -0.64474E-13   -0.61089E-13
  18     0.00000E+00    0.00000E+00
  19    -0.57650E-25   -0.45810E-25
  20    -0.10090E-21   -0.95611E-22
  21    -0.15795E-01   -0.13377E-01
  22    -0.53743E-13   -0.50928E-13
  23    -0.78973E-13   -0.74827E-13
  24     0.00000E+00    0.00000E+00
  25     0.40515E-21    0.38391E-21
  26     0.10139E-21    0.96077E-22
  27     0.25306E-01    0.20872E-01
  28     0.30104E-13    0.28525E-13
  29     0.10336E-13    0.97935E-14
  30     0.00000E+00    0.00000E+00
  31    -0.25327E-22   -0.23999E-22
  32     0.10086E-21    0.95563E-22
  33     0.25306E-06    0.20872E-06
  34     0.30103E-25    0.28524E-25
  35     0.10333E-25    0.97912E-26
```

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  36     0.00000E+00    0.00000E+00
  37    -0.42950E-30   -0.40702E-30
  38     0.65770E-29    0.62319E-29

COUPLED MODE NO.    6

   1     0.14400E-02   -0.55438E-03
   2    -0.14817E-02    0.68436E-03
   3    -0.39357E-06    0.80497E-07
   4     0.79509E-22   -0.15896E-22
   5    -0.11470E-22    0.22949E-23
   6     0.00000E+00    0.00000E+00
   7     0.13779E-23   -0.27550E-24
   8     0.95449E-23   -0.19083E-23
   9    -0.39357E-01    0.80498E-02
  10     0.79509E-10   -0.15896E-10
  11    -0.11470E-10    0.22949E-11
  12     0.00000E+00    0.00000E+00
  13     0.14278E-22   -0.23094E-23
  14     0.11438E-21   -0.23334E-22
  15     0.60953E-01   -0.13068E-01
  16    -0.87649E-10    0.17524E-10
  17     0.16613E-09   -0.33214E-10
  18     0.00000E+00    0.00000E+00
  19    -0.21191E-22    0.42078E-23
  20     0.26101E-18   -0.52185E-19
  21    -0.60938E-01    0.11957E-01
  22     0.13848E-09   -0.27685E-10
  23     0.20357E-09   -0.40699E-10
  24     0.00000E+00    0.00000E+00
  25    -0.10441E-17    0.20875E-18
  26    -0.26100E-18    0.52181E-19
  27     0.39393E-01   -0.82843E-02
  28    -0.77391E-10    0.15472E-10
  29    -0.26635E-10    0.53250E-11
  30     0.00000E+00    0.00000E+00
  31     0.65285E-19   -0.13052E-19
  32    -0.26106E-18    0.52195E-19
  33     0.39393E-06   -0.82842E-07
  34    -0.77387E-22    0.15472E-22
  35    -0.26628E-22    0.53236E-23
  36     0.00000E+00    0.00000E+00
  37     0.11082E-26   -0.22157E-27
  38    -0.16970E-25    0.33927E-26

COUPLED MODE NO.    7

   1     0.14648E+00   -0.90565E-03
   2     0.18508E+00   -0.92703E-03
   3    -0.21210E-05   -0.74233E-07
   4    -0.11849E-22   -0.37426E-23
   5     0.17188E-23    0.54049E-24
   6     0.00000E+00    0.00000E+00
   7    -0.20631E-24   -0.64884E-25
   8    -0.14224E-23   -0.44929E-24
   9    -0.21210E+00   -0.74234E-02
  10    -0.11849E-10   -0.37426E-11
  11     0.17188E-11    0.54049E-12
  12     0.00000E+00    0.00000E+00
  13     0.20308E-22   -0.15261E-24
  14    -0.39541E-22   -0.59191E-23
  15    -0.14907E+00    0.49216E-02
  16     0.13088E-10    0.41264E-11
  17    -0.24780E-10   -0.78206E-11
  18     0.00000E+00    0.00000E+00
  19     0.20701E-23    0.99623E-24
  20    -0.38976E-19   -0.12288E-19
  21    -0.14828E+00    0.10264E-01
  22    -0.20647E-10   -0.65186E-11
  23    -0.30368E-10   -0.95830E-11
  24     0.00000E+00    0.00000E+00
  25     0.15571E-18    0.49151E-19
  26     0.38907E-19    0.12286E-19
  27    -0.35199E+00   -0.11770E-01
  28     0.11532E-10    0.36429E-11
  29     0.39726E-11    0.12538E-11
  30     0.00000E+00    0.00000E+00
  31    -0.97372E-20   -0.30733E-20
  32     0.39005E-19    0.12291E-19
  33    -0.35190E-05   -0.11770E-06
  34     0.11532E-22    0.36427E-23
  35     0.39716E-23    0.12535E-23
  36     0.00000E+00    0.00000E+00
  37    -0.16531E-27   -0.52170E-28
  38     0.25322E-26    0.79887E-27

COUPLED MODE NO.    8

   1    -0.32842E-01   -0.55078E-04
   2    -0.91288E-01   -0.91814E-04
   3     0.50014E-06    0.38992E-08
   4     0.83452E-23    0.55247E-24
   5    -0.12154E-23   -0.79855E-25
   6     0.00000E+00    0.00000E+00
   7     0.14591E-24    0.95866E-26
   8     0.10018E-23    0.66323E-25
   9     0.50014E-01    0.38993E-03
  10     0.83452E-11    0.55247E-12
  11    -0.12154E-11   -0.79855E-13
  12     0.00000E+00    0.00000E+00
  13    -0.27430E-22   -0.16690E-24
  14     0.40986E-22    0.10623E-23
  15     0.55763E-01   -0.30109E-03
  16    -0.92343E-11   -0.60935E-12
  17     0.17466E-10    0.11546E-11
  18     0.00000E+00    0.00000E+00
  19    -0.49618E-24   -0.13330E-24
  20     0.27499E-19    0.18146E-20
  21    0.65593E-01   -0.94068E-03
  22    0.14549E-10    0.96234E-12
  23    0.21408E-10    0.14149E-11
  24    0.00000E+00    0.00000E+00
  25   -0.10974E-18   -0.72565E-20
  26   -0.27410E-19   -0.18137E-20
  27    0.94934E-01    0.12731E-02
  28   -0.81218E-11   -0.53775E-12
  29   -0.28000E-11   -0.18511E-12
  30    0.00000E+00    0.00000E+00
  31    0.68630E-20    0.45373E-21
  32   -0.27532E-19   -0.18152E-20
  33    0.94933E-06    0.12731E-07
  34   -0.81214E-23   -0.53772E-24
  35   -0.27993E-23   -0.18507E-24
  36    0.00000E+00    0.00000E+00
  37    0.11653E-27    0.77026E-29
  38   -0.17855E-26   -0.11796E-27

COUPLED MODE NO.    9

   1   -0.73600E-01   -0.63513E-06
   2    0.37541E-01    0.76838E-04
   3    0.59347E-06    0.43373E-08
   4   -0.12935E-22   -0.43721E-24
   5    0.18865E-23    0.63205E-25
   6    0.00000E+00    0.00000E+00
   7   -0.22647E-24   -0.75876E-26
   8   -0.15528E-23   -0.52486E-25
   9    0.59348E-01    0.43373E-03
  10   -0.12935E-10   -0.43721E-12
  11    0.18865E-11    0.63205E-13
  12    0.00000E+00    0.00000E+00
  13    0.49634E-22    0.15979E-24
  14   -0.70574E-22   -0.86725E-24
  15    0.28388E-01   -0.37628E-03
  16    0.14322E-10    0.48226E-12
  17   -0.27080E-10   -0.91376E-12
  18    0.00000E+00    0.00000E+00
  19    0.18823E-24    0.10134E-24
  20   -0.42648E-19   -0.14361E-20
  21    0.74324E-02    0.10726E-03
  22   -0.22554E-10   -0.76158E-12
  23   -0.33192E-10   -0.11197E-11
  24    0.00000E+00    0.00000E+00
  25    0.17013E-18    0.57427E-20
  26    0.42490E-19    0.14353E-20
  27   -0.19380E-01   -0.30184E-03
  28    0.12589E-10    0.42556E-12
  29    0.43411E-11    0.14650E-12
  30    0.00000E+00    0.00000E+00
  31   -0.10640E-19   -0.35908E-21
  32    0.42708E-19    0.14366E-20
  33   -0.19380E-06   -0.30184E-08
  34    0.12588E-22    0.42553E-24
  35    0.43401E-23    0.14646E-24
  36    0.00000E+00    0.00000E+00
  37   -0.18067E-27   -0.60958E-29
  38    0.27686E-26    0.93351E-28

COUPLED MODE NO.   10

   1   -0.32519E-01    0.31273E-04
   2   -0.91056E-02    0.22053E-04
   3    0.30691E-06    0.45434E-09
   4   -0.25238E-23   -0.56505E-25
   5    0.36829E-24    0.81616E-26
   6    0.00000E+00    0.00000E+00
   7   -0.44212E-25   -0.97978E-27
   8   -0.30298E-24   -0.67833E-26
   9    0.30691E-01    0.45435E-04
  10   -0.25238E-11   -0.56505E-13
  11    0.36829E-12    0.81616E-14
  12    0.00000E+00    0.00000E+00
  13    0.10208E-22    0.17027E-26
  14   -0.14287E-22   -0.93038E-25
  15    0.32968E-01   -0.18865E-03
  16    0.27950E-11    0.62304E-13
  17   -0.52843E-11   -0.11808E-12
  18    0.00000E+00    0.00000E+00
  19   -0.13720E-25    0.14098E-25
  20   -0.83232E-20   -0.18554E-21
  21    0.18481E-01   -0.11139E-03
  22   -0.44009E-11   -0.98418E-13
  23   -0.64771E-11   -0.14469E-12
  24    0.00000E+00    0.00000E+00
  25    0.33199E-19    0.74210E-21
  26    0.82968E-20    0.18549E-21
  27    0.14653E-01   -0.25702E-04
  28    0.24562E-11    0.55000E-13
  29    0.84710E-12    0.18931E-13
  30    0.00000E+00    0.00000E+00
  31   -0.20763E-20   -0.46401E-22
  32    0.83354E-20    0.18558E-21
  33    0.14653E-06   -0.25702E-09
  34    0.24561E-23    0.54997E-25
  35    0.84690E-24    0.18926E-25
  36    0.00000E+00    0.00000E+00
  37   -0.35255E-28   -0.78769E-30
  38    0.54028E-27    0.12062E-28

B A S E   R E S P O N S E   S P E C T R A   D A T A

TOTAL NUMBER OF INPUT SPECTRUM CURVE = 11

MAXIMUM NUMBER OF DEFINITION POINTS IN INPUT SPECTRUM CURVES = 10

SPECTRUM SCALE FACTOR = 0.38640E+03
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RIGID FREQUENCY = 0.20500E+02



  SPECTRUM PARAMETERS

  CURVE NO   1  F1 =   5.79296  F2 = 17.22000  FL =   6.73600  FH = 11.28124

INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20337E-01

     INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1     0.6736E+01     0.8343E+00           0.8343E+00
         2     0.1063E+02     0.6272E+00           0.6372E+00
         3     0.1805E+02     0.5770E+00           0.3611E+00
         4     0.2228E+02     0.4426E+00           0.2241E+00
         5     0.2572E+02     0.4447E+00           0.1951E+00
         6     0.3032E+02     0.4293E+00           0.1597E+00
         7     0.3442E+02     0.4164E+00           0.1365E+00
         8     0.4510E+02     0.3493E+00           0.8738E-01
         9     0.5344E+02     0.3517E+00           0.7425E-01
        10     0.5840E+02     0.3493E+00           0.6738E-01

  SPECTRUM PARAMETERS

  CURVE NO   2  F1 =   5.79296  F2 = 17.22000  FL =   6.73600  FH = 11.28124

INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20594E-01

     INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1     0.6736E+01     0.8316E+00           0.8316E+00
         2     0.1063E+02     0.6257E+00           0.6358E+00
         3     0.1805E+02     0.5756E+00           0.3597E+00
         4     0.2228E+02     0.4413E+00           0.2234E+00
         5     0.2572E+02     0.4435E+00           0.1945E+00
         6     0.3032E+02     0.4285E+00           0.1594E+00
         7     0.3442E+02     0.4158E+00           0.1363E+00
         8     0.4510E+02     0.3493E+00           0.8738E-01
         9     0.5344E+02     0.3517E+00           0.7425E-01
        10     0.5848E+02     0.3493E+00           0.6738E-01

  SPECTRUM PARAMETERS

  CURVE NO   3  F1 =   5.79296  F2 = 17.22000  FL =   6.73600  FH = 11.28124

INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.27041E-01

     INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1     0.6736E+01     0.7656E+00           0.7656E+00
         2     0.1063E+02     0.5915E+00           0.6026E+00
         3     0.1805E+02     0.5263E+00           0.3289E+00
         4     0.2228E+02     0.4151E+00           0.2101E+00
         5     0.2572E+02     0.4165E+00           0.1827E+00
         6     0.3032E+02     0.4102E+00           0.1526E+00
         7     0.3442E+02     0.4020E+00           0.1317E+00
         8     0.4510E+02     0.3486E+00           0.8720E-01
         9     0.5344E+02     0.3513E+00           0.7416E-01
        10     0.5848E+02     0.3450E+00           0.6732E-01

  SPECTRUM PARAMETERS

  CURVE NO   4  F1 =   5.79296  F2 = 17.22000  FL =   6.73600  FH = 11.28124

INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.31606E-01

     INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1     0.6736E+01     0.7226E+00           0.7226E+00
         2     0.1063E+02     0.5708E+00           0.5824E+00
         3     0.1805E+02     0.4983E+00           0.3114E+00
         4     0.2228E+02     0.4008E+00           0.2029E+00
         5     0.2572E+02     0.4013E+00           0.1760E+00
         6     0.3032E+02     0.3999E+00           0.1488E+00
         7     0.3442E+02     0.3940E+00           0.1291E+00
         8     0.4510E+02     0.3484E+00           0.8715E-01
         9     0.5344E+02     0.3511E+00           0.7412E-01
        10     0.5848E+02     0.3490E+00           0.6732E-01

  SPECTRUM PARAMETERS

  CURVE NO   5  F1 =   5.79296  F2 = 17.22000  FL =   6.73600  FH = 11.28124
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INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.58645E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01     0.5357E+00            0.5357E+00
        2    0.1063E+02     0.4934E+00            0.5069E+00
        3    0.1805E+02     0.4086E+00            0.2554E+00
        4    0.2228E+02     0.3695E+00            0.1871E+00
        5    0.2572E+02     0.3604E+00            0.1581E+00
        6    0.3032E+02     0.3659E+00            0.1361E+00
        7    0.3442E+02     0.3660E+00            0.1199E+00
        8    0.4510E+02     0.3484E+00            0.8715E-01
        9    0.5344E+02     0.3503E+00            0.7295E-01
       10    0.5848E+02     0.3491E+00            0.6734E-01

  SPECTRUM PARAMETERS

  CURVE NO   6  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.61902E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01     0.5217E+00            0.5217E+00
        2    0.1063E+02     0.4912E+00            0.5049E+00
        3    0.1805E+02     0.4064E+00            0.2540E+00
        4    0.2228E+02     0.3675E+00            0.1860E+00
        5    0.2572E+02     0.3595E+00            0.1577E+00
        6    0.3032E+02     0.3636E+00            0.1353E+00
        7    0.3442E+02     0.3639E+00            0.1193E+00
        8    0.4510E+02     0.3484E+00            0.8715E-01
        9    0.5344E+02     0.3503E+00            0.7395E-01
       10    0.5848E+02     0.3491E+00            0.6734E-01

  SPECTRUM PARAMETERS

  CURVE NO   7  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

INPUT SPECTRUM CURVE NUMBER =  7

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69026E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01     0.5089E+00            0.5270E+00
        2    0.1063E+02     0.4865E+00            0.5008E+00
        3    0.1805E+02     0.4016E+00            0.2510E+00
        4    0.2228E+02     0.3631E+00            0.1830E+00
        5    0.2572E+02     0.3577E+00            0.1569E+00
        6    0.3032E+02     0.3592E+00            0.1337E+00
        7    0.3442E+02     0.3598E+00            0.1179E+00
        8    0.4510E+02     0.3485E+00            0.8718E-01
        9    0.5344E+02     0.3501E+00            0.7391E-01
       10    0.5848E+02     0.3491E+00            0.6734E-01

  SPECTRUM PARAMETERS

  CURVE NO   8  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

INPUT SPECTRUM CURVE NUMBER =  8

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69662E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01     0.5078E+00            0.5078E+00
        2    0.1063E+02     0.4861E+00            0.5004E+00
        3    0.1805E+02     0.4012E+00            0.2507E+00
        4    0.2228E+02     0.3627E+00            0.1836E+00
        5    0.2572E+02     0.3575E+00            0.1568E+00
        6    0.3032E+02     0.3589E+00            0.1335E+00
        7    0.3442E+02     0.3595E+00            0.1178E+00
        8    0.4510E+02     0.3485E+00            0.8718E-01
        9    0.5344E+02     0.3501E+00            0.7391E-01
       10    0.5848E+02     0.3491E+00            0.6734E-01

  SPECTRUM PARAMETERS

  CURVE NO   9  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

INPUT SPECTRUM CURVE NUMBER =  9

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69700E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION
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        1    0.6736E+01     0.5077E+00            0.5258E+00
        2    0.1063E+02     0.4861E+00            0.5004E+00
        3    0.1805E+02     0.4012E+00            0.2507E+00
        4    0.2228E+02     0.3627E+00            0.1836E+00
        5    0.2572E+02     0.3575E+00            0.1568E+00
        6    0.3032E+02     0.3589E+00            0.1335E+00
        7    0.3442E+02     0.3595E+00            0.1178E+00
        8    0.4510E+02     0.3485E+00            0.8718E-01
        9    0.5344E+02     0.3501E+00            0.7391E-01
       10    0.5848E+02     0.3491E+00            0.6734E-01

  SPECTRUM PARAMETERS

  CURVE NO  10  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

INPUT SPECTRUM CURVE NUMBER = 10

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69703E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01     0.5077E+00            0.5258E+00
        2    0.1063E+02     0.4861E+00            0.5004E+00
        3    0.1805E+02     0.4012E+00            0.2507E+00
        4    0.2228E+02     0.3627E+00            0.1836E+00
        5    0.2572E+02     0.3575E+00            0.1568E+00
        6    0.3032E+02     0.3589E+00            0.1335E+00
        7    0.3442E+02     0.3595E+00            0.1176E+00
        8    0.4510E+02     0.3485E+00            0.8718E-01
        9    0.5344E+02     0.3501E+00            0.7391E-01
       10    0.5848E+02     0.3491E+00            0.6734E-01

  SPECTRUM PARAMETERS

  CURVE NO  11  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

INPUT SPECTRUM CURVE NUMBER = 11

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.70000E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01     0.5072E+00            0.5072E+00
        2    0.1063E+02     0.4859E+00            0.5002E+00
        3    0.1805E+02     0.4010E+00            0.2506E+00
        4    0.2228E+02     0.3625E+00            0.1835E+00
        5    0.2572E+02     0.3574E+00            0.1568E+00
        6    0.3632E+02     0.3588E+00            0.1335E+00
        7    0.3442E+02     0.3594E+00            0.1178E+00
        8    0.4510E+02     0.3485E+00            0.8718E-01
        9    0.5344E+02     0.3561E+00            0.7391E-01
       10    0.5848E+02     0.3491E+00            0.6734E-01

INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS

     FREQUENCY    DAMPING RATIO          SPECTRAL ACCELERATIONS
       (HZ)            (%)                 SAD           SRV

   0.67360E+01     0.58645E+01         0.5357E+00    0.5357E+00
   0.10627E+02     0.31606E+01         0.5708E+00    0.5824E+00
   0.18051E+02     0.27039E+01         0.5263E+00    0.3289E+00
   0.22284E+02     0.61904E+01         0.3675E+00    0.1860E+00
   0.25718E+02     0.20595E+01         0.4435E+00    0.1945E+00
   0.30319E+02     0.20338E+01         0.4293E+00    0.1597E+00
   0.34425E+02     0.69086E+01         0.3598E+00    0.1179E+00
   0.45057E+02     0.69703E+01         0.3485E+00    0.8718E-01
   0.53438E+02     0.69662E+01         0.3501E+00    0.7391E-01
   0.58481E+02     0.69700E+01         0.3491E+00    0.6734E-01

DISPLACEMENT RESPONSE UD (FROM SD)

  MODE NO.     1
 0.6284E-01  0.1310E+00  0.6284E-01  0.2815E-24 -0.4213E-25  0.0000E+00
 0.5065E-26  0.3380E-25  0.1373E+00  0.2815E-12 -0.4219E-13  0.0000E+00
-0.4144E-23  0.4605E-23  0.1872E+00 -0.3154E-12  0.5925E-12  0.0000E+00
 0.1807E-24  0.9391E-21  0.2037E+00  0.4924E-12  0.7268E-12  0.0000E+00
-0.3719E-20 -0.9265E-21  0.1837E+00 -0.2739E-12 -0.9495E-13  0.0000E+00
 0.2327E-21 -0.9435E-21  0.1310E+00 -0.2739E-24 -0.9493E-25  0.0000E+00
 0.3954E-29 -0.5072E-28
  MODE NO.     2
 0.2196E-02  0.5394E-02  0.2196E-02  0.3480E-25 -0.5252E-26  0.0000E+00
 0.6305E-27  0.4178E-26 -0.1892E-01  0.3480E-13 -0.5252E-14  0.0000E+00
-0.6086E-24  0.6656E-24 -0.3176E-01 -0.3910E-13  0.7334E-13  0.0000E+00
 0.2842E-25  0.1164E-21 -0.3069E-01  0.6092E-13  0.8999E-13  0.0000E+00
-0.4602E-21 -0.1146E-21 -0.1619E-01  0.3385E-13 -0.1175E-13  0.0000E+00
 0.2881E-23 -0.1171E-21  0.5394E-02 -0.3385E-25 -0.1175E-25  0.0000E+00
 0.4895E-30 -0.7521E-29
  MODE NO.     3
 0.1426E-02 -0.1043E-02  0.1427E-02 -0.1034E-24  0.2005E-25  0.0000E+00
-0.2407E-26 -0.1242E-25  0.9621E-02 -0.1034E-12  0.2005E-13  0.0000E+00
 0.1381E-22 -0.1399E-22  0.5424E-02  0.1306E-12 -0.2301E-12  0.0000E+00
-0.8352E-24 -0.[illegible]E-21 -0.5742E-02 -0.1570E-12 -0.2867E-12  0.0000E+00
 0.1431E-20 [illegible]3472E-21 -0.9519E-02  0.1002E-12  0.3670E-13  0.0000E+00
-0.900[illegible]-22  0.4026E-21 -0.1043E-02  0.1002E-24  0.3677E-25  0.0000E+00
-0.1541E-29  0.2417E-28
  MODE NO.     4
 0.2271E-02 -0.3221E-02  0.2271E-02 -0.4114E-24  0.5715E-25  0.0000E+00
-0.6860E-26 -0.4939E-25 -0.3273E-02 -0.4114E-12  0.5715E-13  0.0000E+00
-0.6132E-23  0.5470E-23 -0.2260E-02  0.4462E-12 -0.8535E-12  0.0000E+00
 0.4874E-24 -0.1329E-20  0.2216E-02 -0.7135E-12 -0.1045E-11  0.0000E+00
 0.5371E-20  0.1347E-20  0.2310E-02  0.4006E-12  0.1369E-12  0.0000E+00
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-0.1355E-21  0.1323E-20 -0.2221E-02  0.4006E-24  0.1368E-24  0.0000E+00
-0.5691E-29  0.8682E-28
   MODE NO.     5
 0.1394E-05  0.4392E-06  0.1396E-05 -0.2027E-27  0.2085E-28  0.0000E+00
-0.3463E-29 -0.2433E-28  0.1664E-03 -0.2037E-15  0.2085E-16  0.0000E+00
-0.1135E-26  0.1051E-26 -0.1036E-03  0.2225E-15 -0.4231E-15  0.0000E+00
-0.3783E-27 -0.6621E-24 -0.1028E-03 -0.3527E-15 -0.5183E-15  0.0000E+00
 0.2659E-23  0.6654E-24  0.1667E-03  0.1976E-15  0.6783E-16  0.0000E+00
-0.1662E-24  0.6619E-24  0.4408E-06  0.1976E-27  0.6781E-28  0.0000E+00
-0.2819E-32  0.4316E-31
   MODE NO.     6
 0.6673E-05 -0.6773E-05  0.6672E-05  0.3634E-24 -0.5247E-25  0.0000E+00
 0.6299E-26  0.4363E-25 -0.1759E-03  0.3634E-12 -0.5247E-13  0.0000E+00
 0.6527E-25  0.5228E-24  0.2799E-03 -0.4066E-12  0.7594E-12  0.0000E+00
-0.9687E-25  0.1193E-20 -0.2799E-03  0.6330E-12  0.9305E-12  0.0000E+00
-0.4773E-20 -0.1193E-20  0.1760E-03 -0.3538E-12 -0.1217E-12  0.0000E+00
 0.2984E-21 -0.1193E-20 -0.6772E-05 -0.3537E-24 -0.1217E-24  0.0000E+00
 0.5066E-29 -0.7757E-28
   MODE NO.     7
 0.4353E-03  0.5500E-03  0.4353E-03 -0.3521E-25  0.5108E-26  0.0000E+00
-0.6132E-27 -0.4227E-26 -0.1721E-03 -0.3521E-13  0.5108E-14  0.0000E+00
 0.6005E-25 -0.1175E-24  0.3819E-04  0.3889E-13 -0.7364E-13  0.0000E+00
 0.6152E-26 -0.1158E-21  0.6347E-04 -0.6136E-13 -0.9024E-13  0.0000E+00
 0.4627E-21  0.1156E-21 -0.2210E-03  0.3427E-13  0.1181E-13  0.0000E+00
-0.2894E-22  0.1159E-21  0.5500E-03  0.3427E-25  0.1180E-25  0.0000E+00
-0.4913E-30  0.3525E-29
   MODE NO.     8
-0.5508E-04 -0.1531E-03 -0.5508E-04  0.1400E-25 -0.2039E-26  0.0000E+00
 0.2447E-27  0.1680E-26  0.9196E-05  0.1400E-13 -0.2039E-14  0.0000E+00
-0.4600E-25  0.6874E-25 -0.7674E-06 -0.1549E-13  0.2939E-13  0.0000E+00
-0.8322E-27  0.4612E-22 -0.3885E-05  0.2440E-13  0.3590E-13  0.0000E+00
-0.1841E-21 -0.4597E-22  0.2572E-04 -0.1362E-13 -0.4696E-14  0.0000E+00
 0.1151E-22 -0.4618E-22 -0.1531E-03 -0.1362E-25 -0.4695E-26  0.0000E+00
 0.1954E-30 -0.2995E-29
   MODE NO.     9
-0.8832E-04  0.4505E-04 -0.8832E-04 -0.1552E-25  0.2264E-26  0.0000E+00
-0.2718E-27 -0.1863E-26  0.9571E-05 -0.1552E-13  0.2264E-14  0.0000E+00
 0.5955E-25 -0.8469E-25 -0.1027E-05  0.1719E-13 -0.3249E-13  0.0000E+00
 0.2259E-27 -0.5118E-22  0.6201E-06 -0.2706E-13 -0.3983E-13  0.0000E+00
 0.2042E-21  0.5099E-22 -0.4881E-05  0.1511E-13  0.5209E-14  0.0000E+00
-0.1277E-22  0.5125E-22  0.4505E-04  0.1510E-25  0.5208E-26  0.0000E+00
-0.2168E-30  0.3322E-29
   MODE NO.    10
-0.3249E-04 -0.9177E-05 -0.3249E-04 -0.2521E-26  0.3679E-27  0.0000E+00
-0.4417E-28 -0.3027E-27  0.2836E-05 -0.2521E-14  0.3679E-15  0.0000E+00
 0.1020E-25 -0.1427E-25 -0.2174E-06  0.2792E-14 -0.5279E-14  0.0000E+00
-0.1371E-28 -0.8315E-23 -0.3829E-07 -0.4397E-14 -0.6471E-14  0.0000E+00
 0.3317E-22  0.8283E-23  0.7996E-06  0.2454E-14  0.8463E-15  0.0000E+00
-0.2074E-23  0.8328E-23 -0.9177E-05  0.2454E-26  0.8461E-27  0.0000E+00
-0.3522E-31  0.5398E-30


  DISPLACEMENT RESPONSE UV (FROM SV)

   MODE NO.     1
 0.1526E-02  0.3289E-02  0.1526E-02 -0.2483E-25  0.3729E-26  0.0000E+00
-0.4476E-27 -0.2981E-26 -0.6938E-02 -0.2483E-13  0.3729E-14  0.0000E+00
 0.3832E-24 -0.4238E-24 -0.1192E-01  0.2784E-13 -0.5228E-13  0.0000E+00
-0.1703E-25 -0.8291E-22 -0.1183E-01 -0.4345E-13 -0.6414E-13  0.0000E+00
 0.3282E-21  0.8174E-22 -0.6396E-02  0.2416E-13  0.8379E-14  0.0000E+00
-0.2054E-22  0.8331E-22  0.3289E-02  0.2416E-25  0.8377E-26  0.0000E+00
-0.3489E-30  0.5359E-29
   MODE NO.     2
-0.8400E-03 -0.1989E-02 -0.8399E-03 -0.1474E-25  0.2226E-26  0.0000E+00
-0.2672E-27 -0.1770E-26  0.4498E-02 -0.1474E-13  0.2226E-14  0.0000E+00
 0.2605E-24 -0.2847E-24  0.7725E-02  0.1657E-13 -0.3107E-13  0.0000E+00
-0.1220E-25 -0.4934E-22  0.7312E-02 -0.2581E-13 -0.3813E-13  0.0000E+00
 0.1950E-21  0.4855E-22  0.3460E-02  0.1434E-13  0.4980E-14  0.0000E+00
-0.1221E-22  0.4961E-22 -0.1989E-02  0.1434E-25  0.4979E-26  0.0000E+00
-0.2074E-30  0.3187E-29
   MODE NO.     3
 0.2315E-03 -0.2137E-03  0.2315E-03 -0.1611E-25  0.2498E-26  0.0000E+00
-0.2999E-27 -0.1935E-26  0.4379E-03 -0.1611E-13  0.2498E-14  0.0000E+00
 0.4620E-24 -0.4883E-24  0.2095E-03  0.1877E-13 -0.3414E-13  0.0000E+00
-0.2470E-25 -0.5456E-22 -0.2189E-03 -0.2630E-13 -0.4193E-13  0.0000E+00
 0.2140E-21  0.5316E-22 -0.4349E-03  0.1567E-13  0.5470E-14  0.0000E+00
-0.1361E-22  0.5503E-22 -0.2137E-03  0.1567E-25  0.5469E-26  0.0000E+00
-0.2279E-30  0.3510E-29
   MODE NO.     4
-0.1043E-03  0.9329E-04 -0.1043E-03  0.6107E-25 -0.8919E-26  0.0000E+00
 0.1071E-26  0.7331E-26 -0.2748E-03  0.6107E-13 -0.8919E-14  0.0000E+00
-0.2683E-24  0.3672E-24 -0.7534E-04 -0.6766E-13  0.1279E-12  0.0000E+00
 0.1161E-26  0.2015E-21  0.8922E-04  0.1065E-12  0.1568E-12  0.0000E+00
-0.8034E-21 -0.2006E-21  0.2585E-03 -0.5943E-13 -0.2050E-13  0.0000E+00
 0.5025E-22 -0.2018E-21  0.9329E-04 -0.5943E-25 -0.2050E-25  0.0000E+00
 0.8532E-30 -0.1308E-28
   MODE NO.     5
 0.1109E-05  0.6905E-06  0.1110E-05 -0.8425E-28  0.1199E-28  0.0000E+00
-0.1440E-29 -0.1011E-28  0.6073E-04 -0.8425E-16  0.1199E-16  0.0000E+00
-0.4673E-27  0.4197E-27 -0.3798E-04  0.9246E-16 -0.1759E-15  0.0000E+00
-0.1319E-27 -0.2752E-24 -0.3765E-04 -0.1466E-15 -0.2154E-15  0.0000E+00
 0.1105E-23  0.2766E-24  0.6086E-04  0.8211E-16  0.2819E-16  0.0000E+00
-0.6908E-25  0.2751E-24  0.6911E-06  0.8211E-28  0.2819E-28  0.0000E+00
-0.1172E-32  0.1794E-31
   MODE NO.     6
-0.9429E-06  0.1164E-05 -0.9428E-06 -0.2704E-25  0.3903E-26  0.0000E+00
-0.4686E-27 -0.3246E-26  0.1317E-04 -0.2704E-13  0.3903E-14  0.0000E+00
-0.4064E-26 -0.3969E-25 -0.2059E-04  0.2980E-13 -0.5649E-13  0.0000E+00
 0.7157E-26 -0.8876E-22  0.2066E-04 -0.4709E-13 -0.6922E-13  0.0000E+00
 0.3550E-21  0.8875E-22 -0.1335E-04  0.2632E-13  0.9057E-14  0.0000E+00
-0.2220E-22  0.8877E-22  0.1164E-05  0.2631E-25  0.9055E-26  0.0000E+00
-0.3768E-30  0.5770E-29
   MODE NO.     7
-0.8820E-06 -0.9028E-06 -0.8820E-06 -0.3645E-26  0.5263E-27  0.0000E+00
-0.6319E-28 -0.4375E-27 -0.8115E-05 -0.3645E-14  0.5263E-15  0.0000E+00
-0.1486E-27 -0.5764E-26  0.3903E-05  0.4018E-14 -0.7616E-14  0.0000E+00
 0.9702E-27 -0.1197E-22  0.9101E-05 -0.6348E-14 -0.9332E-14  0.0000E+00
 0.4787E-22  0.1196E-22 -0.1236E-04  0.3548E-14  0.1221E-14  0.0000E+00
-0.2993E-23  0.1157E-22 -0.9029E-06  0.3547E-26  0.1221E-26  0.0000E+00
-0.5081E-31  0.7780E-30
   MODE NO.     8
-0.2311E-07 -0.3852E-07 -0.2311E-07  0.2318E-27 -0.3350E-28  0.0000E+00
 0.4022E-29  0.2783E-28  0.1374E-06  0.2318E-15 -0.3350E-16  0.0000E+00
-0.7002E-28  0.4457E-27 -0.1556E-06 -0.2557E-15  0.8844E-15  0.0000E+00
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-0.5593E-28  0.7613E-24 -0.4270E-06  0.4038E-15  0.5936E-15  0.0000E+00
-0.3045E-23 -0.7610E-24  0.4987E-06 -0.2256E-15 -0.7767E-16  0.0000E+00
 0.1904E-24 -0.7614E-24 -0.3852E-07 -0.2256E-27 -0.7763E-28  0.0000E+00
 0.3232E-32 -0.4949E-31
   MODE NO.     9
-0.1609E-07  0.1946E-07 -0.1609E-07 -0.1108E-27  0.1601E-28  0.0000E+00
-0.1922E-29 -0.1330E-28  0.1009E-06 -0.1108E-15  0.1601E-16  0.0000E+00
 0.4048E-28 -0.2197E-27 -0.9719E-07  0.1223E-15 -0.2315E-15  0.0000E+00
 0.2567E-28 -0.3638E-24  0.3241E-07 -0.1929E-15 -0.2837E-15  0.0000E+00
 0.1455E-23  0.3636E-24 -0.6411E-07  0.1070E-15  0.3711E-16  0.0000E+00
-0.9096E-25  0.3639E-24  0.1946E-07  0.1070E-27  0.3710E-28  0.0000E+00
-0.1544E-32  0.2365E-31
   MODE NO.    10
 0.6027E-08  0.4250E-08  0.6027E-08 -0.1089E-28  0.1573E-29  0.0000E+00
-0.1888E-30 -0.1307E-29  0.1443E-07 -0.1089E-16  0.1573E-17  0.0000E+00
 0.3282E-30 -0.1793E-28 -0.3104E-07  0.1201E-16 -0.2276E-16  0.0000E+00
 0.2717E-29 -0.3576E-25 -0.1651E-07 -0.1897E-16 -0.2789E-16  0.0000E+00
 0.1430E-24  0.3575E-25 -0.3480E-09  0.1060E-16  0.3648E-17  0.0000E+00
-0.8943E-26  0.3577E-25  0.4250E-08  0.1060E-28  0.3648E-29  0.0000E+00
-0.1518E-31  0.2325E-32


  CORRELATION EPSD

   MODE NO.     1
 0.1000E+01  0.1302E+00  0.1883E+00  0.1883E+00  0.1883E+00  0.1883E+00
 0.1883E+00  0.1883E+00  0.1883E+00  0.1883E+00
   MODE NO.     2
 0.1302E+00  0.1000E+01  0.5687E+00  0.5687E+00  0.5687E+00  0.5687E+00
 0.5687E+00  0.5687E+00  0.5687E+00  0.5687E+00
   MODE NO.     3
 0.1883E+00  0.5687E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     4
 0.1883E+00  0.5687E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     5
 0.1883E+00  0.5687E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     6
 0.1883E+00  0.5687E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.1883E+00  0.5687E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     8
 0.1883E+00  0.5687E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.1883E+00  0.5687E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    10
 0.1883E+00  0.5687E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION EPSV

   MODE NO.     1
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
 0.0000E+00  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
 0.0000E+00  0.0000E+00  0.1000E+01  0.3776E+00  0.3805E+00  0.3805E+00
 0.3805E+00  0.3805E+00  0.3805E+00  0.3805E+00
   MODE NO.     4
 0.0000E+00  0.0000E+00  0.3776E+00  0.1000E+01  0.8263E+00  0.8263E+00
 0.8263E+00  0.8263E+00  0.8263E+00  0.8263E+00
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.3805E+00  0.8263E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.3805E+00  0.8263E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.3805E+00  0.8263E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.3805E+00  0.8263E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.0000E+00  0.0000E+00  0.3805E+00  0.8263E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    10
 0.0000E+00  0.0000E+00  0.3805E+00  0.8263E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION MU (FOR CROSS TERM OF RD AND RV)

   MODE NO.     1
 0.0000E+00  0.1257E+00  0.3201E-01  0.2563E-01  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
-0.1257E+00  0.0000E+00  0.5838E-01  0.3790E-01  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
-0.3201E-01 -0.5838E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     4
-0.2563E-01 -0.3790E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     8
```

```
0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  MODE NO.    9
0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  MODE NO.   10
0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

 COMBINED VALUES OF COUPLED NODAL DISPLACEMENTS

 DISPLACEMENTS AT PRIMARY SYSTEM CONNECTING DOF

 DOF #     DISPLACEMENT


  2         0.6403E-01

  6         0.1310E+00

 DISPLACEMENTS AT SECONDARY SYSTEM DOF

 NODE      DX          DY          DZ        ROT-X       ROT-Y       ROT-Z


  1    0.6403E-01  0.3056E-24  0.4653E-25  0.0000E+00  0.5585E-26  0.3669E-25

  2    0.1380E+00  0.3056E-12  0.4653E-13  0.0000E+00  0.7863E-23  0.8274E-23

  3    0.1878E+00  0.3447E-12  0.6451E-12  0.0000E+00  0.4286E-24  0.1026E-20

  4    0.2032E+00  0.5355E-12  0.7917E-12  0.0000E+00  0.4047E-20  0.1007E-20

  5    0.1821E+00  0.2973E-12  0.1034E-12  0.0000E+00  0.2534E-21  0.1033E-20

  6    0.1310E+00  0.2972E-24  0.1033E-24  0.0000E+00  0.5306E-29  0.6621E-28

 COMBINED VALUES OF COUPLED MEMEBER FORCES


 NODE      FX          FY          FZ          MX          MY          MZ


  1    0.7641E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  2    0.7641E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  2    0.5075E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  3    0.5075E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  3    0.1655E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  4    0.1655E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  4    0.2435E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  5    0.2435E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  5    0.5686E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  6    0.5686E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

 COMBINED VALUES OF COUPLED SUPPORT REACTIONS


 TYPE     NODE      SUPPORT REACTION


 FX        1        0.7641E+02

 FY        2        0.3543E-08

 FZ        2        0.2220E-09

 FY        3        0.1701E-08

 FZ        3        0.3225E-08

 FY        4        0.2698E-08

 FZ        4        0.3952E-08

 FY        5        0.1502E-08

 FZ        5        0.5170E-09

 FX        6        0.5686E+02
```

c4r.dat

```
IDEN JB=1111 IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL SU=1 CV=2 TI=/CASE-4, 4-DOF PROBLEM/
FREQ FR=33 LO=1 MX=2 TI=/TRUNCATED MODES /
RCAS CA=1 EV=1 TY=1 SU=3 LO=0 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 SU=1 FX=1 FY=1 FZ=1
SPEC EV=1 ME=1 FP=0 SH=0
     LV=1 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=2 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=3 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=4 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=5 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
     LV=6 DX=1 DY=1 DZ=1
          DI=X
              1.0/1.0  50.0/1.0
          DI=Y
              1.0/1.0  50.0/1.0
          DI=Z
              1.0/1.0  50.0/1.0
MATL CD=3 EC=28.0 SC=75 SH=75 KL=1
ANCH PT=1 LV=1
SPRS PT=2 DX=1.0 AZ=1000.0
LUMP PT=2 MA=38.64
RSUP PT=2 DY=1 LV=2
RSUP PT=2 DZ=1 LV=2
ROTR PT=2 RX=1
ROTR PT=2 RY=1
ROTR PT=2 RZ=1
SPRS PT=3 DX=1.0 AZ=1000.0
LUMP PT=3 MA=38.64
RSUP PT=3 DY=1 LV=3
RSUP PT=3 DZ=1 LV=3
ROTR PT=3 RX=1
ROTR PT=3 RY=1
ROTR PT=3 RZ=1
SPRS PT=4 DX=1.0 AZ=1000.0
LUMP PT=4 MA=38.64
RSUP PT=4 DY=1 LV=4
RSUP PT=4 DZ=1 LV=4
ROTR PT=4 RX=1
ROTR PT=4 RY=1
ROTR PT=4 RZ=1
SPRS PT=5 DX=1.0 AZ=1000.0
LUMP PT=5 MA=38.64
RSUP PT=5 DY=1 LV=5
RSUP PT=5 DZ=1 LV=5
ROTR PT=5 RX=1
ROTR PT=5 RY=1
ROTR PT=5 RZ=1
SPRS PT=6 DX=1.0 AZ=1000.0
ANCH PT=6 LV=6
ENDP
```

```
CREST/ PIPESTRESS RUN FOR CASE-4, TRUNCATED MODES OF S.S.
    6     2     2    6    2    1     0    11   1     1    0     1     1
  900    11    10      1.0E-6       20.5       386.4 0.10
      0.07         0.07         0.07         0.07         0.07         0.07
      0.02         0.02
    2     6
    1    16
100000000. 0.0
0.0       100000000.
1 6
7.25094000 21.3315400 34.1721600 45.0265250 53.3137200 58.4066800
0.30811 -0.65816 0.43965 -0.15866 -0.61911 -0.54563
0.65816  0.61991 0.54563 -0.43965  0.30811 -0.15866
   0.1911E+01 -0.6119E+00  0.3362E+00  0.2056E+00  0.1223E+00  0.5720E-01
   10  0.020337
 6.7360.834310.6270.627218.0510.577822.2840.442625.7170.444730.3190.4293
34.4250.416445.0970.349353.4380.351758.4820.3493
   10  0.020594
 6.7360.831610.6270.625718.0510.575622.2840.441325.7170.443530.3190.4285
34.4250.415845.0970.349353.4380.351758.4820.3493
   10  0.027041
 6.7360.765610.6270.591518.0510.526322.2840.415125.7170.416530.3190.4102
34.4250.402045.0970.348653.4380.351358.4820.3490
   10  0.031606
 6.7360.722610.6270.570818.0510.498322.2840.400825.7170.401330.3190.3999
34.4250.394045.0970.348453.4380.351158.4820.3490
   10  0.058645
 6.7360.535710.6270.493418.0510.408622.2840.369525.7170.360430.3190.3659
34.4250.366045.0970.348453.4380.350358.4820.3491
   10  0.061902
 6.7360.521710.6270.491218.0510.406422.2840.367525.7170.359530.3190.3636
34.4250.363945.0970 348453.4380.350358.4820.3491
   10  0.069086
 6.7360.508910.6270.486518.0510.401622.2840.363125.7170.357730.3190.3592
34.4250.359845.0970.348553.4380.350158.4820.3491
   10  0.069662
 6.7360.507810.6270.486118.0510.401222.2840.362725.7170.357530.3190.3589
34.4250.359545.0970.348553.4380.350158.4820.3491
   10  0.069700
 6.7360.507710.6270.486118.0510.401222.2840.362725.7170.357530.3190.3589
34.4250.359545.0970.348553.4380.350158.4820.3491
   10  0.069703
 6.7360.507710.6270.486118.0510.401222.2840.362725.7170.357530.3190.3589
34.4250.359545.0970.348553.4380.350158.4820.3491
   10  0.070000
 6.7360.507210.6270.485918.0510.401022.2840.362525.7170.357430.3190.3588
34.4250.359445.0970.348553.4380.350158.4820.3491
```

```
CREST/ PIPESTRESS RUN FOR CASE-4, TRUNCATED MODES OF S.S.

  NUMBER OF PRIMARY DOF              NP=    6

  NUMBER OF CONNECTING DOF           NC=    2

  NUMBER OF PIPING ANCHORS           NA=    2

  NUMBER OF PRIMARY MODES           NPM=    6

  NUMBER OF SECONDARY MODES         NSM=    2

  NORMALIZATION INDEX FOR P.S.    NORMP=    1

  NORMALIZATION INDEX FOR S.S.    NORMS=    0

  OUTPUT TYPE INDICATOR          IPRINT=    1

  OUTPUT TYPE INDICATOR         IPRINTS=    1

  PRIMARY RESIDUAL MODE KEY       KRESP=    0

  SECONDARY RESIDUAL MODE KEY     KRESS=    1

  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX       NONZP=   11

  GLOBAL EARTHQUARK DIRECTION  X=1  Y=2(VERTICAL)  Z=3       KFLO=    1

  NUMBER OF ITERATIONS           NITER=  300

  NUMBER OF SPECTRA CURVES      NCURVE=   11

  NUMBER OF SPECTRUM POINTS      MXLP=   10

  ITERATION TOLERANCE              TOL=  0.1000E-05

  RIGID FREQUENCY                   FR=  20.500

  SPECTRUM FACTOR                 SPTR= 386.400

  CORRELATION TOLERANCE             ET=   0.100


  TOTAL STORAGE REQUIRED  =      22241
  ACTUAL PROVIDED STORAGE  = 550000000

  PRIMARY DAMPING RATIOS

  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01

  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01

  CONECTING DOF # OF PRIMARY SYSTEM

    2    6

  CONECTING DOF # OF PIPING SUPPORTS

    1   16

  STIFFNESS OF CONNECTING DOF OF S.S.

  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09

  NODE # OF PIPING ANCHORS

    1    6

  MASS OF EACH SECONDARY DOF

  0.2500E-08  0.2500E-08  0.2500E-08  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2500E-08  0.2500E-08  0.2500E-08  0.0000E+00  0.0000E+00  0.0000E+00

  ADDRESS OF DIAGONAL ELEMENTS IN S.S. STIFFNESS MATRIX (JDG MATRIX)

    1    3    6   10   15   21   28   36   45   55   66   78   85   93  102  112
  123  135  142  150  159  169  180  192  199  207  216  226  237  249  256  264
  273  283  294  306

  LOWER TRIANGULAR STIFFNESS MATRIX OF SECONDARY SYSTEM

  0.1000E+09  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.2000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.1000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
```

```
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.2000E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+11
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11
 -0.1000E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.5000E+04  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.5000E+04
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+11  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+11 -0.1000E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10

  SECONDARY FREQUENCIES (HZ)

   9.8362888  18.7097518

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF       2

  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF       6

  0.2000E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.6000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  UNNORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.6180E-05  0.1000E-04
 -0.8759E-31  0.7474E-24
 -0.4080E-31  0.4754E-24
  0.0000E+00  0.0000E+00
  0.6899E-32 -0.5707E-25
 -0.1051E-31  0.6972E-25
  0.6180E+00  0.1000E+01
 -0.8759E-19  0.7474E-12
 -0.4080E-19  0.4754E-12
  0.0000E+00  0.0000E+00
  0.5770E-31  0.1577E-20
 -0.4160E-27 -0.1577E-20
  0.1000E+01  0.6181E+00
 -0.1254E-19  0.1070E-11
 -0.6100E-19 -0.2997E-13
  0.0000E+00  0.0000E+00
  0.4159E-27 -0.9855E-22
 -0.5198E-28 -0.3156E-20
  0.1000E+01 -0.4179E+00
 -0.5963E-19  0.5151E-12
  0.1023E-19 -0.3089E-12
  0.0000E+00  0.0000E+00
 -0.8540E-32 -0.1578E-20
  0.2079E-27 -0.1578E-20
  0.6190E+00 -0.9999E+00
  0.6302E-19 -0.7852E-12
 -0.9865E-19 -0.7367E-14
  0.0000E+00  0.0000E+00
  0.1309E-31  0.2461E-23
  0.1472E-31  0.4733E-20
  0.6180E-05 -0.9999E-05
  0.6303E-31 -0.7851E-24
 -0.9805E-31 -0.7366E-26
  0.0000E+00  0.0000E+00
  0.2999E-37 -0.8723E-30
 -0.2032E-35  0.7551E-28

  NORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.1176E-04  0.1902E-04
 -0.1666E-30  0.1422E-23
 -0.7762E-31  0.9043E-24
  0.0000E+00  0.0000E+00
  0.9318E-32 -0.1086E-24
 -0.3000E-31  0.1707E-24
  0.1176E+01  0.1902E+01
 -0.1666E-18  0.1422E-11
 -0.7762E-19  0.9042E-12
 0.0000E+00  0.0000E+00
 0.1098E-30  0.3000E-20
-0.7913E-27 -0.2999E-20
 0.1902E+01  0.1176E+01
-0.2386E-19  0.2036E-11
-0.1160E-18 -0.5700E-13
 0.0000E+00  0.0000E+00
 0.7911E-27 -0.1875E-21
-0.9887E-28 -0.6002E-20
 0.1902E+01 -0.1175E+01
-0.1134E-18  0.9798E-12
 0.1946E-19 -0.6637E-12
 0.0000E+00  0.0000E+00
-0.1626E-31 -0.3001E-20
 0.3955E-27 -0.3001E-20
 0.1176E+01 -0.1902E+01
 0.1199E-18 -0.1493E-11
-0.1880E-18 -0.1401E-13
 0.0000E+00  0.0000E+00
 0.2490E-31  0.4682E-32
 0.2800E-31  0.9003E-20
 0.1176E-04 -0.1902E-04
 0.1199E-30 -0.1493E-23
-0.1880E-30 -0.1401E-25
 0.0000E+00  0.0000E+00
 0.5704E-37 -0.1659E-29
-0.3865E-35  0.1512E-27

PRIMARY FREQUENCIES (HZ)

 7.2509400  21.3315400  34.1721600  45.0265250  53.3137200  58.6066800

MODE SHAPE OF P.S. AT CONNECTING DOF        2

0.3081E+00 -0.6582E+00  0.4396E+00 -0.1587E+00 -0.6191E+00 -0.5456E+00

MODE SHAPE OF P.S. AT CONNECTING DOF        6

0.6582E+00  0.6199E+00  0.5456E+00 -0.4396E+00  0.3081E+00 -0.1587E+00

BASE INFLUENCE VECTOR FOR S.S.---UBS

0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

PARTICIPATION FACTOR FOR P.S.---GAMAP

0.1911E+01 -0.6119E+00  0.3362E+00  0.2056E+00  0.1223E+00  0.5720E-01

INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20337E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.6736E+01     0.6243E+00
         2     0.1063E+02     0.6272E+00
         3     0.1805E+02     0.5770E+00
         4     0.2228E+02     0.4426E+00
         5     0.2572E+02     0.4447E+00
         6     0.3032E+02     0.4293E+00
         7     0.3442E+02     0.4164E+00
         8     0.4510E+02     0.3493E+00
         9     0.5344E+02     0.3517E+00
        10     0.5848E+02     0.3493E+00

INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.20594E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.6736E+01     0.8316E+00
         2     0.1063E+02     0.6257E+00
         3     0.1805E+02     0.5756E+00
         4     0.2228E+02     0.4413E+00
         5     0.2572E+02     0.4435E+00
         6     0.3032E+02     0.4285E+00
         7     0.3442E+02     0.4158E+00
         8     0.4510E+02     0.3493E+00
         9     0.5344E+02     0.3517E+00
        10     0.5848E+02     0.3493E+00

INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.27041E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.6736E+01     0.7656E+00
         2     0.1063E+02     0.5915E+00
         3     0.1805E+02     0.5263E+00
         4     0.2228E+02     0.4151E+00
         5     0.2572E+02     0.4165E+00
         6     0.3032E+02     0.4102E+00
         7     0.3442E+02     0.4020E+00
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         8     0.4510E+02     0.3486E+00
         9     0.5344E+02     0.3513E+00
        10     0.5848E+02     0.3490E+00

INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.31606E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.6736E+01     0.7226E+00
         2     0.1063E+02     0.5708E+00
         3     0.1805E+02     0.4983E+00
         4     0.2228E+02     0.4008E+00
         5     0.2572E+02     0.4017E+00
         6     0.3032E+02     0.3999E+00
         7     0.3442E+02     0.3940E+00
         8     0.4510E+02     0.3486E+00
         9     0.5344E+02     0.3511E+00
        10     0.5848E+02     0.3490E+00

INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.58645E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.6736E+01     0.5357E+00
         2     0.1063E+02     0.4974E+00
         3     0.1805E+02     0.4086E+00
         4     0.2228E+02     0.3695E+00
         5     0.2572E+02     0.3604E+00
         6     0.3032E+02     0.3659E+00
         7     0.3442E+02     0.3660E+00
         8     0.4510E+02     0.3486E+00
         9     0.5344E+02     0.3503E+00
        10     0.5848E+02     0.3491E+00

INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.61302E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.6736E+01     0.5217E+00
         2     0.1063E+02     0.4912E+00
         3     0.1805E+02     0.4064E+00
         4     0.2228E+02     0.3675E+00
         5     0.2572E+02     0.3595E+00
         6     0.3032E+02     0.3636E+00
         7     0.3442E+02     0.3639E+00
         8     0.4510E+02     0.3484E+00
         9     0.5344E+02     0.3503E+00
        10     0.5848E+02     0.3491E+00

INPUT SPECTRUM CURVE NUMBER =  7

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69084E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.6736E+01     0.5089E+00
         2     0.1063E+02     0.4865E+00
         3     0.1805E+02     0.4016E+00
         4     0.2228E+02     0.3611E+00
         5     0.2572E+02     0.3577E+00
         6     0.3032E+02     0.3592E+00
         7     0.3442E+02     0.3598E+00
         8     0.4510E+02     0.3485E+00
         9     0.5344E+02     0.3501E+00
        10     0.5848E+02     0.3491E+00

INPUT SPECTRUM CURVE NUMBER =  8

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69662E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.6736E+01     0.5078E+00
         2     0.1063E+02     0.4861E+00
         3     0.1805E+02     0.4012E+00
         4     0.2228E+02     0.3627E+00
         5     0.2572E+02     0.3575E+00
         6     0.3032E+02     0.3589E+00
         7     0.3442E+02     0.3595E+00
         8     0.4510E+02     0.3485E+00
         9     0.5344E+02     0.3501E+00
        10     0.5848E+02     0.3491E+00

INPUT SPECTRUM CURVE NUMBER =  9

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.69700E-01

     INPUT      FREQUENCY    INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.6736E+01     0.5077E+00
         2    0.1063E+02      0.4861E+00
         3    0.1805E+02      0.4012E+00
         4    0.2228E+02      0.3627E+00
         5    0.2572E+02      0.3575E+00
         6    0.3032E+02      0.3589E+00
         7    0.3442E+02      0.3595E+00
         8    0.4510E+02      0.3485E+00
         9    0.5344E+02      0.3501E+00
        10    0.5848E+02      0.3491E+00


 INPUT SPECTRUM CURVE NUMBER = 10

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69703E-01

      INPUT     FREQUENCY   INPUT SPECTRAL
      POINT       (HZ)      ACCELERATION
         1    0.6736E+01     0.5077E+00
         2    0.1063E+02     0.4861E+00
         3    0.1805E+02     0.4012E+00
         4    0.2228E+02     0.3627E+00
         5    0.2572E+02     0.3575E+00
         6    0.3032E+02     0.3589E+00
         7    0.3442E+02     0.3595E+30
         8    0.4510E+02     0.3485E+00
         9    0.5344E+02     0.3501E+00
        10    0.5848E+02     0.3491E+00


 INPUT SPECTRUM CURVE NUMBER = 11

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.70000E-01

      INPUT     FREQUENCY   INPUT SPECTRAL
      POINT       (HZ)      ACCELERATION
         1    0.6736E+01     0.5072E+00
         2    0.1063E+02     0.4859E+00
         3    0.1805E+02     0.4010E+00
         4    0.2228E+02     0.3625E+00
         5    0.2572E+02     0.3574E+00
         6    0.3032E+02     0.3588E+00
         7    0.3442E+02     0.3594E+00
         8    0.4510E+02     0.3485E+00
         9    0.5344E+02     0.3501E+00
        10    0.5848E+02     0.3491E+00



     *************************************************************
     *                                                           *
     *                                                           *
     *                                                           *
     *                 A COMPUTER PROGRAM FOR                    *
     *                                                           *
     *                                                           *
     *  COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS  *
     *                                                           *
     *                      " C R E S T "                        *
     *                                                           *
     *                                                           *
     *                      DEVELOPED BY                         *
     *                                                           *
     *                    AJAYA KUMAR GUPTA                      *
     *              JING-WEN JAW   ABHINAV GUPTA                 *
     *                                                           *
     *              NORTH CAROLINA STATE UNIVERSITY              *
     *                  RALEIGH, NORTH CAROLINA                  *
     *                                                           *
     *                      REVISION-1.0                         *
     *                                                           *
     *                                                           *
     *************************************************************


 PARTICIPATION FACTOR FOR S.S.---GAMAS
 0.6155E+00  0.5509E-04

 MASS RATIOS

   PRIMARY SYSTEM MODE     1
 0.8844E-01  0.2319E-02

   PRIMARY SYSTEM MODE     2
 0.1386E-03  0.3094E-01

   PRIMARY SYSTEM MODE     3
 0.9195E-01  0.2120E-03

   PRIMARY SYSTEM MODE     4
 0.3391E-01  0.1494E-02

   PRIMARY SYSTEM MODE     5
 0.9162E-02  0.1629E-01

   PRIMARY SYSTEM MODE     6
 0.4698E-01  0.2839E-02

 C O U P L E D   F R E Q U E N C I E S   A N D   M O D E   S H A P E S   E X T R A C T I O N

 NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION   NITER =  900

 CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                         TOL = 0.10000E-05

 COUPLED  FREQUENCY  DAMPING RATIO
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   MODE        (HZ)          (%)

     1     0.67500E+01    0.58705E-01
     2     0.10627E+02    0.31540E-01
     3     0.18051E+02    0.27031E-01
     4     0.22319E+02    0.62298E-01
     5     0.34313E+02    0.69135E-01
     6     0.45075E+02    0.69754E-01
     7     0.53423E+02    0.69696E-01
     8     0.58461E+02    0.69750E-01


  UNIT DISPLACEMENT & UNIT VELOCITY*W RESPONSE



  COUPLED MODE NO.    1


     1     0.54400E+00    0.13520E-01
     2     0.11337E+01    0.29140E-01
     3     0.52942E-05   -0.75201E-06
     4    -0.18888E-26    0.20002E-26
     5    -0.12014E-26    0.12722E-26
     6     0.00000E+00    0.00000E+00
     7     0.14422E-27   -0.15272E-27
     8    -0.22675E-27    0.24012E-27
     9     0.52943E+00   -0.75201E-01
    10    -0.18888E-14    0.20002E-14
    11    -0.12014E-14    0.12722E-14
    12     0.00000E+00    0.00000E+00
    13    -0.67620E-22    0.25360E-23
    14     0.95153E-22   -0.18519E-23
    15     0.84788E+00   -0.12462E+00
    16    -0.27052E-14    0.28647E-14
    17     0.75702E-16   -0.80184E-16
    18     0.00000E+00    0.00000E+00
    19     0.594[illegible]5E-23   -0.11581E-24
    20     0.1803[illegible]E-22   -0.80900E-23
    21     0.8727[illegible]E+00   -0.12735E+00
    22    -0.13016[illegible]-14    0.13786E-14
    23     0.88182E-[illegible]   -0.9[illegible]381E-15
    24     0.00000E+00    0.00000E+00
    25     0.12446E-21   -0.11015E-23
    26    -0.49599E-22   -0.55517E-23
    27     0.57805E+00   -0.79401E-01
    28     0.19843E-14   -0.21012E-14
    29     0.18577E-16   -0.19701E-16
    30     0.00000E+00    0.00000E+00
    31    -0.23469E-23    0.75004E-26
    32    -0.13715E-21    0.93993E-23
    33     0.57804E-05   -0.79400E-06
    34     0.19890E-26   -0.21010E-26
    35     0.18549E-28   -0.19701E-28
    36     0.00000E+00    0.00000E+00
    37     0.51947E-31   -0.10662E-32
    38     0.16538E-31    0.21597E-30

  COUPLED MODE NO.    2


     1     0.44452E-01   -0.16733E-01
     2     0.10910E+00   -0.39623E-01
     3    -0.44110E-05    0.11145E-05
     4    -0.17266E-26    0.10057E-26
     5    -0.10982E-26    0.63965E-27
     6     0.00000E+00    0.00000E+00
     7     0.13184E-27   -0.76789E-28
     8    -0.20728E-27    0.12073E-27
     9    -0.44110E+00    0.11145E+00
    10    -0.17266E-14    0.10057E-14
    11    -0.10982E-14    0.63965E-15
    12     0.00000E+00    0.00000E+00
    13    -0.20884E-22    0.82240E-23
    14     0.26649E-22   -0.10319E-22
    15    -0.71302E+00    0.17961E+00
    16    -0.24730E-14    0.14404E-14
    17     0.69276E-16   -0.40334E-16
    18     0.00000E+00    0.00000E+00
    19     0.16528E-23   -0.64490E-24
    20     0.13797E-22   -0.62967E-23
    21    -0.70427E+00    0.17586E+00
    22    -0.11900E-14    0.69312E-15
    23     0.80613E-15   -0.46952E-15
    24     0.00000E+00    0.00000E+00
    25     0.33445E-22   -0.12859E-22
    26    -0.70889E-23    0.19281E-23
    27    -0.42476E+00    0.10458E+00
    28     0.18139E-14   -0.10565E-14
    29     0.17100E-16   -0.99339E-17
    30     0.00000E+00    0.00000E+00
    31    -0.58714E-24    0.22671E-24
    32    -0.42958E-22    0.17829E-22
    33    -0.42476E-05    0.10458E-05
    34     0.18150E-26   -0.10569E-26
    35     0.17093E-28   -0.99312E-29
    36     0.00000E+00    0.00000E+00
    37     0.13454E-31   -0.53580E-32
    38    -0.23403E-30    0.11752E-30

  COUPLED MODE NO.    3


     1     0.90028E-01    0.23317E-01
     2    -0.65827E-01   -0.21527E-01
     3     0.54486E-05    0.29353E-06
     4     0.38538E-24    0.13840E-25
     5     0.24512E-24    0.88031E-26
     6     0.00000E+00    0.00000E+00
     7    -0.29426E-25   -0.10568E-26
     8     0.46264E-25    0.16615E-26
     9     0.54486E+00    0.29354E-01
  10     0.38538E-12     0.13840E-13
  11     0.24512E-12     0.88031E-14
  12     0.00000E+00     0.00000E+00
  13    -0.93020E-21     0.62902E-22
  14    -0.89699E-21    -0.54337E-22
  15     0.31755E+00     0.15812E-01
  16     0.55195E-12     0.19822E-13
  17    -0.15451E-13    -0.55490E-15
  18     0.00000E+00     0.00000E+00
  19    -0.56065E-22    -0.3396[illegible]E-23
  20    -0.18128E-20    -0.11002E-21
  21    -0.35983E+00    -0.18610E-01
  22     0.26561E-12     0.95390E-14
  23    -0.17992E-13    -0.64616E-14
  24     0.00000E+00     0.00000E+00
  25    -0.90958E-21    -0.58307E-22
  26    -0.88232E-21    -0.47112E-22
  27    -0.56645E+00    -0.30748E-01
  28    -0.40485E-12    -0.14540E-13
  29    -0.37985E-14    -0.13642E-15
  30     0.00000E+00     0.00000E+00
  31     0.12973E-22     0.58114E-24
  32     0.25871E-20     0.13080E-21
  33    -0.56645E-05    -0.30748E-06
  34    -0.40484E-24    -0.14540E-25
  35    -0.37983E-26    -0.13641E-27
  36     0.00000E+00     0.00000E+00
  37    -0.45120E-30    -0.17585E-31
  38     0.45428E-28     0.26936E-29

COUPLED MODE NO.    4

   1     0.30714E+00    -0.23659E-01
   2    -0.30018E+00     0.20833E-01
   3    -0.50323E-05    -0.54104E-06
   4    -0.55280E-24    -0.28092E-25
   5    -0.35160E-24    -0.17868E-25
   6     0.00000E+00     0.00000E+00
   7     0.42209E-25     0.21450E-26
   8    -0.66362E-25    -0.33724E-26
   9    -0.50323E+00    -0.54105E-01
  10    -0.55280E-12    -0.28092E-13
  11    -0.35160E-12    -0.17868E-13
  12     0.00000E+00     0.00000E+00
  13    -0.46867E-21    -0.11034E-21
  14     0.64075E-21     0.97057E-22
  15    -0.34327E+00    -0.29755E-01
  16    -0.79173E-12    -0.40234E-13
  17     0.22163E-13     0.11263E-14
  18     0.00000E+00     0.00000E+00
  19     0.40051E-22     0.60663E-23
  20     0.12753E-20     0.19739E-21
  21     0.33210E+00     0.34181E-01
  22    -0.38100E-12    -0.19362E-13
  23     0.25808E-12     0.13115E-13
  24     0.00000E+00     0.00000E+00
  25     0.55726E-21     0.10293E-21
  26     0.80621E-21     0.87029E-22
  27     0.49831E+00     0.56032E-01
  28     0.58672E-12     0.29511E-13
  29     0.54457E-14     0.27689E-15
  30     0.00000E+00     0.00000E+00
  31    -0.15380E-22    -0.11009E-23
  32    -0.26524E-20    -0.24300E-21
  33     0.49831E-05     0.56022E-06
  34     0.58068E-24     0.29512E-25
  35     0.54484E-26     0.27688E-27
  36     0.00000E+00     0.00000E+00
  37     0.61029E-30     0.34630E-31
  38    -0.33795E-28    -0.48568E-29

COUPLED MODE NO.    5

   1     0.14705E+00    -0.90981E-03
   2     0.18576E+00    -0.77541E-03
   3    -0.37258E-06     0.70376E-08
   4     0.38246E-25     0.40976E-27
   5     0.24326E-25     0.26063E-27
   6     0.00000E+00     0.00000E+00
   7    -0.29203E-26    -0.31288E-28
   8     0.45913E-26     0.49191E-28
   9    -0.37258E-01     0.70376E-03
  10     0.38246E-13     0.40976E-15
  11     0.24326E-13     0.26063E-15
  12     0.00000E+00     0.00000E+00
  13    -0.32933E-22     0.54259E-24
  14     0.22597E-21    -0.17390E-23
  15    -0.25056E+00     0.16383E-02
  16     0.54776E-13     0.58687E-15
  17    -0.15332E-14    -0.16429E-16
  18     0.00000E+00     0.00000E+00
  19     0.14123E-22    -0.10869E-24
  20    -0.43127E-21     0.97264E-24
  21    -0.2[illegible]E+00     0.10708E-02
  22     0.1[illegible]E-13     0.28261E-15
  23    -0.17[illegible]5E-13    -0.19130E-15
  24     0.00000E+00     0.00000E+00
  25     0.35019E-21    -0.22591E-23
  26    -0.46417E-21     0.15355E-23
  27    -0.61606E-01    -0.17227E-03
  28    -0.40179E-13    -0.43066E-15
  29    -0.37672E-15    -0.40402E-17
  30     0.00000E+00     0.00000E+00
  31    -0.95640E-23     0.66551E-25
  32    -0.12519E-21     0.32973E-23
  33    -0.61606E-06    -0.17227E-08
  34    -0.40160E-25    -0.43050E-27
  35    -0.37684E-27    -0.40392E-29
  36     0.00000E+00     0.00000E+00
  37     0.19908E-30    -0.16648E-32
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  38     0.12769E-28    -0.32489E-31

COUPLED MODE NO.    6

   1    -0.32832E-01    -0.47175E-04
   2    -0.91256E-01    -0.95462E-04
   3    -0.18790E-06    -0.20618E-08
   4    -0.81462E-25    -0.19157E-27
   5    -0.51813E-25    -0.12185E-27
   6     0.00000E+00     0.00000E+00
   7     0.62201E-26     0.14628E-28
   8    -0.97794E-26    -0.22998E-28
   9    -0.18791E-01    -0.20618E-03
  10    -0.81462E-13    -0.19157E-15
  11    -0.51813E-13    -0.12185E-15
  12     0.00000E+00     0.00000E+00
  13     0.10740E-21    -0.17186E-24
  14    -0.18128E-21     0.65080E-25
  15     0.89197E-01    -0.16070E-03
  16    -0.11667E-12    -0.27439E-15
  17     0.32659E-14     0.76806E-17
  18     0.00000E+00     0.00000E+00
  19    -0.11329E-22     0.40689E-26
  20     0.20589E-21     0.78384E-24
  21     0.12832E+00     0.76513E-04
  22    -0.56145E-13    -0.13204E-15
  23     0.38032E-13     0.89439E-16
  24     0.00000E+00     0.00000E+00
  25    -0.28630E-21    -0.44707E-25
  26     0.31322E-21     0.61204E-24
  27     0.80047E-02     0.67226E-04
  28     0.85578E-13     0.20125E-15
  29     0.80278E-15     0.18881E-17
  30     0.00000E+00     0.00000E+00
  31     0.51427E-23     0.21168E-26
  32    -0.13459E-22    -0.74983E-24
  33     0.80046E-07     0.67225E-09
  34     0.85556E-25     0.20123E-27
  35     0.80282E-27     0.18881E-29
  36     0.00000E+00     0.00000E+00
  37    -0.72661E-31     0.35466E-34
  38    -0.69073E-29    -0.21514E-31

COUPLED MODE NO.    7

   1    -0.73563E-01    -0.13385E-04
   2     0.37519E-01     0.53318E-04
   3     0.12049E-06     0.10047E-08
   4     0.20144E-24     0.20905E-27
   5     0.12812E-24     0.13296E-27
   6     0.00000E+00     0.00000E+00
   7    -0.15381E-25    -0.15962E-28
   8     0.24182E-25     0.25096E-28
   9     0.12049E-01     0.10047E-03
  10     0.20144E-12     0.20905E-15
  11     0.12812E-12     0.13296E-15
  12     0.00000E+00     0.00000E+00
  13    -0.30405E-21    -0.49837E-27
  14     0.68142E-22    -0.63033E-25
  15     0.76909E-01    -0.12587E-05
  16     0.28850E-12     0.29941E-15
  17    -0.80761E-14    -0.83813E-17
  18     0.00000E+00     0.00000E+00
  19     0.42574E-23    -0.26911E-26
  20     0.36748E-21    -0.34354E-24
  21    -0.66744E-02    -0.19583E-03
  22     0.13883E-12     0.14408E-15
  23    -0.94063E-13    -0.97598E-16
  24     0.00000E+00     0.00000E+00
  25     0.12793E-21     0.42725E-25
  26     0.63582E-22    -0.34388E-24
  27    -0.27873E-01    -0.15662E-03
  28    -0.21141E-12    -0.21961E-15
  29    -0.19855E-14    -0.20605E-17
  30     0.00000E+00     0.00000E+00
  31     0.63041E-23     0.20293E-26
  32     0.39281E-21     0.68983E-24
  33    -0.27872E-06    -0.15662E-08
  34    -0.21156E-24    -0.21958E-27
  35    -0.19854E-26    -0.20604E-29
  36     0.00000E+00     0.00000E+00
  37    -0.25685E-30    -0.15144E-33
  38    -0.79349E-29     0.10191E-31

COUPLED MODE NO.    8

   1    -0.32501E-01     0.13355E-05
   2    -0.91707E-02     0.13015E-04
   3    -0.10615E-06    -0.26561E-09
   4     0.48893E-25     0.33539E-28
   5     0.31098E-25     0.21332E-28
   6     0.00000E+00     0.00000E+00
   7    -0.37332E-26    -0.25609E-29
   8     0.58695E-26     0.40263E-29
   9    -0.10616E-01    -0.26561E-04
  10     0.48893E-13     0.33539E-16
  11     0.31098E-13     0.21332E-16
  12     0.00000E+00     0.00000E+00
  13    -0.77628E-23    -0.22370E-25
  14    -0.46764E-22     0.27281E-25
  15     0.52962E-01    -0.75062E-04
  16     0.70025E-13     0.48035E-16
  17    -0.19603E-14    -0.13446E-17
  18     0.00000E+00     0.00000E+00
  19    -0.29231E-23     0.17046E-26
  20     0.22735E-21    -0.56070E-25
  21     0.33981E-01    -0.98645E-04
  22     0.33698E-13     0.23116E-16
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   23   -0.22026E-13   -0.15658E-16
   24    0.00000E+00    0.00000E+00
   25   -0.64880E-22    0.52429E-25
   26    0.14977E-21   -0.78430E-25
   27   -0.17693E-01   -0.52543E-04
   28   -0.51363E-13   -0.35233E-16
   29   -0.48200E-15   -0.33054E-18
   30    0.00000E+00    0.00000E+00
   31    0.46168E-23   -0.58008E-27
   32    0.15460E-21    0.64568E-25
   33   -0.17693E-06   -0.52543E-09
   34   -0.51359E-25   -0.35227E-28
   35   -0.48192E-27   -0.33054E-30
   36    0.00000E+00    0.00000E+00
   37   -0.13389E-30   -0.44545E-35
   38   -0.58863E-29    0.18408E-32

 B A S E   R E S P O N S E   S P E C T R A   D A T A

 TOTAL NUMBER OF INPUT SPECTRUM CURVE = 11

 MAXIMUM NUMBER OF DEFINITION POINTS IN INPUT SPECTRUM CURVES = 10

 SPECTRUM SCALE FACTOR = 0.38640E+03

 RIGID FREQUENCY = 0.20500E+02



  SPECTRUM PARAMETERS

  CURVE NO   1  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

 INPUT SPECTRUM CURVE NUMBER =  1

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.20337E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01    0.8343E+00          0.8343E+00
        2    0.1063E+02    0.6272E+00          0.6372E+00
        3    0.1805E+02    0.5778E+00          0.3611E+00
        4    0.2228E+02    0.4424E+00          0.2241E+00
        5    0.2572E+02    0.4447E+00          0.1951E+00
        6    0.3032E+02    0.4293E+00          0.1597E+00
        7    0.3442E+02    0.4164E+00          0.1365E+00
        8    0.4510E+02    0.3493E+00          0.8738E-01
        9    0.5344E+02    0.3517E+00          0.7425E-01
       10    0.5848E+02    0.3493E+00          0.6738E-01

  SPECTRUM PARAMETERS

  CURVE NO   2  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

 INPUT SPECTRUM CURVE NUMBER =  2

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.20594E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01    0.8316E+00          0.8316E+00
        2    0.1063E+02    0.6257E+00          0.6358E+00
        3    0.1805E+02    0.5756E+00          0.3597E+00
        4    0.2228E+02    0.4413E+00          0.2234E+00
        5    0.2572E+02    0.4435E+00          0.1945E+00
        6    0.3032E+02    0.4285E+00          0.1594E+00
        7    0.3442E+02    0.4158E+00          0.1363E+00
        8    0.4510E+02    0.3493E+00          0.8738E-01
        9    0.5344E+02    0.3517E+00          0.7425E-01
       10    0.5848E+02    0.3493E+00          0.6735E-01

  SPECTRUM PARAMETERS

  CURVE NO   3  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

 INPUT SPECTRUM CURVE NUMBER =  3

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.27041E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01    0.7656E+00          0.7656E+00
        2    0.1063E+02    0.5915E+00          0.6026E+00
        3    0.1805E+02    0.5263E+00          0.3289E+00
        4    0.2228E+02    0.4151E+00          0.2101E+00
        5    0.2572E+02    0.4165E+00          0.1827E+00
        6    0.3032E+02    0.4102E+00          0.1526E+00
        7    0.3442E+02    0.4020E+00          0.1317E+00
        8    0.4510E+02    0.3486E+00          0.8720E-01
        9    0.5344E+02    0.3513E+00          0.7416E-01
       10    0.5848E+02    0.3490E+00          0.6732E-01

  SPECTRUM PARAMETERS

  CURVE NO   4  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124
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 INPUT SPECTRUM CURVE NUMBER =  4

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.31606E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01    0.7226E+00          0.7226E+00
        2    0.1063E+02    0.5708E+00          0.5824E+00
        3    0.1805E+02    0.4983E+00          0.3114E+00
        4    0.2228E+02    0.4008E+00          0.2029E+00
        5    0.2572E+02    0.4013E+00          0.1760E+00
        6    0.3032E+02    0.3999E+00          0.1488E+00
        7    0.3442E+02    0.3940E+00          0.1291E+00
        8    0.4510E+02    0.3484E+00          0.8715E-01
        9    0.5344E+02    0.3511E+00          0.7412E-01
       10    0.5848E+02    0.3490E+00          0.6732E-01

  SPECTRUM PARAMETERS

  CURVE NO   5  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

 INPUT SPECTRUM CURVE NUMBER =  5

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.58445E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01    0.5357E+00          0.5357E+00
        2    0.1063E+02    0.4934E+00          0.5059E+00
        3    0.1805E+02    0.4086E+00          0.2554E+00
        4    0.2228E+02    0.3695E+00          0.1871E+00
        5    0.2572E+02    0.3604E+00          0.1581E+00
        6    0.3032E+02    0.3659E+00          0.1361E+00
        7    0.3442E+02    0.3660E+00          0.1199E+00
        8    0.4510E+02    0.3484E+00          0.8715E-01
        9    0.5344E+02    0.3503E+00          0.7395E-01
       10    0.5848E+02    0.3491E+00          0.6734E-01

  SPECTRUM PARAMETERS

  CURVE NO   6  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

 INPUT SPECTRUM CURVE NUMBER =  6

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.61902E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01    0.5217E+00          0.5217E+00
        2    0.1063E+02    0.4912E+00          0.5049E+00
        3    0.1805E+02    0.4064E+00          0.2540E+00
        4    0.2228E+02    0.3675E+00          0.1860E+00
        5    0.2572E+02    0.3595E+00          0.1577E+00
        6    0.3032E+02    0.3636E+00          0.1353E+00
        7    0.3442E+02    0.3639E+00          0.1193E+00
        8    0.4510E+02    0.3484E+00          0.8715E-01
        9    0.5344E+02    0.3503E+00          0.7395E-01
       10    0.5848E+02    0.3491E+00          0.6734E-01

  SPECTRUM PARAMETERS

  CURVE NO   7  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

 INPUT SPECTRUM CURVE NUMBER =  7

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69086E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1    0.6736E+01    0.5089E+00          0.5270E+00
        2    0.1063E+02    0.4865E+00          0.5008E+00
        3    0.1805E+02    0.4016E+00          0.2510E+00
        4    0.2228E+02    0.3631E+00          0.1838E+00
        5    0.2572E+02    0.3577E+00          0.1569E+00
        6    0.3032E+02    0.3592E+00          0.1337E+00
        7    0.3442E+02    0.3598E+00          0.1179E+00
        8    0.4510E+02    0.3465E+00          0.8718E-01
        9    0.5344E+02    0.3501E+00          0.7391E-01
       10    0.5848E+02    0.3491E+00          0.6734E-01

  SPECTRUM PARAMETERS

  CURVE NO   8  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

 INPUT SPECTRUM CURVE NUMBER =  8

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69662E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION
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          1    0.6736E+01     0.5078E+00           0.5078E+00
          2    0.1063E+02     0.4861E+00           0.5004E+00
          3    0.1805E+02     0.4012E+00           0.2507E+00
          4    0.2228E+02     0.3627E+00           0.1836E+00
          5    0.2572E+02     0.3575E+00           0.1568E+00
          6    0.3032E+02     0.3589E+00           0.1335E+00
          7    0.3442E+02     0.3595E+00           0.1178E+00
          8    0.4510E+02     0.3485E+00           0.8718E-01
          9    0.5344E+02     0.3501E+00           0.7391E-01
         10    0.5848E+02     0.3491E+00           0.6734E-01

   SPECTRUM PARAMETERS

   CURVE NO   9  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

 INPUT SPECTRUM CURVE NUMBER =  9

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69700E-01

      INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
      POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

          1    0.6736E+01     0.5077E+00           0.5258E+00
          2    0.1063E+02     0.4861E+00           0.5004E+00
          3    0.1805E+02     0.4012E+00           0.2507E+00
          4    0.2228E+02     0.3627E+00           0.1836E+00
          5    0.25 2E+02     0.3575E+00           0.1568E+00
          6    0.3032E+02     0.3589E+00           0.1335E+00
          7    0.3442E+02     0.3595E+00           0.1178E+00
          8    0.4510E+02     0.3485E+00           0.8718E-01
          9    0.5344E+02     0.3501E+00           0.7391E-01
         10    0.5848E+02     0.3491E+00           0.6734E-01

   SPECTRUM PARAMETERS

   CURVE NO  10  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

 INPUT SPECTRUM CURVE NUMBER = 10

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69703E-01

      INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
      POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

          1    0.6736E+01     0.5077E+00           0.5258E+00
          2    0.1063E+02     0.4861E+00           0.5004E+00
          3    0.1805E+02     0.4012E+00           0.2507E+00
          4    0.2228E+02     0.3627E+00           0.1836E+00
          5    0.2572E+02     0.3575E+00           0.1568E+00
          6    0.3032E+02     0.3589E+00           0.1335E+00
          7    0.3442E+02     0.3595E+00           0.1178E+00
          8    0.4510E+02     0.3485E+00           0.8718E-01
          9    0.5344E+02     0.3501E+00           0.7391E-01
         10    0.5848E+02     0.3491E+00           0.6734E-01

   SPECTRUM PARAMETERS

   CURVE NO  11  F1 =  5.79296  F2 = 17.22000  FL =  6.73600  FH = 11.28124

 INPUT SPECTRUM CURVE NUMBER = 11

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.70000E-01

      INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
      POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

          1    0.6736E+01     0.5072E+00           0.5072E+00
          2    0.1063E+02     0.4859E+00           0.5002E+00
          3    0.1805E+02     0.4010E+00           0.2506E+00
          4    0.2228E+02     0.3625E+00           0.1835E+00
          5    0.2572E+02     0.3574E+00           0.1568E+00
          6    0.3032E+02     0.3588E+00           0.1335E+00
          7    0.3442E+02     0.3594E+00           0.1178E+00
          8    0.4510E+02     0.3485E+00           0.8718E-01
          9    0.5344E+02     0.3501E+00           0.7391E-01
         10    0.5848E+02     0.3491E+00           0.6734E-01

 INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS


     FREQUENCY    DAMPING RATIO          SPECTRAL ACCELERATIONS
       (HZ)            (%)                  SAD          SAV

   0.67500E+01     0.58705E+01       0.5352E+00   0.5353E+00
   0.10627E+02     0.31540E+01       0.5711E+00   0.5827E+00
   0.18051E+02     0.27031E+01       0.5264E+00   0.3290E+00
   0.22319E+02     0.62298E+01       0.3672E+00   0.1856E+00
   0.34313E+02     0.69135E+01       0.3598E+00   0.1183E+00
   0.45075E+02     0.69754E+01       0.3485E+00   0.8723E-01
   0.53423E+02     0.69696E+01       0.3501E+00   0.7393E-01
   0.58461E+02     0.69750E+01       0.3491E+00   0.6737E-01

 DISPLACEMENT RESPONSE UD (FROM SD)

  MODE NO.     1
 0.6255E-01  0.1304E+00  0.6255E-01 -0.2172E-27 -0.1381E-27  0.0000E+00
 0.1650E-28 -0.2607E-28  0.1370E+00 -0.2172E-15 -0.1381E-15  0.0000E+00
-0.7776E-23  0.1094E-22  0.1872E+00 -0.3110E-15  0.8704E-17  0.0000E+00
 0.6838E-24  0.2073E-23  0.2036E+00 -0.1497E-15  0.1014E-15  0.0000E+00
 0.1431E-22 -0.5703E-23  0.1833E+00  0.2282E-15  0.2136E-17  0.0000E+00
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-0.2698E-24 -0.1577E-22  0.1304E+00  0.2287E-27  0.2132E-29  0.0000E+00
 0.5973E-32  0.1902E-32
   MODE NO.     2
 0.2200E-02  0.5404E-02  0.2200E-02 -0.8545E-28 -0.5435E-28  0.0000E+00
 0.6525E-29 -0.1026E-28 -0.1899E-01 -0.8545E-16 -0.5435E-16  0.0000E+00
-0.1034E-23  0.1309E-23 -0.3181E-01 -0.1224E-15  0.3429E-17  0.0000E+00
 0.8180E-25  0.6828E-24 -0.3073E-01 -0.5690E-16  0.3990E-16  0.0000E+00
 0.1655E-23 -0.3508E-24 -0.3626E-01  0.8977E-16  0.8463E-18  0.0000E+00
-0.2906E-25 -0.2126E-23  0.5403E-02  0.6983E-28  0.8460E-30  0.0000E+00
 0.6659E-33 -0.1158E-31
   MODE NO.     3
 0.1423E-02 -0.1041E-02  0.1424E-02  0.6093E-26  0.3876E-26  0.0000E+00
-0.4653E-27  0.7315E-27  0.9546E-02  0.6093E-14  0.3876E-14  0.0000E+00
 0.1471E-22 -0.1618E-23  0.5459E-02  0.6727E-14 -0.2443E-15  0.0000E+00
-0.8865E-24 -0.2866E-22 -0.5744E-02  0.4200E-14 -0.2845E-14  0.0000E+00
-0.1438E-22 -0.1395E-22 -0.9504E-02 -0.6401E-14 -0.6004E-16  0.0000E+00
 0.2051E-24  0.4091E-22 -0.1041E-02 -0.6401E-26 -0.6006E-28  0.0000E+00
-0.7134E-32  0.7183E-30
   MODE NO.     4
 0.2214E-02 -0.2166E-02  0.2216E-02 -0.3988E-26 -0.2537E-26  0.0000E+00
 0.3645E-27 -0.4788E-27 -0.2291E-02 -0.3988E-14 -0.2537E-14  0.0000E+00
-0.3381E-23  0.4623E-23 -0.2013E-02 -0.5712E-14  0.1599E-15  0.0000E+00
 0.2889E-24  0.9200E-23  0.1983E-02 -0.2749E-14  0.1862E-14  0.0000E+00
 0.4020E-23  0.5816E-23  0.2306E-02  0.4189E-14  0.3931E-16  0.0000E+00
-0.1110E-24 -0.1877E-22 -0.2165E-02  0.4189E-26  0.3931E-28  0.0000E+00
 0.4403E-32 -0.2438E-30
   MODE NO.     5
 0.4398E-03  0.5555E-03  0.4398E-03  0.1144E-27  0.7275E-28  0.0000E+00
-0.8733E-29  0.1373E-28  0.3515E-03  0.1144E-15  0.7275E-16  0.0000E+00
-0.9849E-25  0.6758E-24 -0.2635E-03  0.1638E-15 -0.4585E-17  0.0000E+00
 0.4224E-25 -0.1290E-23 -0.3129E-03  0.7883E-16 -0.5340E-16  0.0000E+00
 0.1047E-23 -0.1388E-23  0.3475E-03 -0.1202E-15 -0.1127E-17  0.0000E+00
-0.2860E-25 -0.3744E-24  0.5555E-03 -0.1201E-27 -0.1127E-29  0.0000E+00
 0.5954E-33  0.3819E-31
   MODE NO.     6
-0.5512E-04 -0.1532E-03 -0.5512E-04 -0.1368E-27 -0.8699E-28  0.0000E+00
 0.1044E-29 -0.1642E-28 -0.1063E-03 -0.1368E-15 -0.8699E-16  0.0000E+00
 0.1803E-24 -0.3044E-24  0.5540E-04 -0.1959E-15  0.5483E-17  0.0000E+00
-0.1902E-25  0.3457E-24  0.1015E-03 -0.9426E-16  0.6385E-16  0.0000E+00
-0.4807E-24  0.5259E-24 -0.1202E-03  0.1437E-15  0.1348E-17  0.0000E+00
 0.8634E-26 -0.2260E-25 -0.1532E-03  0.1436E-27  0.1348E-29  0.0000E+00
-0.1220E-33 -0.1140E-31
   MODE NO.     7
-0.8832E-04  0.4505E-04 -0.8832E-04  0.2419E-27  0.1538E-27  0.0000E+00
-0.1847E-30  0.2903E-28 -0.4718E-04  0.2419E-15  0.1538E-15  0.0000E+00
-0.3651E-24  0.8181E-25  0.5737E-04  0.3464E-15 -0.5697E-17  0.0000E+00
 0.5113E-26  0.4412E-24 -0.1631E-04  0.1667E-15 -0.1129E-15  0.0000E+00
 0.1536E-24  0.7634E-25 -0.1509E-04 -0.2561E-15 -0.2404E-17  0.0000E+00
 0.7569E-26  0.4716E-24  0.4505E-04 -0.2540E-27 -0.2184E-29  0.0000E+00
-0.3109E-33 -0.9527E-32
   MODE NO.     8
-0.3249E-04 -0.9177E-05 -0.3249E-04  0.4889E-28  0.3109E-28  0.0000E+00
-0.3732E-29  0.5868E-29 -0.3844E-04  0.4888E-16  0.3109E-16  0.0000E+00
-0.7760E-25 -0.4675E-25  0.2978E-04  0.7001E-16 -0.1960E-17  0.0000E+00
-0.2922E-26  0.2273E-24  0.1547E-04  0.3369E-16 -0.2282E-16  0.0000E+00
-0.6486E-25  0.1497E-24 -0.3153E-04 -0.5135E-16 -0.4819E-18  0.0000E+00
 0.4616E-26  0.1566E-24 -0.9177E-05 -0.5135E-28 -0.4818E-30  0.0000E+00
-0.1339E-33 -0.5885E-32


  DISPLACEMENT RESPONSE UV (FROM SV)

   MODE NO.     1
 0.1555E-02  0.3351E-02  0.1555E-02  0.2300E-27  0.1463E-27  0.0000E+00
-0.1756E-28  0.2761E-29 -0.6734E-02  0.2300E-15  0.1463E-15  0.0000E+00
 0.2917E-24 -0.2130E-24 -0.1206E-01  0.3294E-15 -0.9221E-17  0.0000E+00
-0.1332E-25 -0.9303E-24 -0.1201E-01  0.1585E-15 -0.1074E-15  0.0000E+00
-0.1267E-24 -0.6384E-24 -0.6139E-02 -0.2416E-15 -0.2266E-17  0.0000E+00
 0.8625E-27  0.1081E-23  0.3351E-02 -0.2416E-27 -0.2265E-29  0.0000E+00
-0.1226E-33  0.2483E-31
   MODE NO.     2
-0.8449E-03 -0.2001E-02 -0.8449E-03  0.5078E-28  0.3230E-28  0.0000E+00
-0.3877E-29  0.6096E-29  0.4551E-02  0.5078E-16  0.3230E-16  0.0000E+00
 0.4153E-24 -0.5211E-24  0.7762E-02  0.7273E-16 -0.2037E-17  0.0000E+00
-0.3256E-25 -0.3179E-24  0.7341E-02  0.3500E-16 -0.2371E-16  0.0000E+00
-0.6493E-24  0.9736E-25  0.3511E-02 -0.5335E-16 -0.5016E-18  0.0000E+00
 0.1145E-25  0.9002E-24 -0.2001E-02 -0.5337E-28 -0.5015E-30  0.0000E+00
-0.2705E-33  0.5934E-32
   MODE NO.     3
 0.2304E-03 -0.2127E-03  0.2304E-03  0.1368E-27  0.8699E-28  0.0000E+00
-0.1044E-28  0.1642E-28  0.4318E-03  0.1368E-15  0.8699E-16  0.0000E+00
 0.6216E-24 -0.5769E-24  0.2096E-03  0.1959E-15 -0.5483E-17  0.0000E+00
-0.3356E-25 -0.1087E-23 -0.2194E-03  0.9426E-16 -0.6385E-16  0.0000E+00
-0.5762E-24 -0.4655E-24 -0.4279E-03 -0.1437E-15 -0.1348E-17  0.0000E+00
 0.5743E-26  0.1293E-23 -0.2127E-03 -0.1437E-27 -0.1348E-29  0.0000E+00
-0.1738E-33  0.2662E-31
   MODE NO.     4
-0.8627E-04  0.7586E-04 -0.8627E-04 -0.1024E-27 -0.6515E-28  0.0000E+00
 0.7822E-29 -0.1230E-28 -0.2511E-03 -0.1024E-15 -0.6515E-16  0.0000E+00
-0.4024E-24  0.3539E-24 -0.1299E-03 -0.1467E-15  0.4107E-17  0.0000E+00
 0.2212E-25  0.7198E-24  0.1356E-03 -0.7060E-16  0.4782E-16  0.0000E+00
 0.3753E-24  0.3173E-24  0.2477E-03  0.1076E-15  0.1010E-17  0.0000E+00
-0.4014E-26 -0.8861E-24  0.7586E-04  0.1076E-27  0.1010E-29  0.0000E+00
 0.1263E-31 -0.1771E-31
   MODE NO.     5
-0.8946E-06 -0.7624E-06 -0.8946E-06  0.4029E-30  0.2563E-30  0.0000E+00
-0.3076E-31  0.4837E-31 -0.1762E-06  0.4029E-18  0.2563E-18  0.0000E+00
 0.5335E-27 -0.1710E-26  0.7691E-06  0.5770E-18 -0.1615E-19  0.0000E+00
-0.1069E-27  0.9760E-27  0.2376E-06  0.3777E-18 -0.1881E-18  0.0000E+00
-0.2221E-26  0.1510E-26 -0.3582E-06 -0.4232E-18 -0.3972E-20  0.0000E+00
 0.6347E-28  0.3242E-26 -0.7624E-06 -0.4233E-30 -0.3971E-32  0.0000E+00
-0.1637E-35 -0.3194E-34
   MODE NO.     6
-0.1982E-07 -0.4011E-07 -0.1982E-07 -0.8050E-31 -0.5120E-31  0.0000E+00
 0.6147E-32 -0.9664E-32 -0.1441E-06 -0.8050E-19 -0.5120E-19  0.0000E+00
-0.7213E-28  0.2735E-28 -0.9546E-07 -0.1153E-18  0.3237E-20  0.0000E+00
 0.1710E-29  0.3294E-27  0.1538E-09 -0.5548E-19  0.3758E-19  0.0000E+00
-0.1879E-28  0.2572E-27 -0.7806E-08  0.8457E-19  0.7934E-21  0.0000E+00
 0.9725E-30 -0.3151E-27 -0.4011E-07  0.8455E-31  0.7934E-33  0.0000E+00
 0.1490E-37 -0.5040E-35
   MODE NO.     7
-0.3394E-08  0.1352E-07 -0.3393E-08  0.5300E-31  0.3371E-31  0.0000E+00
-0.4047E-32  0.6363E-32  0.2546E-07  0.5300E-19  0.3371E-19  0.0000E+00
-0.1264E-30 -0.1091E-28  0.3052E-08  0.7591E-19 -0.2125E-20  0.0000E+00
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-0.6823E-30 -0.8710E-28 -0.4290E-07  0.3653E-19 -0.2474E-19  0.0000E+00
 0.1083E-28 -0.8719E-28 -0.2957E-07 -0.5568E-19 -0.5224E-21  0.0000E+00
 0.5145E-30  0.1749E-27  0.1352E-07 -0.5567E-31 -0.5224E-33  0.0000E+00
-0.3840E-37  0.2584E-35
   MODE NO.     8
 0.2574E-09  0.2511E-08  0.2576E-09  0.6470E-32  0.4115E-32  0.0000E+00
-0.4941E-33  0.7760E-33 -0.4416E-08  0.6470E-20  0.4115E-20  0.0000E+00
-0.4317E-29  0.5263E-29 -0.1332E-07  0.9267E-20 -0.2594E-21  0.0000E+00
 0.3289E-30 -0.1082E-28 -0.1742E-07  0.4460E-20 -0.3021E-20  0.0000E+00
 0.1011E-28 -0.1513E-28 -0.8077E-08 -0.6797E-20 -0.6377E-22  0.0000E+00
-0.1119E-30  0.1246E-28  0.2511E-08 -0.6796E-32 -0.6377E-34  0.0000E+00
-0.8594E-39  0.3551E-36


 CORRELATION EPSD

   MODE NO.     1
 0.1000E+01  0.1317E+00  0.1909E+00  0.1909E+00  0.1909E+00  0.1909E+00
 0.1909E+00  0.1909E+00
   MODE NO.     2
 0.1317E+00  0.1000E+01  0.5684E+00  0.5684E+00  0.5684E+00  0.5684E+00
 0.5684E+00  0.5684E+00
   MODE NO.     3
 0.1909E+00  0.5684E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01
   MODE NO.     4
 0.1909E+00  0.5684E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01
   MODE NO.     5
 0.1909E+00  0.5684E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01
   MODE NO.     6
 0.1909E+00  0.5684E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01
   MODE NO.     7
 0.1909E+00  0.5684E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01
   MODE NO.     8
 0.1909E+00  0.5684E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01


 CORRELATION EPSV

   MODE NO.     1
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00
   MODE NO.     2
 0.0000E+00  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00
   MODE NO.     3
 0.0000E+00  0.0000E+00  0.1000E+01  0.3777E+00  0.3804E+00  0.3804E+00
 0.3804E+00  0.3804E+00
   MODE NO.     4
 0.0000E+00  0.0000E+00  0.3777E+00  0.1000E+01  0.8294E+00  0.8294E+00
 0.8294E+00  0.8294E+00
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.3804E+00  0.8294E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.3804E+00  0.8294E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.3804E+00  0.8294E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.3804E+00  0.8294E+00  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01


 CORRELATION MU (FOR CROSS TERM OF RD AND SV)

   MODE NO.     1
 0.0000E+00  0.1262E+00  0.3212E-01  0.2555E-01  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00
   MODE NO.     2
-0.1262E+00  0.0000E+00  0.5834E-01  0.3761E-01  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00
   MODE NO.     3
-0.3212E-01 -0.5834E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00
   MODE NO.     4
-0.2555E-01 -0.3761E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00


 COMBINED VALUES OF COUPLED NODAL DISPLACEMENTS

 DISPLACEMENTS AT PRIMARY SYSTEM CONNETING DOF

 DOF #      DISPLACEMENT


  2         0.6374E-01

  6         0.1304E+00

 DISPLACEMENTS AT SECONDARY SYSTEM DOF

 NODE      DX           DY           DZ          ROT-X        ROT-Y        ROT-Z
```

```
   1    0.6374E-01  0.2309E-26  0.1469E-26  0.0000E+00  0.1763E-27  0.2772E-27

   2    0.1377E+00  0.2309E-14  0.1469E-14  0.0000E+00  0.1175E-22  0.1249E-23

   3    0.1878E+00  0.3307E-14  0.9258E-16  0.0000E+00  0.7806E-24  0.1912E-22

   4    0.2031E+00  0.1592E-14  0.1078E-14  0.0000E+00  0.1532E-23  0.1155E-22

   5    0.1816E+00  0.2426E-14  0.2276E-16  0.0000E+00  0.2660E-24  0.2392E-22

   6    0.1304E+00  0.2426E-26  0.2276E-28  0.0000E+00  0.5993E-32  0.4808E-30

 COMBINED VALUES OF COUPLED MEMBER FORCES

 NODE       FX          FY          FZ          MX          MY          MZ


   1    0.7641E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   2    0.7641E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   2    0.5103E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   3    0.5103E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   3    0.1651E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   4    0.1651E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   4    0.2479E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   5    0.2479E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   5    0.5692E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

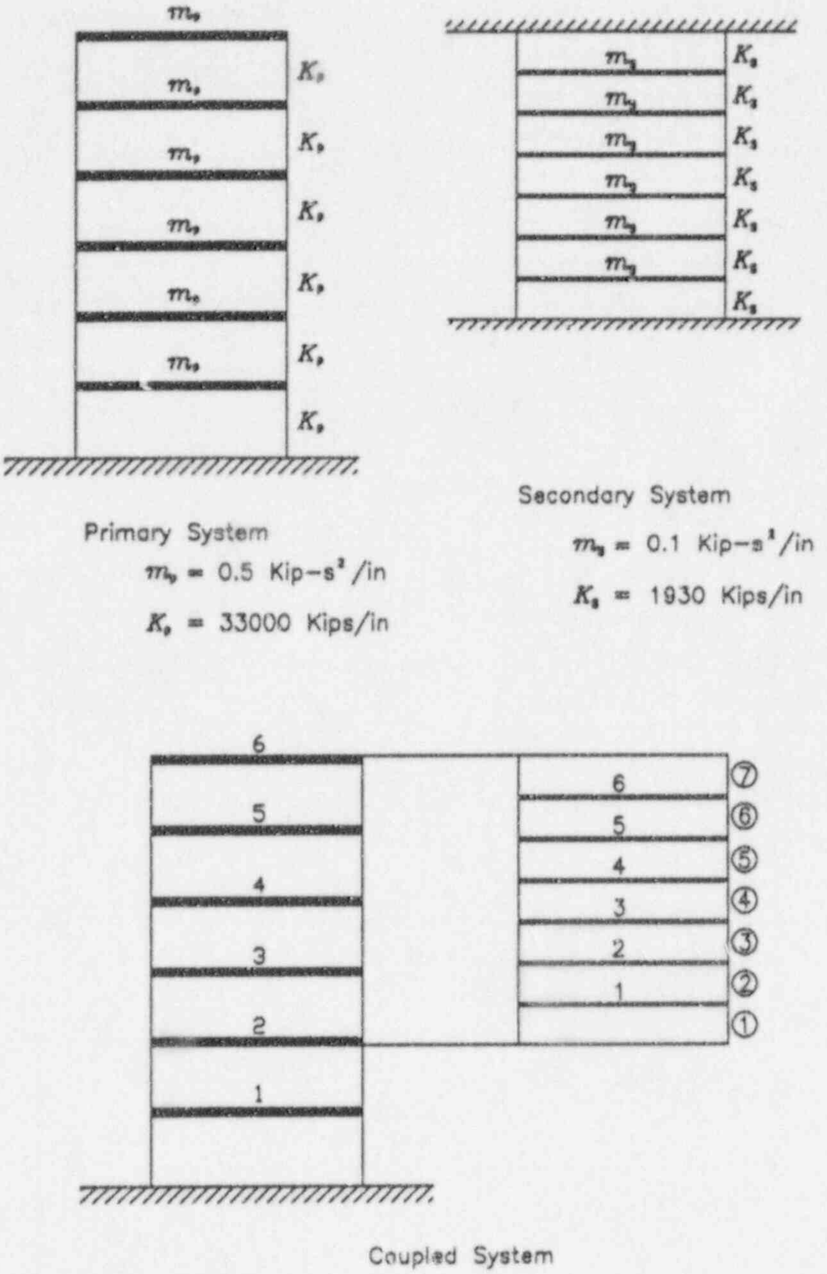
   6    0.5692E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

 COMBINED VALUES OF COUPLED SUPPORT REACTIONS

 TYPE     NODE       SUPPORT REACTION


 FX        1         0.7641E+02

 FX        6         0.5692E+02
```



m_p
K_p
m_s
K_s
6
5
4
3
2
1
⑦
⑥
⑤
④
③
②
①

Primary System
m_p = 0.5 Kip-s^2/in
K_p = 33000 Kips/in

Secondary System
m_s = 0.1 Kip-s^2/in
K_s = 1930 Kips/in

Coupled System

Figure 5: Primary, Secondary and Coupled Systems, Case 5

Table 13: Frequencies and Damping Ratios - Case 5

6-DOf Primary System			6-DOF Secondary System		
Mode No.	Freq. (Hz.)	Damping Ratio	Mode No.	Freq. (Hz.)	Damping Ratio
1	9.85694	0.07	1	9.84007	0.02
2	28.99800	0.07	2	19.18613	0.02
3	46.451455	0.07	3	27.57201	0.02
4	61.20940	0.07	4	34.57323	0.02
5	72.40913	0.07	5	39.84126	0.02
6	79.39922	0.07	6	43.11189	0.02

Table 14: Comparison of Nodal Displacements (inches) for Secondary System - Case 5

Node no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	0.09631	0.09636	0.0963
2	0.1435	0.1436	0.1435
3	0.1729	0.1729	0.1729
4	0.1803	0.1804	0.1803
5	0.1651	0.1652	0.1651
6	0.1303	0.1304	0.1303

Table 15: Comparison of Spring Forces (kips) for Secondary System - Case 5

Element no.	CREST / PIPESTRESS		TIME HISTORY
	Including all modes	Truncated modes; Including missing mass	
1	117.3	117.4	117.3
2	93.56	93.56	93.56
3	57.57	57.57	57.58
4	16.18	16.18	16.18
5	35.15	35.14	35.15
6	75.41	75.51	75.41
7	106.0	106.0	106.0

c5.dat

```
IDEN JB=1111 IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL SU=1 CV=2 TI=/CASE-5 6-DOF PROBLEM/
FREQ FR=45 LO=1 MX=6 TI=/INCLUDING ALL MODES /
RCAS CA=1 EV=1 TY=1 SU=3 LO=1 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 SU=1 FX=1 FY=1 FZ=1
SPEC EV=1 ME=1 FP=0 SH=0
     LV=1 DX=1 DY=1 DZ=1
         DI=X
            1.0/1.0  50.0/1.0
         DI=Y
            1.0/1.0  50.0/1.0
         DI=Z
            1.0/1.0  50.0/1.0
     LV=2 DX=1 DY=1 DZ=1
         DI=X
            1.0/1.0  50.0/1.0
         DI=Y
            1.0/1.0  50.0/1.0
         DI=Z
            1.0/1.0  50.0/1.0
     LV=3 DX=1 DY=1 DZ=1
         DI=X
            1.0/1.0  50.0/1.0
         DI=Y
            1.0/1.0  50.0/1.0
         DI=Z
            1.0/1.0  50.0/1.0
     LV=4 DX=1 DY=1 DZ=1
         DI=X
            1.0/1.0  50.0/1.0
         DI=Y
            1.0/1.0  50.0/1.0
         DI=Z
            1.0/1.0  50.0/1.0
     LV=5 DX=1 DY=1 DZ=1
         DI=X
            1.0/1.0  50.0/1.0
         DI=Y
            1.0/1.0  50.0/1.0
         DI=Z
            1.0/1.0  50.0/1.0
     LV=6 DX=1 DY=1 DZ=1
         DI=X
            1.0/1.0  50.0/1.0
         DI=Y
            1.0/1.0  50.0/1.0
         DI=Z
            1.0/1.0  50.0/1.0
     LV=7 DX=1 DY=1 DZ=1
         DI=X
            1.0/1.0  50.0/1.0
         DI=Y
            1.0/1.0  50.0/1.0
         DI=Z
            1.0/1.0  50.0/1.0
     LV=8 DX=1 DY=1 DZ=1
         DI=X
            1.0/1.0  50.0/1.0
         DI=Y
            1.0/1.0  50.0/1.0
         DI=Z
            1.0/1.0  50.0/1.0
MATL CD=3 EC=28.0 SC=75 SH=75 KL=1
ANCH PT=1 LV=1
SPRS PT=2 DX=1.0 AZ=1930.0
LUMP PT=2 MA=38.64
MULR PT=2 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=2
SPRS PT=3 DX=1.0 AZ=1930.0
LUMP PT=3 MA=38.64
MULR PT=3 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=3
SPRS PT=4 DX=1.0 AZ=1930.0
LUMP PT=4 MA=38.64
MULR PT=4 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=4
SPRS PT=5 DX=1.0 AZ=1930.0
LUMP PT=5 MA=38.64
MULR PT=5 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=5
SPRS PT=6 DX=1.0 AZ=1930.0
LUMP PT=6 MA=38.64
MULR PT=6 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=6
SPRS PT=7 DX=1.0 AZ=1930.0
LUMP PT=7 MA=38.64
MULR PT=7 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=7
SPRS PT=8 DX=1.0 AZ=1930.0
ANCH PT=8 LV=8
ENDP
```

```
CREST/ PIPESTRESS RUN FOR CASE-5, WITH ALL THE S.S. MODES
    6     2     2    6    6    1    0     11    1     1     0     0     1
  900    11    10     1.0E-6        20.5        386.4 0.10
      0.07        0.07        0.07        0.07        0.07        0.07
      0.02        0.02        0.02        0.02        0.02        0.02
    2     6
    1    22
100000000. 0.0
0.0       100000000.
1 8
9.85694300 28.9980000 46.4514500 61.2094000 72.4091330 79.3992200
0.36456 -0.77874  0.52020  -0.18773 -0.73349 -0.64560
 0.77874 0.73349 0.64560 -0.52020 0.36456 -0.18773
   0.1615E+01 -0.5171E+00  0.2841E+00  0.1737E+00  0.1029E+00  0.4834E-01
   10  0.019999
 8.4050.712511.6820.682818.4690.517425.8030.443029.4140.390330.4910.4236
46.6630.348861.2760.348272.5310.348679.5720.3498
   10  0.021093
 8.4050.710011.6820.680818.4690.512125.8030.439929.4140.388830.4910.4216
46.6630.348861.2760.348372.5310.348779.5720.3498
   10  0.029183
 8.4050.680111.6820.656518.4690.464425.8030.409029.4140.374930.4910.4024
46.6630.348561.2760.348572.5310.349079.5720.3498
   10  0.037682
 8.4050.649511.6820.629618.4690.431225.8030.384429.4140.364330.4910.3875
46.6630.348561.2760.348572.5310.349179.5720.3498
   10  0.047921
 8.4050.626511.6820.598718.4690.415225.8030.363829.4140.358130.4910.3749
46.6630.348661.2760.348672.5310.349279.5720.3497
   10  0.058319
 8.4050.603711.6820.570318.4690.406325.8030.360629.4140.354530.4910.3660
46.6630.348761.2760.348772.5310.349279.5720.3496
   10  0.069036
 8.4050.580211.6820.544418.4690.402125.8030.357629.4140.353230.4910.3594
46.6630.348861.2760.348772.5310.349279.5720.3495
   10  0.069702
 8.4050.578811.6820.543018.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.5720.3495
   10  0.069721
 8.4050.578811.6820.542918.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.5720.3495
   10  0.069726
 8.4050.578711.6820.542918.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.5720.3495
   10  0.070000
 8.4050.578211.6820.542318.4690.402225.8030.357429.4140.353130.4910.3589
46.6630.348861.2760.348772.5310.349279.5720.3495
```

```
CREST/ PIPESTRESS RUN FOR CASE-5. WITH ALL THE S.S. MODES

  NUMBER OF PRIMARY DOF              NP=    6
  NUMBER OF CONNECTING DOF           NC=    2
  NUMBER OF PIPING ANCHORS           NA=    2
  NUMBER OF PRIMARY MODES           NPM=    6
  NUMBER OF SECONDARY MODES         NSM=    6
  NORMALIZATION INDEX FOR P.S.    NORMP=    1
  NORMALIZATION INDEX FOR S.S.    NORMS=    0
  OUTPUT TYPE INDICATOR          IPRINT=    1
  OUTPUT TYPE INDICATOR         IPRINTS=    1
  PRIMARY RESIDUAL MODE KEY       KRESP=    0
  SECONDARY RESIDUAL MODE KEY     KRESS=    0
  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX       NONZP=   11
  GLOBAL EARTHQUAKE DIRECTION  X=1  Y=2(VERTICAL)  Z=3       KFLG=    1

  NUMBER OF ITERATIONS           NITER=  900
  NUMBER OF SPECTRA CURVES      NCURVE=   11
  NUMBER OF SPECTRUM POINTS       MXLP=   10
  ITERATION TOLERANCE              TOL=  0.1000E-05
  RIGID FREQUENCY                   FR=  20.500
  SPECTRUM FACTOR                 SFTR= 386.400
  CORRELATION TOLERANCE             ET=   0.100

  TOTAL STORAGE REQUIRED  =     42373
  ACTUAL PROVIDED STORAGE  = 550000000

  PRIMARY DAMPING RATIOS

  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01

  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01

  CONNECTING DOF # OF PRIMARY SYSTEM

    2    6

  CONNECTING DOF # OF PIPING SUPPORTS

    1   22

  STIFFNESS OF CONNECTING DOF OF S.S.

  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09

  NODE # OF PIPING ANCHORS

    1    8

  MASS OF EACH SECONDARY DOF

  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00

  ADDRESS OF DIAGONAL ELEMENTS IN S.S. STIFFNESS MATRIX (JDG MATRIX)

    1    3    6   10   15   21   28   36   45   55   66   78   85   93  103  112
  123  135  142  150  159  169  180  192  199  207  216  226  237  249  256  264
  273  283  294  306  313  321  330  340  351  363  370  378  387  397  408  420

  LOWER TRIANGULAR STIFFNESS MATRIX OF SECONDARY SYSTEM

  0.1000E+09  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1930E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.3860E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E-10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
```

```
 -0.1930E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3860E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1930E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.3860E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
 -0.1930E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3860E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1930E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.3860E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
 -0.1930E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3860E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1930E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10

  SECONDARY FREQUENCIES (HZ)

   9.8400596  19.1867123  27.5712860  34.5733415  39.8417555  43.1123323

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        2

  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8571E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.7143E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5714E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4286E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2857E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1429E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2757E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        6

  0.2757E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1429E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2857E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4286E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5714E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.7143E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8571E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  UNNORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.8589E-05  0.1548E-04  0.1930E-04 -0.1930E-04 -0.1548E-04 -0.8589E-05
  0.1840E-71 -0.7439E-78  0.4445E-88 -0.4154E-96  0.3292E-48 -0.1867E-29
  0.8572E-72 -0.3466E-78  0.2070E-88 -0.1936E-96 -0.2575E-48  0.2195E-29
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1029E-72  0.4160E-79 -0.2495E-89  0.2324E-97  0.3092E-49 -0.2635E-30
  0.2209E-72 -0.8930E-79  0.5336E-89 -0.4987E-97  0.3952E-49 -0.2242E-30
  0.4450E+00  0.8019E+00  0.1000E+01 -0.1000E+01 -0.8019E+00 -0.4450E+00
  0.1840E-59 -0.7439E-66  0.4445E-76 -0.4135E-84  0.3292E-36 -0.1867E-17
  0.8572E-60 -0.3466E-66  0.2071E-76 -0.1936E-84 -0.2575E-36  0.2195E-17
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.2219E-67  0.8970E-74  0.3132E-80 -0.2490E-88  0.2425E-40 -0.1310E-21
 -0.7823E-64  0.2066E-69  0.2133E-80 -0.1075E-91 -0.2423E-40  0.2616E-21
  0.8019E+00  0.1000E+01  0.4450E+00  0.4451E+00  0.1000E+01  0.8019E+00
  0.2635E-60 -0.1065E-66  0.6364E-77 -0.5950E-85 -0.4189E-36 -0.1338E-17
  0.1282E-59 -0.5181E-66  0.3096E-76 -0.2894E-84 -0.4028E-36 -0.2565E-17
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.7828E-64  0.3548E-70  0.2132E-80  0.1249E-88 -0.2424E-40  0.2618E-21
 -0.1957E-64  0.1330E-70 -0.4572E-89 -0.1245E-89 -0.2424E-40 -0.1309E-21
  0.1000E+01  0.4450E+00 -0.8019E+00  0.8019E+00 -0.4450E+00 -0.1000E+01
  0.1253E-59 -0.5065E-66  0.3026E-76 -0.2829E-84  0.2930E-36  0.3049E-17
 -0.2150E-60  0.8691E-67 -0.5192E-77  0.4853E-85 -0.3270E-36  0.1820E-17
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.9785E-65 -0.7264E-79 -0.5331E-81 -0.4057E-97 -0.9006E-50  0.1309E-21
  0.1188E-72  0.7096E-70  0.2869E-89  0.1249E-88  0.1212E-40 -0.1309E-21
 0.1000E+01 -0.4450E+00 -0.8019E+00 -0.8019E+00 -0.4450E+00  0.1000E+01
-0.1324E-59  0.5354E-66 -0.3198E-76  0.2990E-84 -0.2081E-36  0.9816E-18
 0.2077E-59 -0.8295E-65  0.5015E-76 -0.4689E-84  0.1212E-36 -0.3353E-17
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.7828E-64  0.1112E-78  0.6529E-80  0.2498E-88  0.6060E-41  0.1309E-21
-0.7828E-64  0.3548E-70 -0.2132E-80  0.2498E-88 -0.2424E-40 -0.6545E-22
 0.8019E+00 -0.1000E+01  0.4450E+00 -0.4451E+00  0.1000E+01 -0.8019E+00
-0.3181E-59  0.1286E-65 -0.7684E-76  0.7182E-84 -0.5635E-37  0.4032E-17
-0.1262E-59  0.5101E-66 -0.3048E-76  0.2849E-84  0.6114E-37 -0.2196E-17
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.7828E-64  0.3548E-70  0.2132E-80 -0.2498E-88  0.6060E-41 -0.1885E-31
 0.3131E-63  0.9015E-79 -0.8529E-80 -0.4996E-88  0.1822E-49  0.2618E-21
 0.4450E+00 -0.8019E+00  0.1000E+01  0.1000E+01 -0.8019E+00  0.4450E+00
 0.4312E-60 -0.1744E-66  0.1042E-76 -0.9738E-85 -0.2960E-36 -0.3387E-17
-0.1076E-60  0.4350E-67 -0.2599E-77  0.2430E-85 -0.2833E-37 -0.5069E-18
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.4893E-65  0.5602E-79 -0.3347E-89  0.3129E-97  0.1515E-41 -0.3273E-22
 0.4337E-72  0.1753E-78 -0.1066E-80 -0.9793E-97 -0.2877E-49 -0.1309E-21
 0.8509E-05 -0.1548E-04  0.1930E-04  0.1930E-04 -0.1548E-04  0.8589E-05
 0.4313E-72 -0.1744E-78  0.1042E-88 -0.9740E-97 -0.2960E-48 -0.3385E-29
-0.1076E-72  0.4350E-79 -0.2599E-89  0.2430E-97 -0.2833E-49 -0.5069E-30
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.4470E-77  0.3328E-83  0.2044E-93  0.3414-102  0.4273E-54  0.4194E-34
-0.1797E-76  0.2432E-82  0.1715E-93  0.2815-101  0.3767E-52 -0.6322E-33

NORMALIZED MODE SHAPE OF SECONDARY SYSTEM

 0.1415E-04  0.2551E-04  0.3190E-04 -0.3180E-04 -0.2550E-04 -0.1415E-04
 0.3032E-71 -0.1226E-77  0.7325E-88 -0.6846E-96  0.5425E-48 -0.3077E-29
 0.1413E-71 -0.5711E-78  0.3412E-88 -0.3190E-96 -0.4244E-48  0.3617E-29
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.1696E-72  0.6856E-79 -0.4096E-89  0.3830E-97  0.5095E-49 -0.4342E-30
 0.3640E-72 -0.1472E-78  0.8793E-89 -0.8218E-97  0.4513E-49 -0.3694E-30
 0.7334E+00  0.1322E+01  0.1648E+01 -0.1648E+01 -0.1322E+01 -0.7334E+00
 0.3032E-59 -0.1226E-65  0.7325E-76 -0.6847E-84  0.5425E-36 -0.3077E-17
 0.1413E-59 -0.5711E-66  0.3412E-76 -0.3190E-84 -0.4244E-36  0.3617E-17
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.3656E-67  0.1470E-73  0.3513E-80 -0.4116E-88  0.3996E-40 -0.2158E-21
-0.1289E-63  0.1754E-69  0.3516E-80 -0.1772E-91 -0.3993E-40  0.4314E-21
 0.1322E+01  0.1648E+01  0.7334E+00  0.7334E+00  0.1648E+01  0.1322E+01
 0.4342E-60 -0.1756E-66  0.1049E-76 -0.9805E-85 -0.6902E-36 -0.2205E-17
 0.2112E-59 -0.8538E-66  0.5102E-76 -0.4769E-84 -0.6617E-36 -0.4228E-17
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1290E-63  0.5847E-70  0.3514E-80  0.2058E-88 -0.3995E-40  0.4314E-21
-0.3225E-64  0.2193E-70 -0.7534E-89 -0.1029E-88 -0.3995E-40 -0.2157E-21
 0.1648E+01  0.7334E+00 -0.1322E+01  0.1322E+01 -0.7334E+00 -0.1648E+01
 0.2064E-59 -0.8347E-66  0.4987E-76 -0.4663E-84  0.4828E-36  0.5024E-17
-0.3562E-59  0.1432E-66 -0.8555E-77  0.7997E-85 -0.5401E-36  0.3000E-17
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.1613E-66 -0.2287E-78 -0.8784E-81 -0.6606E-97 -0.1484E-49  0.2157E-21
 0.1957E-72  0.2098E-69  0.4728E-89  0.2058E-88  0.1997E-40 -0.2157E-21
 0.1648E+01 -0.7334E+00 -0.1322E+01 -0.1322E+01 -0.7334E+00  0.1648E+01
-0.2182E-59  0.8822E-66 -0.5271E-76  0.4927E-84 -0.3430E-36  0.1618E-17
 0.3423E-59 -0.1383E-65  0.8265E-76 -0.7727E-84  0.1997E-36 -0.3877E-17
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1290E-63  0.1833E-78  0.1406E-79  0.4117E-88  0.5987E-41  0.2157E-21
-0.1290E-63  0.5847E-70 -0.3514E-80  0.4117E-88 -0.3995E-40 -0.1079E-21
 0.1322E+01 -0.1648E+01  0.7334E+00 -0.7334E+00  0.1648E+01 -0.1322E+01
-0.5242E-59  0.2120E-65 -0.1266E-75  0.1184E-83 -0.9286E-37  0.6644E-17
-0.2079E-59  0.8406E-66 -0.5023E-76  0.4695E-84  0.1008E-36 -0.3619E-17
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1290E-63  0.5847E-70  0.3514E-80 -0.4117E-88  0.9987E-41 -0.3106E-31
 0.5160E-63  0.1486E-78 -0.1406E-79 -0.8233E-88  0.3063E-49  0.4314E-21
 0.7334E+00 -0.1322E+01  0.1648E+01  0.1648E+01 -0.1322E+01  0.7334E+00
 0.7106E-60 -0.2874E-66  0.1717E-76 -0.1605E-84 -0.4879E-36 -0.5581E-17
-0.1773E-60  0.7168E-67 -0.4283E-77  0.4004E-85 -0.4648E-37 -0.8352E-18
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.8063E-65  0.9232E-79 -0.5515E-89  0.5156E-97  0.2497E-41 -0.5393E-22
 0.7147E-72 -0.2890E-78 -0.1757E-80 -0.1614E-96 -0.4741E-49 -0.2157E-21
 0.1415E-04 -0.2551E-04  0.3180E-04  0.3180E-04 -0.2550E-04  0.1415E-04
 0.7107E-72 -0.2873E-78  0.1717E-88 -0.1605E-96 -0.4878E-48 -0.5579E-29
-0.1773E-72  0.7169E-79 -0.4283E-89  0.4004E-97 -0.4668E-49 -0.8353E-30
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.7366E-77  0.5484E-83  0.3368E-93  0.5626-102  0.7042E-54  0.6895E-34
-0.2962E-76  0.4007E-82  0.2826E-93  0.4639-101  0.6207E-52 -0.1042E-32

PRIMARY FREQUENCIES (HZ)

  9.8569430  28.9980000  46.4514500  61.2094000  72.4091330  79.3992200

MODE SHAPE OF P.S. AT CONNECTING DOF       2

0.3646E+00 -0.7787E+00  0.5202E+00 -0.1077E+00 -0.7335E+00 -0.6456E+00

MODE SHAPE OF P.S. AT CONNECTING DOF       6

0.7787E+00  0.7335E+00  0.6456E+00 -0.5202E+00  0.3646E+00 -0.1877E+00

BASE INFLUENCE VECTOR FOR S.S. ---UBS

0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

PARTICIPATION FACTOR FOR P.S. ---GAMAP

0.163[illegible]E-01 -0.5171E+00  0.2841E+00  0.1737E+00  0.1029E+00  0.4834E-01

INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10
```

```
DAMPING RATIO FOR THIS CURVE =    0.19999E-01

     INPUT      FREQUENCY     INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01      0.7125E+00
         2     0.1168E+02      0.6828E+00
         3     0.1847E+02      0.5174E+00
         4     0.2580E+02      0.4430E+00
         5     0.2941E+02      0.3903E+00
         6     0.3049E+02      0.4234E+00
         7     0.4666E+02      0.3488E+00
         8     0.6128E+02      0.3483E+00
         9     0.7253E+02      0.3486E+00
        10     0.7957E+02      0.3498E+00

INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.21093E-01

     INPUT      FREQUENCY     INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01      0.7100E+00
         2     0.1168E+02      0.6808E+00
         3     0.1847E+02      0.5121E+00
         4     0.2580E+02      0.4399E+00
         5     0.2941E+02      0.3888E+00
         6     0.3049E+02      0.4216E+00
         7     0.4666E+02      0.3488E+00
         8     0.6128E+02      0.3483E+00
         9     0.7253E+02      0.3487E+00
        10     0.7957E+02      0.3498E+00

INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.29103E-01

     INPUT      FREQUENCY     INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01      0.6901E+00
         2     0.1168E+02      0.6565E+00
         3     0.1847E+02      0.4644E+00
         4     0.2580E+02      0.4090E+00
         5     0.2941E+02      0.3769E+00
         6     0.3049E+02      0.4024E+00
         7     0.4666E+02      0.3465E+00
         8     0.6128E+02      0.3485E+00
         9     0.7253E+02      0.3490E+00
        10     0.7957E+02      0.3498E+00

INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.37682E-01

     INPUT      FREQUENCY     INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01      0.6495E+00
         2     0.1168E+02      0.6296E+00
         3     0.1847E+02      0.4312E+00
         4     0.2580E+02      0.3644E+00
         5     0.2941E+02      0.3643E+00
         6     0.3049E+02      0.3875E+00
         7     0.4666E+02      0.3485E+00
         8     0.6128E+02      0.3485E+00
         9     0.7253E+02      0.3491E+00
        10     0.7957E+02      0.3498E+00

INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.47921E-01

     INPUT      FREQUENCY     INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01      0.6265E+00
         2     0.1168E+02      0.5987E+00
         3     0.1847E+02      0.4152E+00
         4     0.2580E+02      0.3638E+00
         5     0.2941E+02      0.3581E+00
         6     0.3049E+02      0.3749E+00
         7     0.4666E+02      0.3486E+00
         8     0.6128E+02      0.3486E+00
         9     0.7253E+02      0.3492E+00
        10     0.7957E+02      0.3497E+00

INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.58119E-01

     INPUT      FREQUENCY     INPUT SPECTRAL
     POINT        (HZ)        ACCELERATION
         1     0.8405E+01      0.6037E+00
         2     0.1168E+02      0.5703E+00
         3     0.1847E+02      0.4063E+00
         4     0.2580E+02      0.3606E+00
         5     0.2941E+02      0.3545E+00
         6     0.3049E+02      0.3660E+00
         7     0.4666E+02      0.3467E+00
         8     0.6128E+02      0.3487E+00
         9     0.7253E+02      0.3492E+00
        10     0.7957E+02      0.3496E+00
```

```
INPUT SPECTRUM CURVE NUMBER -  7

NUMBER OF DEFINITION POINTS - 10

DAMPING RATIO FOR THIS CURVE -     0.69036E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1     0.8405E+01      0.5802E+00
          2     0.1168E+02      0.5444E+00
          3     0.1847E+02      0.4021E+00
          4     0.2580E+02      0.3576E+00
          5     0.2941E+02      0.3532E+00
          6     0.3049E+02      0.3594E+00
          7     0.4666E+02      0.3488E+00
          8     0.6128E+02      0.3487E+00
          9     0.7253E+02      0.3492E+00
         10     0.7957E+02      0.3495E+00

INPUT SPECTRUM CURVE NUMBER -  8

NUMBER OF DEFINITION POINTS - 10

DAMPING RATIO FOR THIS CURVE -     0.67702E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1     0.8405E+01      0.5788E+00
          2     0.1168E+02      0.5430E+00
          3     0.1847E+02      0.4022E+00
          4     0.2580E+02      0.3574E+00
          5     0.2941E+02      0.3532E+00
          6     0.3049E+02      0.3590E+00
          7     0.4666E+02      0.3488E+00
          8     0.6128E+02      0.3487E+00
          9     0.7253E+02      0.3492E+00
         10     0.7957E+02      0.3495E+00

INPUT SPECTRUM CURVE NUMBER -  9

NUMBER OF DEFINITION POINTS - 10

DAMPING RATIO FOR THIS CURVE -     0.69721E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1     0.8405E+01      0.5788E+00
          2     0.1168E+02      0.5429E+00
          3     0.1847E+02      0.4022E+00
          4     0.2580E+02      0.3574E+00
          5     0.2941E+02      0.3532E+00
          6     0.3049E+02      0.3590E+00
          7     0.4666E+02      0.3488E+00
          8     0.6128E+02      0.3487E+00
          9     0.7253E+02      0.3492E+00
         10     0.7957E+02      0.3495E+00

INPUT SPECTRUM CURVE NUMBER - 10

NUMBER OF DEFINITION POINTS - 10

DAMPING RATIO FOR THIS CURVE -     0.69726E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1     0.8405E+01      0.5787E+00
          2     0.1168E+02      0.5429E+00
          3     0.1847E+02      0.4022E+00
          4     0.2580E+02      0.3574E+00
          5     0.2941E+02      0.3532E+00
          6     0.3049E+02      0.3590E+00
          7     0.4666E+02      0.3488E+00
          8     0.6128E+02      0.3487E+00
          9     0.7253E+02      0.3492E+00
         10     0.7957E+02      0.3495E+00

INPUT SPECTRUM CURVE NUMBER - 11

NUMBER OF DEFINITION POINTS - 10

DAMPING RATIO FOR THIS CURVE -     0.70000E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1     0.8405E+01      0.5782E+00
          2     0.1168E+02      0.5423E+00
          3     0.1847E+02      0.4022E+00
          4     0.2580E+02      0.3574E+00
          5     0.2941E+02      0.3531E+00
          6     0.3049E+02      0.3589E+00
          7     0.4666E+02      0.3488E+00
          8     0.6128E+02      0.3487E+00
          9     0.7253E+02      0.3492E+00
         10     0.7957E+02      0.3495E+00


        ***********************************************************
        *                                                         *
        *                                                         *
        *                                                         *
        *                 A COMPUTER PROGRAM FOR                  *
        *                                                         *
        *                                                         *
        *    COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS  *
        *                                                         *
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        *                    "C A R S T"                          *
        *                                                         *
        *                                                         *
        *                    DEVELOPED BY                         *
        *                                                         *
        *                 AJAYA KUMAR GUPTA                       *
        *           JING-WEN JAW    ABHINAV GUPTA              *
        *                                                         *
        *           NORTH CAROLINA STATE UNIVERSITY               *
        *              RALEIGH, NORTH CAROLINA                    *
        *                                                         *
        *                   REVISION-1.6                         *
        *                                                         *
        *                                                         *
        ***********************************************************


PARTICIPATION FACTOR FOR S.S.---GAMAS
0.7406E+00  0.1069E-06  0.2120E+00  0.3452E-09 -0.8140E-01  0.4832E-11


MASS RATIOS

  PRIMARY SYSTEM MODE    1
0.1792E+00  0.5283E-02  0.1468E-01  0.7792E-03  0.2165E-02  0.6383E-04

  PRIMARY SYSTEM MODE    2
0.2807E-01  0.7043E-01  0.2300E-04  0.1039E-01  0.3392E-05  0.8509E-03

  PRIMARY SYSTEM MODE    3
0.1863E+00  0.4843E-03  0.1526E-01  0.7143E-04  0.2251E-02  0.5851E-05

  PRIMARY SYSTEM MODE    4
0.6872E-01  0.3404E-02  0.5629E-02  0.5021E-03  0.8302E-03  0.4113E-04

  PRIMARY SYSTEM MODE    5
0.1066E-01  0.3714E-01  0.1529E-02  0.5477E-02  0.2255E-03  0.4486E-03

  PRIMARY SYSTEM MODE    6
0.9522E-01  0.6457E-02  0.7799E-02  0.9523E-03  0.1159E-02  0.7801E-04

C O U P L E D   F R E Q U E N C I E S   A N D   M O D E   S H A P E S   E X T R A C T I O N

NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION   NITER =  900

CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                     TOL = 0.10000E-05

COUPLED  FREQUENCY  DAMPING RATIO
 MODE       (HZ)        (%)

  1     0.83371E+01    0.33143E+01
  2     0.12055E+02    0.47769E+01
  3     0.18777E+02    0.21857E+01
  4     0.27663E+02    0.20860E+01
  5     0.29491E+02    0.62497E+01
  6     0.35133E+02    0.25135E+01
  7     0.39759E+02    0.20790E+01
  8     0.43141E+02    0.20151E+01
  9     0.46972E+02    0.68759E+01
 10     0.61351E+02    0.69526E+01
 11     0.72658E+02    0.69423E+01
 12     0.79547E+02    0.69514E+01

UNIT DISPLACEMENT & UNIT VELOCITY*W RESPONSE


COUPLED MODE NO.    1


  1     0.39488E+00    0.30264E-01
  2     0.83974E+00    0.47601E-01
  3     0.11043E-04   -0.99333E-06
  4    -0.10291E-32   -0.23502E-34
  5     0.12096E-32    0.27626E-34
  6     0.00000E+00    0.00000E+00
  7    -0.14522E-33   -0.33164E-35
  8    -0.12354E-33   -0.28213E-35
  9     0.57217E+00   -0.51469E-01
 10    -0.10289E-20   -0.23498E-22
 11     0.12096E-20    0.27625E-22
 12     0.00000E+00    0.00000E+00
 13    -0.72174E-25   -0.16483E-26
 14     0.14426E-24    0.32946E-26
 15     0.10133E+01   -0.92989E-01
 16    -0.73753E-21   -0.16844E-22
 17    -0.14119E-20   -0.32291E-22
 18     0.00000E+00    0.00000E+00
 19     0.14429E-24    0.32952E-26
 20    -0.72143E-25   -0.16476E-26
 21     0.12641E+01   -0.11505E+00
 22     0.16802E-20    0.38372E-22
 23     0.10032E-20    0.22911E-22
 24     0.00000E+00    0.00000E+00
 25     0.72143E-25    0.16476E-26
 26    -0.72143E-25   -0.16476E-26
 27     0.12871E+01   -0.11532E+00
 28     0.54100E-21    0.12355E-22
 29    -0.12967E-20   -0.29614E-22
 30     0.00000E+00    0.00000E+00
 31     0.72143E-25    0.16476E-26
 32    -0.36071E-25   -0.82380E-27
 33     0.10597E+01   -0.91669E-01
 34     0.22219E-20    0.50743E-22
 35    -0.12102E-20   -0.27637E-22
 36     0.00000E+00    0.00000E+00
 37    -0.10387E-34   -0.23722E-36
 38     0.14429E-24    0.32952E-26
 39     0.62697E+00   -0.50187E-01
 40    -0.18664E-20   -0.42625E-22
 41    -0.27933E-21    -0.63792E-23
 42     0.00000E+00     0.00000E+00
 43    -0.18036E-25    -0.41190E-27
 44    -0.72143E-25    -0.16476E-26
 45     0.12100E-04    -0.96859E-06
 46    -0.18657E-32    -0.42609E-34
 47    -0.27936E-33    -0.63799E-35
 48     0.00000E+00     0.00000E+00
 49     0.23050E-37     0.52660E-39
 50    -0.34861E-36    -0.79570E-38

COUPLED MODE NO.    2

  1     0.21235E+00    -0.39335E-01
  2     0.47327E+00    -0.87571E-01
  3    -0.10994E-04     0.10707E-05
  4    -0.12918E-32     0.36104E-33
  5     0.15185E-32    -0.42440E-33
  6     0.00000E+00     0.00000E+00
  7    -0.18229E-33     0.50948E-34
  8    -0.15508E-33     0.43342E-34
  9    -0.56913E+00     0.55478E-01
 10    -0.12916E-20     0.36098E-21
 11     0.15185E-20    -0.42439E-21
 12     0.00000E+00     0.00000E+00
 13    -0.90601E-25     0.25322E-25
 14     0.18109E-24    -0.50612E-25
 15    -0.10430E+01     0.10450E+00
 16    -0.92583E-21     0.25876E-21
 17    -0.17749E-20     0.49606E-21
 18     0.00000E+00     0.00000E+00
 19     0.18112E-24    -0.50622E-25
 20    -0.90562E-25     0.25311E-25
 21    -0.12925E+01     0.12723E+00
 22     0.21091E-20    -0.58948E-21
 23     0.12594E-20    -0.35197E-21
 24     0.00000E+00     0.00000E+00
 25     0.90562E-25    -0.25311E-25
 26    -0.90562E-25     0.25311E-25
 27    -0.12547E+01     0.11555E+00
 28     0.67912E-21    -0.16981E-21
 29    -0.16278E-20     0.45494E-21
 30     0.00000E+00     0.00000E+00
 31     0.90562E-25    -0.25311E-25
 32    -0.45281E-25     0.12655E-25
 33    -0.95156E+00     0.76421E-01
 34     0.27892E-20    -0.77953E-21
 35    -0.15191E-20     0.42457E-21
 36     0.00000E+00     0.00000E+00
 37    -0.13039E-34     0.36442E-35
 38     0.18112E-24    -0.50622E-25
 39    -0.48357E+00     0.29535E-01
 40    -0.23429E-20     0.65482E-21
 41    -0.35064E-21     0.98000E-22
 42     0.00000E+00     0.00000E+00
 43    -0.22641E-25     0.63277E-26
 44    -0.90562E-25     0.25311E-25
 45    -0.93328E-05     0.57001E-06
 46    -0.23421E-32     0.65458E-33
 47    -0.35068E-33     0.98010E-34
 48     0.00000E+00     0.00000E+00
 49     0.28945E-37    -0.80897E-38
 50    -0.43737E-36     0.12224E-36

COUPLED MODE NO.    3

  1     0.50674E-01     0.43735E-03
  2    -0.14396E-01    -0.43039E-02
  3     0.61951E-05    -0.19603E-06
  4     0.90663E-33     0.36463E-34
  5    -0.10657E-32    -0.42862E-34
  6     0.00000E+00     0.00000E+00
  7     0.12794E-33     0.51454E-35
  8     0.10884E-33     0.43773E-35
  9     0.32099E+00    -0.10261E-01
 10     0.90649E-21     0.36457E-22
 11    -0.10657E-20    -0.42861E-22
 12     0.00000E+00     0.00000E+00
 13     0.63588E-25     0.25574E-26
 14    -0.12710E-24    -0.51116E-26
 15     0.38118E+00    -0.11342E-01
 16     0.64979E-21     0.26133E-22
 17     0.12457E-20     0.50099E-22
 18     0.00000E+00     0.00000E+00
 19    -0.12712E-24    -0.51125E-26
 20     0.63560E-25     0.25563E-26
 21     0.14401E+00    -0.20968E-02
 22    -0.14803E-20    -0.59534E-22
 23    -0.88386E-21    -0.35547E-22
 24     0.00000E+00     0.00000E+00
 25    -0.63560E-25    -0.25563E-26
 26     0.63560E-25     0.25563E-26
 27    -0.21314E+00     0.10476E-01
 28    -0.47664E-21    -0.19169E-27
 29     0.11424E-20     0.45946E-22
 30     0.00000E+00     0.00000E+00
 31    -0.63560E-25    -0.25563E-26
 32     0.31780E-25     0.12781E-26
 33    -0.42660E+00     0.16686E-01
 34    -0.19576E-20    -0.78729E-22
 35     0.10662E-20     0.42880E-22
 36     0.00000E+00     0.00000E+00
 37     0.91513E-35     0.36804E-36
 38    -0.12712E-24    -0.51125E-26
 39    -0.33609E+00     0.11833E-01
 40     0.16444E-20     0.66133E-22
 41     0.24609E-21     0.98974E-23
 42     0.00000E+00     0.00000E+00
 43     0.15890E-25     0.63906E-27
 44     0.63560E-25     0.25563E-26
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 45    -0.64864E-05     0.22836E-06
 46     0.16438E-32     0.66109E-34
 47     0.24612E-33     0.98985E-35
 48     0.00000E+00     0.00000E+00
 49    -0.20315E-37    -0.81702E-39
 50     0.30696E-36     0.12345E-37

COUPLED MODE NO.    4

  1    -0.25853E-03     0.44749E-03
  2    -0.43545E-03    -0.16285E-02
  3     0.19849E-06     0.65282E-06
  4     0.97064E-35     0.85970E-34
  5    -0.11410E-34    -0.10106E-33
  6     0.00000E+00     0.00000E+00
  7     0.13697E-35     0.12132E-34
  8     0.11652E-35     0.10321E-34
  9     0.10285E-01     0.33825E-01
 10     0.97050E-23     0.85957E-22
 11    -0.11410E-22    -0.10105E-21
 12     0.00000E+00     0.00000E+00
 13     0.68077E-27     0.60296E-26
 14    -0.13607E-26    -0.12052E-25
 15     0.48159E-02     0.14494E-01
 16     0.69566E-23     0.61615E-22
 17     0.13336E-22     0.11612E-21
 18     0.00000E+00     0.00000E+00
 19    -0.13610E-26    -0.12054E-25
 20     0.68048E-27     0.60270E-26
 21    -0.77464E-02    -0.27287E-01
 22    -0.15848E-22    -0.14037E-21
 23    -0.94627E-23    -0.83811E-22
 24     0.00000E+00     0.00000E+00
 25    -0.68048E-27    -0.60270E-26
 26     0.68048E-27     0.60270E-26
 27    -0.75799E-02    -0.25694E-01
 28    -0.51029E-23    -0.45196E-22
 29     0.12231E-22     0.10833E-21
 30     0.00000E+00     0.00000E+00
 31    -0.68048E-27    -0.60270E-26
 32     0.34024E-27     0.30135E-26
 33     0.50967E-02     0.17242E-01
 34    -0.20958E-22    -0.18562E-21
 35     0.11415E-22     0.10110E-21
 36     0.00000E+00     0.00000E+00
 37     0.97974E-37     0.86776E-36
 38    -0.13610E-26    -0.12054E-25
 39     0.10374E-01     0.34819E-01
 40     0.17605E-22     0.15592E-21
 41     0.26347E-23     0.23336E-22
 42     0.00000E+00     0.00000E+00
 43     0.17012E-27     0.15068E-26
 44     0.68048E-27     0.60270E-26
 45     0.20021E-06     0.67200E-06
 46     0.17598E-34     0.15587E-33
 47     0.26350E-35     0.23338E-34
 48     0.00000E+00     0.00000E+00
 49    -0.21749E-39    -0.19263E-38
 50     0.32863E-38     0.29107E-37

COUPLED MODE NO.    5

  1     0.33504E+00     0.89897E-02
  2    -0.31972E+00    -0.10603E-01
  3    -0.17216E-05    -0.16103E-05
  4     0.33990E-31    -0.52156E-32
  5    -0.39964E-31     0.61309E-32
  6     0.00000E+00     0.00000E+00
  7     0.47976E-32    -0.73600E-33
  8     0.40814E-32    -0.62612E-33
  9    -0.89205E-01    -0.83435E-01
 10     0.33997E-19    -0.52148E-20
 11    -0.39967E-19     0.61308E-20
 12     0.00000E+00     0.00000E+00
 13     0.23845E-23    -0.36580E-24
 14    -0.47660E-23     0.73115E-24
 15    -0.83832E+00     0.59663E-06
 16     0.24366E-19    -0.37380E-20
 17     0.46712E-19    -0.71661E-20
 18     0.00000E+00     0.00000E+00
 19    -0.47669E-23     0.73129E-24
 20     0.23835E-23    -0.36564E-24
 21    -0.27069E+00     0.37004E-01
 22    -0.55509E-19     0.85157E-20
 23    -0.33144E-19     0.50846E-20
 24     0.00000E+00     0.00000E+00
 25    -0.23835E-23     0.36564E-24
 26     0.23835E-23    -0.36564E-24
 27     0.27658E+00    -0.23972E-01
 28    -0.17873E-19     0.27420E-20
 29     0.42841E-19    -0.65722E-20
 30     0.00000E+00     0.00000E+00
 31    -0.23835E-23     0.36564E-24
 32     0.11917E-23    -0.18282E-24
 33     0.40470E+00    -0.37269E-02
 34    -0.73407E-19     0.11261E-19
 35     0.39981E-19    -0.61335E-20
 36     0.00000E+00     0.00000E+00
 37     0.34317E-33    -0.52645E-34
 38    -0.47669E-23     0.73129E-24
 39     0.49505E-01     0.59869E-01
 40     0.61662E-19    -0.94596E-20
 41     0.92284E-20    -0.14157E-20
 42     0.00000E+00     0.00000E+00
 43     0.59586E-24    -0.91411E-25
 44     0.23835E-23    -0.36564E-24
 45     0.95543E-06     0.13485E-05
 46     0.61640E-31    -0.94562E-32
 47     0.92294E-32    -0.14159E-32
 48     0.00000E+00     0.00000E+00
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  49    -0.76179E-36    0.11687E-36
  50     0.11511E-34   -0.17659E-35


COUPLED MODE NO.    6


   1     0.26237E-01   -0.18118E-01
   2    -0.28007E-01    0.18460E-01
   3    -0.42429E-05    0.14604E-05
   4     0.61388E-32   -0.46153E-32
   5    -0.72161E-32    0.54252E-32
   6     0.00000E+00    0.00000E+00
   7     0.86620E-33   -0.65129E-33
   8     0.73695E-33   -0.55406E-33
   9    -0.21984E+00    0.76085E-01
  10     0.61379E-20   -0.46146E-20
  11    -0.72159E-20    0.54251E-20
  12     0.00000E+00    0.00000E+00
  13     0.43055E-24   -0.32370E-24
  14    -0.86057E-24    0.64700E-24
  15     0.67860E-01   -0.12065E-01
  16     0.43997E-20   -0.33078E-20
  17     0.84346E-20   -0.63413E-20
  18     0.00000E+00    0.00000E+00
  19    -0.86073E-24    0.64712E-24
  20     0.43036E-24   -0.32356E-24
  21     0.15773E+00   -0.47933E-01
  22    -0.10023E-19    0.75355E-20
  23    -0.59846E-20    0.44994E-20
  24     0.00000E+00    0.00000E+00
  25    -0.43036E-24    0.32356E-24
  26     0.43036E-24   -0.32356E-24
  27    -0.15704E+00    0.47808E-01
  28    -0.32273E-20    0.24264E-20
  29     0.77354E-20   -0.58157E-20
  30     0.00000E+00    0.00000E+00
  31    -0.43036E-24    0.32356E-24
  32     0.21518E-24   -0.16178E-24
  33    -0.64448E-01    0.11331E-01
  34    -0.13255E-19    0.99651E-20
  35     0.72191E-20   -0.54275E-20
  36     0.00000E+00    0.00000E+00
  37     0.61963E-34   -0.46585E-34
  38    -0.86073E-24    0.64712E-24
  39     0.22108E+00   -0.76436E-01
  40     0.11134E-19   -0.83708E-20
  41     0.16663E-20   -0.12528E-20
  42     0.00000E+00    0.00000E+00
  43     0.10759E-24   -0.80890E-25
  44     0.43036E-24   -0.32356E-24
  45     0.42814E-05   -0.14752E-05
  46     0.11130E-31   -0.83678E-32
  47     0.16665E-32   -0.12529E-32
  48     0.00000E+00    0.00000E+00
  49    -0.13755E-36    0.10341E-36
  50     0.20784E-35   -0.15626E-35


COUPLED MODE NO.    7


   1     0.90350E-03    0.93352E-03
   2     0.73572E-03    0.95093E-03
   3     0.50853E-06    0.24265E-06
   4     0.56489E-34   -0.76557E-35
   5    -0.66402E-34    0.89991E-35
   6     0.00000E+00    0.00000E+00
   7     0.79714E-35   -0.10803E-35
   8     0.67814E-35   -0.91905E-36
   9     0.26349E-01    0.12573E-01
  10     0.56480E-22   -0.76545E-23
  11    -0.66401E-22    0.89989E-23
  12     0.00000E+00    0.00000E+00
  13     0.39619E-26   -0.53694E-27
  14    -0.79189E-26    0.10732E-26
  15    -0.35461E-01   -0.18365E-01
  16     0.40486E-22   -0.54868E-23
  17     0.77615E-22   -0.10519E-22
  18     0.00000E+00    0.00000E+00
  19    -0.79204E-26    0.10734E-26
  20     0.39602E-26   -0.53671E-27
  21     0.14701E-01    0.68951E-02
  22    -0.92231E-22    0.12500E-22
  23    -0.55070E-22    0.74634E-23
  24     0.00000E+00    0.00000E+00
  25    -0.39602E-26    0.53671E-27
  26     0.39602E-26   -0.53671E-27
  27     0.14574E-01    0.69111E-02
  28    -0.29697E-22    0.40247E-23
  29     0.71181E-22   -0.96468E-23
  30     0.00000E+00    0.00000E+00
  31    -0.39602E-26    0.53671E-27
  32     0.19801E-26   -0.26835E-27
  33    -0.35354E-01   -0.18378E-01
  34    -0.12197E-21    0.16530E-22
  35     0.66430E-22   -0.90029E-23
  36     0.00000E+00    0.00000E+00
  37     0.57018E-36   -0.77274E-37
  38    -0.79204E-26    0.10734E-26
  39     0.26574E-01    0.12547E-01
  40     0.10245E-21   -0.13885E-22
  41     0.15333E-22   -0.20780E-23
  42     0.00000E+00    0.00000E+00
  43     0.99005E-27   -0.13418E-27
  44     0.39602E-26   -0.53671E-27
  45     0.51292E-06    0.24215E-06
  46     0.10242E-33   -0.13880E-34
  47     0.15335E-34   -0.20783E-35
  48     0.00000E+00    0.00000E+00
  49    -0.12657E-38    0.17154E-39
  50     0.19126E-37   -0.25920E-38
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COUPLED MODE NO.    8


   1     0.65123E-03   -0.16885E-03
   2    -0.60660E-03    0.28360E-03
   3    -0.27292E-06    0.39163E-07
   4    -0.55999E-31    0.77824E-32
   5     0.65826E-31   -0.91481E-32
   6     0.00000E+00    0.00000E+00
   7    -0.79022E-32    0.10982E-32
   8    -0.67225E-32    0.93426E-33
   9    -0.14141E-01    0.20292E-02
  10    -0.55990E-19    0.77812E-20
  11     0.65824E-19   -0.91479E-20
  12     0.00000E+00    0.00000E+00
  13    -0.39275E-23    0.54583E-24
  14     0.78502E-23   -0.10910E-23
  15     0.23763E-01   -0.32614E-02
  16    -0.40134E-19    0.55777E-20
  17    -0.76941E-19    0.10693E-19
  18     0.00000E+00    0.00000E+00
  19     0.78516E-23   -0.10912E-23
  20    -0.39258E-23    0.54559E-20
  21    -0.29908E-01    0.40552E-02
  22     0.91430E-19   -0.12707E-19
  23     0.54592E-19   -0.75870E-20
  24     0.00000E+00    0.00000E+00
  25     0.39258E-23   -0.54559E-24
  26    -0.39258E-23    0.54559E-24
  27     0.29853E-01   -0.41948E-02
  28     0.29440E-19   -0.40914E-20
  29    -0.70543E-19    0.98065E-20
  30     0.00000E+00    0.00000E+00
  31     0.39258E-23   -0.54559E-24
  32    -0.19629E-23    0.27280E-24
  33    -0.23780E-01    0.32172E-02
  34     0.12091E-18   -0.16803E-19
  35    -0.65853E-19    0.91520E-20
  36     0.00000E+00    0.00000E+00
  37    -0.56523E-33    0.78553E-34
  38     0.78516E-23   -0.10912E-23
  39     0.14054E-01   -0.22454E-02
  40    -0.10157E-18    0.14115E-19
  41    -0.15200E-19    0.21124E-20
  42     0.00000E+00    0.00000E+00
  43    -0.98146E-24    0.13640E-24
  44    -0.39258E-23    0.54559E-24
  45     0.27123E-06   -0.43335E-07
  46    -0.10153E-30    0.14110E-31
  47    -0.15202E-31    0.21127E-32
  48     0.00000E+00    0.00000E+00
  49     0.12548E-35   -0.17436E-36
  50    -0.18960E-34    0.26349E-35


COUPLED MODE NO.    9


   1     0.14537E+00   -0.19350E-02
   2     0.18534E+00   -0.21261E-02
   3    -0.41845E-05   -0.21714E-06
   4     0.11422E-31    0.56634E-32
   5    -0.13426E-31   -0.66573E-32
   6     0.00000E+00    0.00000E+00
   7     0.16118E-32    0.79920E-33
   8     0.13712E-32    0.67989E-33
   9    -0.21682E+00   -0.11251E-01
  10     0.11420E-19    0.56626E-20
  11    -0.13426E-19   -0.66572E-20
  12     0.00000E+00    0.00000E+00
  13     0.80109E-24    0.39721E-24
  14    -0.16012E-23   -0.79393E-24
  15    -0.13552E+00    0.14723E-01
  16     0.81861E-20    0.40590E-20
  17     0.15694E-19    0.77814E-20
  18     0.00000E+00    0.00000E+00
  19    -0.16015E-23   -0.79408E-24
  20     0.80075E-24    0.39704E-24
  21    -0.16869E+00    0.46552E-04
  22    -0.18649E-19   -0.92469E-20
  23    -0.11135E-19   -0.55212E-20
  24     0.00000E+00    0.00000E+00
  25    -0.80074E-24   -0.39704E-24
  26     0.80074E-24    0.39704E-24
  27    -0.17807E+00   -0.46328E-02
  28    -0.60048E-20   -0.29774E-20
  29     0.14393E-19    0.71365E-20
  30     0.00000E+00    0.00000E+00
  31    -0.80075E-24   -0.39704E-24
  32     0.40037E-24    0.19852E-24
  33    -0.14000E+00    0.20289E-01
  34    -0.24662E-19   -0.12228E-19
  35     0.13432E-19    0.66601E-20
  36     0.00000E+00    0.00000E+00
  37     0.11529E-33    0.57165E-34
  38    -0.16015E-23   -0.79408E-24
  39    -0.26344E+00   -0.15791E-01
  40     0.20716E-19    0.10272E-19
  41     0.31004E-20    0.15373E-20
  42     0.00000E+00    0.00000E+00
  43     0.20019E-24    0.99260E-25
  44     0.80075E-24    0.39704E-24
  45    -0.50862E-05   -0.30476E-06
  46     0.20709E-31    0.10268E-31
  47     0.31007E-32    0.15374E-32
  48     0.00000E+00    0.00000E+00
  49    -0.25593E-36   -0.12690E-36
  50     0.38672E-35    0.19175E-35


COUPLED MODE NO.   10


   1    -0.32942E-01   -0.69033E-04
   2    -0.91697E-01   -0.10198E-03
   3     0.91129E-06    0.10203E-07
   4    -0.67704E-32   -0.54634E-33
   5     0.79585E-32    0.64221E-33
   6     0.00000E+00    0.00000E+00
   7    -0.95540E-33   -0.77096E-34
   8    -0.81277E-33   -0.65586E-34
   9     0.47218E-01    0.52864E-03
  10    -0.67693E-20   -0.54625E-21
  11     0.79583E-20    0.64220E-21
  12     0.00000E+00    0.00000E+00
  13    -0.47485E-24   -0.38318E-25
  14     0.94911E-24    0.76588E-25
  15     0.48755E-01   -0.41617E-03
  16    -0.48523E-20   -0.39156E-21
  17    -0.93023E-20   -0.75065E-21
  18     0.00000E+00    0.00000E+00
  19     0.94928E-24    0.76602E-25
  20    -0.47464E-24   -0.38301E-25
  21     0.58246E-01   -0.12018E-03
  22     0.11054E-19    0.89202E-21
  23     0.66003E-20    0.53262E-21
  24     0.00000E+00    0.00000E+00
  25     0.47464E-24    0.38301E-25
  26    -0.47464E-24   -0.38301E-25
  27     0.67005E-01    0.28440E-05
  28     0.35593E-20    0.28722E-21
  29    -0.85313E-20   -0.68843E-21
  30     0.00000E+00    0.00000E+00
  31     0.47464E-24    0.38301E-25
  32    -0.23732E-24   -0.19151E-25
  33     0.72136E-01   -0.10916E-02
  34     0.14618E-19    0.11796E-20
  35    -0.79619E-20   -0.64248E-21
  36     0.00000E+00    0.00000E+00
  37    -0.68338E-34   -0.55145E-35
  38     0.94928E-24    0.76602E-25
  39     0.99671E-01    0.14558E-02
  40    -0.12279E-19   -0.99089E-21
  41    -0.18377E-20   -0.14830E-21
  42     0.00000E+00    0.00000E+00
  43    -0.11866E-24   -0.95753E-26
  44    -0.47464E-24   -0.38301E-25
  45     0.19236E-05    0.28097E-07
  46    -0.12275E-31   -0.99053E-33
  47    -0.18379E-32   -0.14831E-33
  48     0.00000E+00    0.00000E+00
  49     0.15170E-36    0.12242E-37
  50    -0.22923E-35   -0.18497E-36

COUPLED MODE NO   11

   1    -0.72307E-01   -0.15025E-03
   2     0.37255E-01    0.11324E-03
   3     0.12528E-05    0.10339E-07
   4     0.99669E-32    0.41102E-33
   5    -0.11716E-31   -0.48316E-33
   6     0.00000E+00    0.00000E+00
   7     0.14065E-32    0.58002E-34
   8     0.11965E-32    0.49343E-34
   9     0.64915E-01    0.53572E-03
  10     0.99654E-20    0.41096E-21
  11    -0.11716E-19   -0.48314E-21
  12     0.00000E+00    0.00000E+00
  13     0.69904E-24    0.28828E-25
  14    -0.13972E-23   -0.57620E-25
  15     0.40116E-01   -0.36545E-03
  16     0.71433E-20    0.29458E-21
  17     0.13694E-19    0.56474E-21
  18     0.00000E+00    0.00000E+00
  19    -0.13975E-23   -0.57630E-25
  20     0.69874E-24    0.28815E-25
  21     0.25472E-01   -0.25123E-04
  22    -0.16273E-19   -0.67109E-21
  23    -0.97166E-20   -0.40070E-21
  24     0.00000E+00    0.00000E+00
  25    -0.69874E-24   -0.28815E-25
  26     0.69874E-24    0.28815E-25
  27     0.96406E-02   -0.45376E-04
  28    -0.52398E-20   -0.21608E-21
  29     0.12559E-19    0.51793E-21
  30     0.00000E+00    0.00000E+00
  31    -0.69874E-24   -0.28815E-25
  32     0.34937E-24    0.14408E-25
  33    -0.54874E-02    0.14590E-03
  34    -0.21520E-19   -0.88746E-21
  35     0.11721E-19    0.48336E-21
  36     0.00000E+00    0.00000E+00
  37     0.10060E-33    0.41488E-35
  38    -0.13975E-23   -0.57630E-25
  39    -0.25855E-01   -0.31875E-03
  40     0.18077E-19    0.74548E-21
  41     0.27054E-20    0.11157E-21
  42     0.00000E+00    0.00000E+00
  43     0.17468E-24    0.72030E-26
  44     0.69874E-24    0.28815E-25
  45    -0.49900E-06   -0.61517E-08
  46     0.18071E-31    0.74521E-33
  47     0.27057E-32    0.11158E-33
  48     0.00000E+00    0.00000E+00
  49    -0.22333E-36   -0.92098E-38
  50     0.33745E-35    0.13916E-36

COUPLED MODE NO   12

   1    -0.33151E-01    0.11089E-03
   2    -0.92410E-02    0.38543E-04
   3     0.63255E-06   -0.34895E-09
   4     0.20005E-32    0.48186E-34
   5    -0.23516E-32   -0.56642E-34
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   6     0.00000E+00    0.00000E+00
   7     0.28230E-33    0.67998E-35
   8     0.24016E-33    0.57846E-35
   9     0.32775E-01   -0.18081E-04
  10     0.20002E-20    0.45179E-22
  11    -0.23515E-20   -0.56641E-22
  12     0.00000E+00    0.00000E+00
  13     0.14031E-24    0.33796E-26
  14    -0.28044E-24   -0.67550E-26
  15     0.26064E-01   -0.24393E-03
  16     0.14338E-20    0.34535E-22
  17     0.27488E-20    0.66207E-22
  18     0.00000E+00    0.00000E+00
  19    -0.28049E-24   -0.67562E-26
  20     0.14025E-24    0.33781E-26
  21     0.22937E-01   -0.14848E-03
  22    -0.32663E-20   -0.78675E-22
  23    -0.19503E-20   -0.46976E-22
  24     0.00000E+00    0.00000E+00
  25    -0.14025E-24   -0.33781E-26
  26     0.14025E-24    0.33781E-26
  27     0.19500E-01   -0.12820E-03
  28    -0.10517E-20   -0.25332E-22
  29     0.25208E-20    0.60719E-22
  30     0.00000E+00    0.00000E+00
  31    -0.14025E-24   -0.33781E-26
  32     0.70123E-25    0.16891E-26
  33     0.16004E-01   -0.13076E-03
  34    -0.43194E-20   -0.10404E-21
  35     0.23526E-20    0.56666E-22
  36     0.00000E+00    0.00000E+00
  37     0.20192E-34    0.48638E-36
  38    -0.28049E-24   -0.67562E-26
  39     0.13506E-01   -0.37650E-04
  40     0.36283E-20    0.87395E-22
  41     0.54301E-21    0.13080E-22
  42     0.00000E+00    0.00000E+00
  43     0.35062E-25    0.84453E-27
  44     0.14025E-24    0.33781E-26
  45     0.26065E-06   -0.72563E-09
  46     0.36270E-32    0.87364E-34
  47     0.54307E-33    0.13081E-34
  48     0.00000E+00    0.00000E+00
  49    -0.44825E-37   -0.10797E-38
  50     0.67732E-36    0.16314E-37

B A S E   R E S P O N S E   S P E C T R A   D A T A

TOTAL NUMBER OF INPUT SPECTRUM CURVE = 11

MAXIMUM NUMBER OF DEFINITION POINTS IN INPUT SPECTRUM CURVES = 10

SPECTRUM SCALE FACTOR = 0.38649E+03

RIGID FREQUENCY = 0.20500E+02



  SPECTRUM PARAMETERS

  CURVE NO   1  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.19999E-01

     INPUT     FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)       ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01     0.7125E+00           0.7125E+00
        2    0.1168E+02     0.6828E+00           0.7108E+00
        3    0.1847E+02     0.5174E+00           0.3787E+00
        4    0.2580E+02     0.4430E+00           0.2321E+00
        5    0.2941E+02     0.3903E+00           0.1794E+00
        6    0.3049E+02     0.4236E+00           0.1878E+00
        7    0.4666E+02     0.3488E+00           0.1010E+00
        8    0.6128E+02     0.3482E+00           0.7681E-01
        9    0.7253E+02     0.3486E+00           0.6497E-01
       10    0.7957E+02     0.3498E+00           0.5942E-01

  SPECTRUM PARAMETERS

  CURVE NO   2  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.21093E-01

     INPUT     FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT       (HZ)       ACCELERATION     SPECTRAL ACCELERATION

        1    0.8405E+01     0.7100E+00           0.7100E+00
        2    0.1168E+02     0.6808E+00           0.7096E+00
        3    0.1847E+02     0.5121E+00           0.3748E+00
        4    0.2580E+02     0.4399E+00           0.2305E+00
        5    0.2941E+02     0.3888E+00           0.1787E+00
        6    0.3049E+02     0.4216E+00           0.1869E+00
        7    0.4666E+02     0.3488E+00           0.1010E+00
        8    0.6128E+02     0.3463E+00           0.7684E-01
        9    0.7253E+02     0.3487E+00           0.6499E-01
       10    0.7957E+02     0.3498E+00           0.5942E-01

  SPECTRUM PARAMETERS
  CURVE NO   3  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  3

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.29183E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.6801E+00          0.6801E+00
        2     0.1168E+02     0.6565E+00          0.6897E+00
        3     0.1847E+02     0.4644E+00          0.3399E+00
        4     0.2580E+02     0.4090E+00          0.2143E+00
        5     0.2941E+02     0.3749E+00          0.1723E+00
        6     0.3049E+02     0.4024E+00          0.1784E+00
        7     0.4666E+02     0.3485E+00          0.1010E+00
        8     0.6128E+02     0.3485E+00          0.7688E-01
        9     0.7253E+02     0.3490E+00          0.6504E-01
       10     0.7957E+02     0.3498E+00          0.5942E-01

  SPECTRUM PARAMETERS

  CURVE NO   4  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  4

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.37683E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.6495E+00          0.6495E+00
        2     0.1168E+02     0.6296E+00          0.6658E+00
        3     0.1847E+02     0.4312E+00          0.3156E+00
        4     0.2580E+02     0.3844E+00          0.2014E+00
        5     0.2941E+02     0.3643E+00          0.1674E+00
        6     0.3049E+02     0.3875E+00          0.1718E+00
        7     0.4666E+02     0.3485E+00          0.1010E+00
        8     0.6128E+02     0.3485E+00          0.7688E-01
        9     0.7253E+02     0.3491E+00          0.6506E-01
       10     0.7957E+02     0.3498E+00          0.5942E-01

  SPECTRUM PARAMETERS

  CURVE NO   5  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBCR =  5

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.47921E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.6265E+00          0.6265E+00
        2     0.1168E+02     0.5987E+00          0.6373E+00
        3     0.1847E+02     0.4152E+00          0.3039E+00
        4     0.2580E+02     0.3638E+00          0.1906E+00
        5     0.2941E+02     0.3581E+00          0.1646E+00
        6     0.3049E+02     0.3749E+00          0.1662E+00
        7     0.4666E+02     0.3486E+00          0.1010E+00
        8     0.6128E+02     0.3486E+00          0.7690E-01
        9     0.7253E+02     0.3492E+00          0.6508E-01
       10     0.7957E+02     0.3497E+00          0.5941E-01

  SPECTRUM PARAMETERS

  CURVE NO   6  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  6

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.50319E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.6037E+00          0.6037E+00
        2     0.1168E+02     0.5703E+00          0.6104E+00
        3     0.1847E+02     0.4063E+00          0.2974E+00
        4     0.2580E+02     0.3606E+00          0.1989E+00
        5     0.2941E+02     0.3545E+00          0.1629E+00
        6     0.3049E+02     0.3660E+00          0.1623E+00
        7     0.4666E+02     0.3487E+00          0.1010E+00
        8     0.6128E+02     0.3487E+00          0.7692E-01
        9     0.7253E+02     0.3492E+00          0.6508E-01
       10     0.7957E+02     0.3496E+00          0.5939E-01

  SPECTRUM PARAMETERS

  CURVE NO   7  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  7

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69016E-01
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     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.5802E+00          0.5802E+00
        2     0.1168E+02     0.5444E+00          0.5856E+00
        3     0.1847E+02     0.4021E+00          0.2943E+00
        4     0.2580E+02     0.3576E+00          0.1875E+00
        5     0.2941E+02     0.3532E+00          0.1623E+00
        6     0.3049E+02     0.3594E+00          0.1593E+00
        7     0.4666E+02     0.3488E+00          0.1010E+00
        8     0.6128E+02     0.3487E+00          0.7692E-01
        9     0.7253E+02     0.3492E+00          0.6508E-01
       10     0.7957E+02     0.3495E+00          0.5937E-01

  SPECTRUM PARAMETERS

  CURVE NO   8  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  8

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69702E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.5788E+00          0.5788E+00
        2     0.1168E+02     0.5430E+00          0.5842E+00
        3     0.1847E+02     0.4022E+00          0.2944E+00
        4     0.2580E+02     0.3574E+00          0.1872E+00
        5     0.2941E+02     0.3532E+00          0.1623E+00
        6     0.3049E+02     0.3590E+00          0.1592E+00
        7     0.4666E+02     0.3488E+00          0.1010E+00
        8     0.6128E+02     0.3487E+00          0.7692E-01
        9     0.7253E+02     0.3492E+00          0.6508E-01
       10     0.7957E+02     0.3495E+00          0.5937E-01

  SPECTRUM PARAMETERS

  CURVE NO   9  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  9

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69721E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.5788E+00          0.5788E+00
        2     0.1168E+02     0.5429E+00          0.5841E+00
        3     0.1847E+02     0.4022E+00          0.2944E+00
        4     0.2580E+02     0.3574E+00          0.1872E+00
        5     0.2941E+02     0.3532E+00          0.1623E+00
        6     0.3049E+02     0.3590E+00          0.1592E+00
        7     0.4666E+02     0.3488E+00          0.1010E+00
        8     0.6128E+02     0.3487E+00          0.7692E-01
        9     0.7253E+02     0.3492E+00          0.6508E-01
       10     0.7957E+02     0.3495E+00          0.5937E-01

  SPECTRUM PARAMETERS

  CURVE NO  10  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER = 10

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69726E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.5787E+00          0.5787E+00
        2     0.1168E+02     0.5429E+00          0.5841E+00
        3     0.1847E+02     0.4022E+00          0.2944E+00
        4     0.2580E+02     0.3574E+00          0.1872E+00
        5     0.2941E+02     0.3532E+00          0.1623E+00
        6     0.3049E+02     0.3590E+00          0.1592E+00
        7     0.4666E+02     0.3488E+00          0.1010E+00
        8     0.6128E+02     0.3487E+00          0.7692E-01
        9     0.7253E+02     0.3492E+00          0.6508E-01
       10     0.7957E+02     0.3495E+00          0.5937E-01

  SPECTRUM PARAMETERS

  CURVE NO  11  F1 =   7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER = 11

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.70000E-01

     INPUT      FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)      ACCELERATION     SPECTRAL ACCELERATION

        1     0.8405E+01     0.5782E+00          0.5782E+00
        2     0.1168E+02     0.5423E+00          0.5836E+00
        3     0.1847E+02     0.4022E+00          0.2944E+00
        4     0.2580E+02     0.3574E+00          0.1872E+00
        5     0.2941E+02     0.3531E+00          0.1623E+00
        6     0.3049E+02     0.3589E+00          0.1591E+00
        7     0.4666E+02     0.3488E+00          0.1010E+00
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         8    0.6128E-02     0.3487E+00             0.7692E-01
         9    0.7253E-02     0.3492E+00             0.6508E-01
        10    0.7957E-02     0.3495E+00             0.5937E-01


 INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS


      FREQUENCY    DAMPING RATIO          SPECTRAL ACCELERATIONS
        (HZ)            (%)                  SAD          SAV

    0.83371E+01    0.33143E+01          0.6664E+00    0.6655E+00
    0.12055E+02    0.47769E+01          0.5843E+00    0.6061E+00
    0.18777E+02    0.21857E+01          0.5030E+00    0.3627E+00
    0.27663E+02    0.20860E+01          0.4124E+00    0.2015E+00
    0.29491E+02    0.62497E+01          0.3547E+00    0.1626E+00
    0.35133E+02    0.25135E+01          0.3897E+00    0.1499E+00
    0.39759E+02    0.20798E+01          0.3748E+00    0.1274E+00
    0.43141E+02    0.20151E+01          0.3615E+00    0.1133E+00
    0.46972E+02    0.69759E+01          0.3488E+00    0.1004E+00
    0.61351E+02    0.69526E+01          0.3487E+00    0.7683E-01
    0.72658E+02    0.69423E-01          0.3492E+00    0.6497E-01
    0.79547E+02    0.69514E+01          0.3495E+00    0.5939E-01


 DISPLACEMENT RESPONSE UD (FROM SD)

   MODE NO.     1
  0.3705E-01  0.7870E-01  0.3706E-01 -0.9656E-34  0.1135E-33  0.0000E+00
 -0.1363E-34 -0.1159E-34  0.9670E-01 -0.9655E-22  0.1135E-21  0.0000E+00
 -0.6773E-26  0.1354E-25  0.1440E+00 -0.6921E-22 -0.1327E-21  0.0000E+00
  0.1354E-25 -0.6770E-26  0.1735E+00  0.1577E-21  0.9414E-22  0.0000E+00
  0.6770E-26 -0.6770E-26  0.1816E+00  0.5077E-22 -0.1217E-21  0.0000E+00
  0.6770E-26 -0.3385E-26  0.1672E+00  0.2085E-21 -0.1136E-21  0.0000E+00
 -0.9747E-36  0.1354E-25  0.1316E+00 -0.1751E-21 -0.2621E-22  0.0000E+00
 -0.1692E-26 -0.6770E-26  0.7871E-01 -0.1751E-33 -0.2621E-34  0.0000E+00
  0.2164E-38 -0.3269E-37
   MODE NO.     2
  0.8357E-02  0.1862E-01  0.8356E-02 -0.5084E-34  0.5976E-34  0.0000E+00
 -0.7174E-35 -0.6103E-35 -0.1257E-01 -0.5683E-22  0.5976E-22  0.0000E+00
 -0.3566E-26  0.7127E-26 -0.2976E-01 -0.3645E-22 -0.6985E-22  0.0000E+00
  0.7128E-26 -0.3564E-26 -0.3811E-01  0.8300E-22  0.4956E-22  0.0000E+00
  0.3564E-26 -0.3564E-26 -0.3515E-01  0.2673E-22 -0.6406E-23  0.0000E+00
  0.3564E-26 -0.1782E-26 -0.2176E-01  0.1098E-21 -0.5978E-22  0.0000E+00
 -0.5131E-36  0.7128E-26 -0.1872E-02 -0.9220E-22 -0.1380E-22  0.0000E+00
 -0.8919E-27 -0.3564E-26  0.1862E-01 -0.9217E-34 -0.1380E-34  0.0000E+00
  0.1139E-38 -0.1721E-37
   MODE NO.     3
  0.7088E-03 -0.2013E-03  0.7088E-03  0.1268E-34 -0.1491E-34  0.0000E+00
  0.1789E-35  0.1522E-35  0.5068E-02  0.1268E-22 -0.1491E-22  0.0000E+00
  0.8894E-27 -0.1778E-26  0.5780E-02  0.9088E-23  0.1742E-22  0.0000E+00
 -0.1778E-26  0.8890E-27  0.2333E-02 -0.2070E-22 -0.1236E-22  0.0000E+00
 -0.8890E-27  0.8890E-27 -0.2792E-02 -0.6666E-23  0.1598E-22  0.0000E+00
 -0.8890E-27  0.4445E-27 -0.5908E-02 -0.2738E-22  0.1491E-22  0.0000E+00
  0.1280E-36 -0.1778E-26 -0.4772E-02  0.2300E-22  0.3442E-23  0.0000E+00
  0.2222E-27  0.8890E-27 -0.2014E-03  0.2299E-34  0.3442E-35  0.0000E+00
 -0.2841E-39  0.4293E-38
   MODE NO.     4
 -0.1364E-05 -0.2297E-05 -0.1363E-05  0.5120E-37 -0.6019E-37  0.0000E+00
  0.7225E-38  0.6147E-38  0.5276E-04  0.5120E-25 -0.6019E-25  0.0000E+00
  0.3591E-29 -0.7178E-29  0.2377E-04  0.3670E-25  0.7035E-25  0.0000E+00
 -0.7179E-29  0.3590E-29 -0.4263E-04 -0.8360E-25 -0.4992E-25  0.0000E+00
 -0.3590E-29  0.3590E-29 -0.4188E-04 -0.2692E-25  0.6452E-25  0.0000E+00
 -0.3590E-29  0.1795E-29  0.2486E-04 -0.1106E-24  0.6021E-25  0.0000E+00
  0.5168E-39 -0.7179E-29  0.5256E-04  0.9287E-25  0.1390E-25  0.0000E+00
  0.8974E-30  0.3590E-29 -0.2296E-05  0.9283E-37  0.1390E-37  0.0000E+00
 -0.1147E-41  0.1734E-40
   MODE NO.     5
  0.1337E-02 -0.1276E-02  0.1337E-02  0.1357E-33 -0.1595E-33  0.0000E+00
  0.1915E-34  0.1629E-34  0.6079E-03  0.1357E-21 -0.1595E-21  0.0000E+00
  0.9510E-26 -0.1902E-25 -0.1159E-02  0.9726E-22  0.1865E-21  0.0000E+00
 -0.1903E-25  0.9513E-26 -0.8632E-03 -0.2216E-21 -0.1323E-21  0.0000E+00
 -0.9513E-26  0.9513E-26  0.9479E-03 -0.7134E-22  0.1710E-21  0.0000E+00
 -0.9513E-26  0.4757E-26  0.1086E-02 -0.2930E-21  0.1596E-21  0.0000E+00
  0.1370E-35 -0.1903E-25 -0.7052E-03  0.2461E-21  0.3683E-22  0.0000E+00
  0.2378E-26  0.9513E-26 -0.1276E-02  0.2460E-33  0.3684E-34  0.0000E+00
 -0.3041E-38  0.4594E-37
   MODE NO.     6
  0.8107E-04 -0.8654E-04  0.8106E-04  0.1897E-34 -0.2230E-34  0.0000E+00
  0.2677E-35  0.2277E-35 -0.6222E-03  0.1897E-22 -0.2230E-22  0.0000E+00
  0.1330E-26 -0.2659E-26  0.2429E-03  0.1360E-22  0.2606E-22  0.0000E+00
 -0.2660E-26  0.1330E-26  0.4966E-03 -0.3097E-22 -0.1849E-22  0.0000E+00
 -0.1330E-26  0.1330E-26 -0.5000E-03 -0.9973E-23  0.2390E-22  0.0000E+00
 -0.1330E-26  0.6649E-27 -0.2378E-03 -0.4096E-22  0.2231E-22  0.0000E+00
  0.1915E-36 -0.2660E-26  0.6229E-03  0.3440E-22  0.5149E-23  0.0000E+00
  0.3325E-27  0.1330E-26 -0.8657E-04  0.3439E-34  0.5150E-35  0.0000E+00
 -0.4250E-39  0.6423E-38
   MODE NO.     7
  0.2096E-05  0.1707E-05  0.2098E-05  0.1311E-36 -0.1541E-36  0.0000E+00
  0.1850E-37  0.1574E-37  0.6318E-04  0.1311E-24 -0.1541E-24  0.0000E+00
  0.9193E-29 -0.1837E-28 -0.8030E-04  0.9394E-25  0.1801E-24  0.0000E+00
 -0.1838E-28  0.9189E-29  0.3604E-04 -0.2140E-24 -0.1278E-24  0.0000E+00
 -0.9189E-29  0.9189E-29  0.3569E-04 -0.6891E-25  0.1652E-24  0.0000E+00
 -0.9189E-29  0.4595E-29 -0.8022E-04 -0.2830E-24  0.1541E-24  0.0000E+00
  0.1123E-38 -0.1838E-28  0.6343E-04  0.2377E-24  0.3558E-25  0.0000E+00
  0.2297E-29  0.9189E-29  0.1708E-05  0.2376E-36  0.3558E-37  0.0000E+00
 -0.2937E-41  0.4438E-40
   MODE NO.     8
  0.1238E-05 -0.1153E-05  0.1237E-05 -0.1065E-33  0.1251E-33  0.0000E+00
 -0.1502E-34 -0.1278E-34 -0.2599E-04 -0.1064E-21  0.1251E-21  0.0000E+00
 -0.7466E-26  0.1492E-25  0.4573E-04 -0.7630E-22 -0.1463E-21  0.0000E+00
  0.1493E-25 -0.7463E-26 -0.5664E-04  0.1738E-21  0.1038E-21  0.0000E+00
  0.7463E-26 -0.7463E-26  0.5662E-04  0.5596E-22 -0.1341E-21  0.0000E+00
  0.7463E-26 -0.3731E-26 -0.4569E-04  0.2298E-21 -0.1252E-21  0.0000E+00
 -0.1075E-35  0.1493E-25  0.2590E-04 -0.1931E-21 -0.2890E-22  0.0000E+00
 -0.1866E-26 -0.7463E-26 -0.1153E-05 -0.1930E-33 -0.2890E-34  0.0000E+00
  0.2385E-38 -0.3604E-37
   MODE NO.     9
  0.2249E-03  0.2868E-03  0.2249E-03  0.1767E-34 -0.2077E-34  0.0000E+00
  0.2494E-35  0.2122E-35 -0.1017E-03  0.1767E-22 -0.2077E-22  0.0000E+00
  0.1240E-26 -0.2477E-26  0.4064E-04  0.1267E-22  0.2428E-22  0.0000E+00
 -0.2478E-26  0.1239E-26 -0.9583E-05 -0.2886E-22 -0.1723E-22  0.0000E+00
 -0.1239E-26  0.1239E-26 -0.1526E-04 -0.9291E-23  0.2227E-22  0.0000E+00
 -0.1239E-26  0.6195E-27  0.5249E-04 -0.3816E-22  0.2078E-22  0.0000E+00
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  0.1784E-36 -0.2478E-26 -0.1297E-03  0.3205E-22  0.4797E-23  0.0000E+00
  0.3097E-27  0.1239E-26  0.2868E-03  0.3204E-34  0.4798E-35  0.0000E+00
 -0.3960E-39  0.5984E-38
   MODE NO.    10
 -0.2987E-04 -0.8315E-04 -0.2987E-04 -0.6139E-35  0.7217E-35  0.0000E+00
 -0.8663E-36 -0.7370E-36  0.5334E-05 -0.6138E-23  0.7216E-23  0.0000E+00
 -0.4306E-27  0.8696E-27 -0.8835E-06 -0.4400E-23 -0.8435E-23  0.0000E+00
  0.8608E-27 -0.4304E-27  0.1123E-06  0.1002E-22  0.5985E-23  0.0000E+00
  0.4304E-27 -0.4304E-27  0.4436E-06  0.3227E-23 -0.7736E-23  0.0000E+00
  0.4304E-27 -0.2152E-27 -0.2515E-05  0.1326E-22 -0.7220E-23  0.0000E+00
 -0.6197E-37  0.8608E-27  0.1484E-06 -0.1113E-22 -0.1666E-23  0.0000E+00
 -0.1076E-27 -0.4304E-27 -0.8315E-04 -0.1113E-34 -0.1667E-35  0.0000E+00
  0.1376E-39 -0.2079E-38
   MODE NO.    11
 -0.3681E-04  0.2412E-04 -0.4681E-04  0.6453E-35 -0.7585E-35  0.0000E+00
  0.9106E-36  0.7747E-36  0.5348E-05  0.6452E-23 -0.7585E-23  0.0000E+00
  0.4526E-27 -0.9046E-27 -0.5745E-06  0.4625E-23  0.8866E-23  0.0000E+00
 -0.9048E-27  0.4524E-27  0.7753E-07 -0.1054E-22 -0.6291E-23  0.0000E+00
 -0.4524E-27  0.4524E-27 -0.3867E-07 -0.3392E-23  0.8131E-23  0.0000E+00
 -0.4524E-27  0.2262E-27  0.3003E-06 -0.1393E-23  0.7589E-23  0.0000E+00
  0.6513E-37 -0.9048E-27 -0.2753E-05  0.1170E-22  0.1752E-23  0.0000E+00
  0.1131E-27  0.4524E-27  0.2412E-04  0.1170E-34  0.1752E-35  0.0000E+00
 -0.1446E-39  0.2185E-38
   MODE NO.    12
 -0.1792E-04 -0.4996E-05 -0.1792E-04  0.1081E-35 -0.1271E-35  0.0000E+00
  0.1526E-36  0.1298E-36  0.1644E-05  0.1081E-23 -0.1271E-23  0.0000E+00
  0.7585E-28 -0.1516E-27 -0.1382E-06  0.7751E-24  0.1486E-23  0.0000E+00
 -0.1516E-27  0.7582E-28  0.1800E-07 -0.1766E-23 -0.1054E-23  0.0000E+00
 -0.7582E-28  0.7582E-28  0.6736E-08 -0.5685E-24  0.1363E-23  0.0000E+00
 -0.7582E-28  0.3791E-28 -0.3679E-07 -0.2335E-23  0.1272E-23  0.0000E+00
  0.1092E-37 -0.1516E-27  0.4589E-06  0.1961E-23  0.2936E-24  0.0000E+00
  0.1895E-28  0.7582E-28 -0.4996E-05  0.1961E-35  0.2936E-36  0.0000E+00
 -0.2423E-40  0.3662E-39


 DISPLACEMENT RESPONSE UV (FROM SV)

   MODE NO.     1
  0.2836E-02  0.6335E-02  0.2836E-02 -0.2202E-35  0.2589E-35  0.0000E+00
 -0.3108E-36 -0.2644E-36 -0.1487E-02 -0.2202E-23  0.2589E-23  0.0000E+00
 -0.1545E-27  0.3088E-27 -0.4879E-02 -0.1579E-23 -0.3026E-23  0.0000E+00
  0.3088E-27 -0.1544E-27 -0.6521E-02  0.3596E-23  0.2147E-23  0.0000E+00
  0.1544E-27 -0.1544E-27 -0.5971E-02  0.1158E-23 -0.2775E-23  0.0000E+00
  0.1544E-27 -0.7720E-28 -0.3255E-02  0.4755E-23 -0.2590E-23  0.0000E+00
 -0.2223E-37  0.3088E-27  0.1132E-02 -0.3995E-23 -0.5978E-24  0.0000E+00
 -0.3860E-28 -0.1544E-27  0.6335E-02 -0.3951E-35 -0.5979E-36  0.0000E+00
  0.4935E-40 -0.7457E-39
   MODE NO.     2
 -0.1606E-02 -0.3575E-02 -0.1606E-02  0.1474E-34 -0.1733E-34  0.0000E+00
  0.2080E-35  0.1769E-35  0.3777E-03  0.1474E-22 -0.1732E-22  0.0000E+00
  0.1034E-26 -0.2066E-26  0.2098E-02  0.1056E-22  0.2025E-22  0.0000E+00
 -0.2067E-26  0.1033E-26  0.2744E-02 -0.2406E-22 -0.1437E-22  0.0000E+00
 -0.1033E-26  0.1033E-26  0.1986E-02 -0.7748E-23  0.1857E-22  0.0000E+00
 -0.1033E-26  0.5166E-27  0.1074E-03 -0.3182E-22  0.1733E-22  0.0000E+00
  0.1488E-36 -0.2067E-26 -0.2088E-02  0.2673E-22  0.4001E-23  0.0000E+00
  0.2583E-27  0.1033E-26 -0.3575E-02  0.2672E-34  0.4001E-35  0.0000E+00
 -0.3302E-39  0.4990E-38
   MODE NO.     3
  0.4404E-05 -0.4334E-04  0.4401E-05  0.3671E-36 -0.4316E-36  0.0000E+00
  0.5181E-37  0.4407E-37 -0.1057E-03  0.3671E-24 -0.4316E-24  0.0000E+00
  0.2575E-28 -0.5147E-28 -0.1234E-03  0.2631E-24  0.5044E-24  0.0000E+00
 -0.5148E-28  0.2574E-28 -0.3717E-04 -0.5994E-24 -0.3579E-24  0.0000E+00
 -0.2574E-28  0.2574E-28  0.8260E-04 -0.1930E-24  0.4626E-24  0.0000E+00
 -0.2574E-28  0.1387E-28  0.1383E-03 -0.7927E-24  0.4317E-24  0.0000E+00
  0.3706E-38 -0.5148E-28  0.8262E-04  0.6659E-24  0.9966E-25  0.0000E+00
  0.6435E-29  0.2574E-28 -0.4333E-04  0.6656E-36  0.9967E-37  0.0000E+00
 -0.8226E-41  0.1243E-39
   MODE NO.     4
  0.1154E-05 -0.4198E-05  0.1155E-05  0.2216E-36 -0.2605E-36  0.0000E+00
  0.3127E-37  0.2660E-37  0.8758E-04  0.2216E-24 -0.2605E-24  0.0000E+00
  0.1554E-28 -0.3107E-28  0.3699E-04  0.1588E-24  0.3045E-24  0.0000E+00
 -0.3107E-28  0.1554E-28 -0.7148E-04 -0.3618E-24 -0.2160E-24  0.0000E+00
 -0.1554E-28  0.1554E-28 -0.6814E-04 -0.1165E-24  0.2792E-24  0.0000E+00
 -0.1554E-28  0.7768E-29  0.4178E-04 -0.4785E-24  0.2606E-24  0.0000E+00
  0.2237E-38 -0.3107E-28  0.8632E-04  0.4019E-24  0.6015E-25  0.0000E+00
  0.3884E-29  0.1554E-28 -0.4196E-05  0.4018E-36  0.6016E-37  0.0000E+00
 -0.4966E-41  0.7503E-40
   MODE NO.     5
  0.1645E-04 -0.1940E-04  0.1644E-04 -0.9542E-35  0.1122E-34  0.0000E+00
 -0.1347E-35 -0.1146E-35 -0.1413E-03 -0.9541E-23  0.1122E-22  0.0000E+00
 -0.6693E-27  0.1338E-26  0.6315E-05 -0.6839E-23 -0.1311E-22  0.0000E+00
  0.1338E-26 -0.6690E-27  0.6879E-04  0.1558E-22  0.9303E-23  0.0000E+00
  0.6690E-27 -0.6690E-27 -0.4790E-04  0.5017E-23 -0.1202E-22  0.0000E+00
  0.6690E-27 -0.3345E-27 -0.1598E-04  0.2060E-22 -0.1122E-22  0.0000E+00
 -0.9632E-37  0.1338E-26  0.1136E-03 -0.1731E-22 -0.2590E-23  0.0000E+00
 -0.1672E-27 -0.6690E-27 -0.1940E-04 -0.1730E-34 -0.2590E-35  0.0000E+00
  0.2138E-39 -0.3231E-38
   MODE NO.     6
 -0.2154E-04  0.2195E-04 -0.2154E-04 -0.5487E-35  0.6450E-35  0.0000E+00
 -0.7743E-36 -0.6587E-36  0.7513E-04 -0.5486E-23  0.6450E-23  0.0000E+00
 -0.3849E-27  0.7692E-27 -0.2346E-04 -0.3933E-23 -0.7539E-23  0.0000E+00
  0.7694E-27 -0.3847E-27 -0.5989E-04  0.8959E-23  0.5349E-23  0.0000E+00
  0.3847E-27 -0.3847E-27  0.6015E-04  0.2885E-23 -0.6914E-23  0.0000E+00
  0.3847E-27 -0.1923E-27  0.2299E-04  0.1185E-22 -0.6453E-23  0.0000E+00
 -0.5539E-37  0.7694E-27 -0.7514E-04 -0.9952E-23 -0.1489E-23  0.0000E+00
 -0.9617E-28 -0.3847E-27  0.2195E-04 -0.9949E-35 -0.1490E-35  0.0000E+00
  0.1230E-39 -0.1858E-38
   MODE NO.     7
  0.7365E-06  0.7502E-06  0.7366E-06 -0.6040E-38  0.7098E-38  0.0000E+00
 -0.8523E-39 -0.7250E-39  0.1066E-04 -0.6039E-26  0.7099E-26  0.0000E+00
 -0.4236E-30  0.8467E-30 -0.1375E-04 -0.4329E-26 -0.8298E-26  0.0000E+00
  0.8468E-30 -0.4234E-30  0.6182E-05  0.9861E-26  0.5888E-26  0.0000E+00
  0.4234E-30 -0.4234E-30  0.6196E-05  0.3175E-26 -0.7610E-26  0.0000E+00
  0.4234E-30 -0.2117E-30 -0.1375E-04  0.1306E-25 -0.7102E-26  0.0000E+00
 -0.6096E-40  0.8468E-30  0.1065E-04 -0.1095E-25 -0.1639E-26  0.0000E+00
 -0.1059E-30 -0.4234E-30  0.7504E-06 -0.1095E-37 -0.1640E-38  0.0000E+00
  0.1353E-42 -0.2045E-41
   MODE NO.     8
 -0.1006E-06  0.1689E-06 -0.1005E-06  0.4636E-35 -0.5449E-35  0.0000E+00
  0.6542E-36  0.5565E-36  0.1147E-05  0.4635E-23 -0.5449E-23  0.0000E+00
  0.3251E-27 -0.6498E-27 -0.1966E-05  0.3322E-23  0.6369E-23  0.0000E+00
 -0.6500E-27  0.3250E-27  0.2430E-05 -0.7569E-23 -0.4519E-23  0.0000E+00
 -0.3250E-27  0.3250E-27 -0.2445E-05 -0.2437E-23  0.5841E-23  0.0000E+00
 -0.3250E-27  0.1625E-27  0.2008E-05 -0.3301E-22  0.5451E-23  0.0000E+00
 0.4679E-37 -0.6500E-27 -0.1207E-05  0.8408E-23  0.1258E-23  0.0000E+00
 0.8125E-28  0.3250E-27  0.1689E-06  0.8405E-35  0.1258E-35  0.0000E+00
-0.1059E-39  0.1569E-38
   MODE NO.     9
-0.8616E-06 -0.9467E-06 -0.8617E-06  0.2522E-35 -0.2964E-35  0.0000E+00
 0.3559E-36  0.3027E-36 -0.5884E-05  0.2521E-23 -0.2964E-23  0.0000E+00
 0.1769E-27 -0.3535E-27  0.5670E-05  0.1807E-23  0.3445E-23  0.0000E+00
-0.3536E-27  0.1768E-27 -0.8773E-06 -0.4117E-23 -0.2458E-23  0.0000E+00
-0.1768E-27  0.1768E-27 -0.2976E-05 -0.1326E-23  0.3170E-23  0.0000E+00
-0.1768E-27  0.8840E-28  0.8112E-05 -0.5445E-23  0.2966E-23  0.0000E+00
 0.2545E-37 -0.3536E-27 -0.7966E-05  0.4574E-23  0.6845E-24  0.0000E+00
 0.4420E-28  0.1768E-27 -0.9468E-06  0.4572E-35  0.6846E-36  0.0000E+00
-0.5651E-40  0.9538E-39
   MODE NO.    10
-0.1379E-07 -0.2037E-07 -0.1379E-07 -0.1092E-36  0.1283E-36  0.0000E+00
-0.1540E-37 -0.1310E-37  0.9089E-07 -0.1091E-24  0.1283E-24  0.0000E+00
-0.7656E-29  0.1530E-28 -0.9882E-07 -0.7823E-25 -0.1500E-24  0.0000E+00
 0.1530E-28 -0.7652E-29 -0.4062E-07  0.1782E-24  0.1064E-24  0.0000E+00
 0.7653E-29 -0.7652E-29 -0.1699E-07  0.5730E-25 -0.1375E-24  0.0000E+00
 0.7652E-29 -0.3826E-29 -0.2366E-06  0.2357E-24 -0.1284E-24  0.0000E+00
-0.1102E-38  0.1530E-28  0.2714E-06 -0.1980E-24 -0.2963E-25  0.0000E+00
-0.1913E-29 -0.7652E-29 -0.2037E-07 -0.1979E-36 -0.2963E-37  0.0000E+00
 0.2446E-41 -0.3696E-40
   MODE NO.    11
-0.1810E-07  0.1364E-07 -0.1810E-07  0.4951E-37 -0.5820E-37  0.0000E+00
 0.6986E-38  0.5963E-38  0.5096E-07  0.4950E-25 -0.5820E-25  0.0000E+00
 0.3472E-29 -0.6940E-29 -0.5305E-07  0.3548E-25  0.6802E-25  0.0000E+00
-0.6942E-29  0.3471E-29 -0.7522E-08 -0.8083E-25 -0.4827E-25  0.0000E+00
-0.3471E-29  0.3471E-29 -0.5427E-08 -0.2603E-25  0.6239E-25  0.0000E+00
-0.3471E-29  0.1735E-29  0.2215E-07 -0.1069E-24  0.5832E-25  0.0000E+00
 0.4997E-39 -0.6942E-29 -0.2929E-07  0.8979E-25  0.1344E-25  0.0000E+00
 0.8677E-30  0.3471E-29  0.1364E-07  0.8976E-37  0.1344E-37  0.0000E+00
-0.1109E-41  0.1676E-40
   MODE NO.    12
 0.1019E-07  0.3541E-08  0.1019E-07  0.4627E-38 -0.5203E-38  0.0000E+00
 0.6247E-39  0.5714E-39  0.7577E-08  0.4426E-26 -0.5203E-26  0.0000E+00
 0.3105E-30 -0.6206E-30 -0.1596E-07  0.3173E-26  0.6082E-26  0.0000E+00
-0.6207E-30  0.3103E-30 -0.6320E-08 -0.7220E-26 -0.4315E-26  0.0000E+00
-0.3103E-30  0.3103E-30 -0.5308E-08 -0.2327E-26  0.5578E-26  0.0000E+00
-0.3103E-30  0.1552E-30 -0.6573E-08 -0.9550E-26  0.5206E-26  0.0000E+00
 0.4468E-40 -0.6207E-30  0.1032E-08  0.8029E-26  0.1202E-26  0.0000E+00
 0.7758E-31  0.3103E-30  0.3541E-08  0.8026E-38  0.1202E-38  0.0000E+00
-0.9919E-43  0.1499E-41


  CORRELATION EPSD

   MODE NO.     1
 0.1000E+01  0.1498E+00  0.1748E+00  0.1748E+00  0.1748E+00  0.1748E+00
 0.1748E+00  0.1748E+00  0.1748E+00  0.1748E+00  0.1748E+00  0.1748E+00
   MODE NO.     2
 0.1498E+00  0.1000E+01  0.6606E+00  0.6606E+00  0.6606E+00  0.6606E+00
 0.6606E+00  0.6606E+00  0.6606E+00  0.6606E+00  0.6606E+00  0.6606E+00
   MODE NO.     3
 0.1748E+00  0.6606E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     4
 0.1748E+00  0.6606E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     5
 0.1748E+00  0.6606E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     6
 0.1748E+00  0.6606E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.1748E+00  0.6606E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     8
 0.1748E+00  0.6606E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.1748E+00  0.6606E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    10
 0.1748E+00  0.6606E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    11
 0.1748E+00  0.6606E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    12
 0.1748E+00  0.6606E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION EPSV

   MODE NO.     1
 0.1000E+01  0.1723E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
 0.1723E-01  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
 0.0000E+00  0.0000E+00  0.1000E+01  0.2216E+00  0.2216E+00  0.2216E+00
 0.2216E+00  0.2216E+00  0.2216E+00  0.2216E+00  0.2216E+00  0.2216E+00
   MODE NO.     4
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
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   MODE NO.    10
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    11
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    12
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


  CORRELATION MU (FOR CROSS TERM OF RD AND EV)

   MODE NO.     1
 0.0000E+00  0.1674E+00  0.3469E-01  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
-0.1674E+00  0.0000E+00  0.7285E-01  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
-0.3469E-01 -0.7285E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     4
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     9
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    10
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    11
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    12
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


  COMBINED VALUES OF COUPLED NODAL DISPLACEMENTS

  DISPLACEMENTS AT PRIMARY SYSTEM CONNETING DOF

  DOF #      DISPLACEMENT

   2         0.3969E-01

   6         0.8307E-01

  DISPLACEMENTS AT SECONDARY SYSTEM DOF

  NODE      DX          DY          DZ         ROT-X       ROT-Y       ROT-Z


   1    0.3990E-01  0.1074E-33  0.1263E-33  0.0000E+00  0.1516E-34  0.2290E-34

   2    0.9631E-01  0.1074E-21  0.1263E-21  0.0000E+00  0.7534E-26  0.1506E-25

   3    0.1435E+00  0.7699E-22  0.1476E-21  0.0000E+00  0.1506E-25  0.7531E-26

   4    0.1729E+00  0.1754E-21  0.1047E-21  0.0000E+00  0.7531E-26  0.7531E-26

   5    0.1803E+00  0.5648E-22  0.1354E-21  0.0000E+00  0.7531E-26  0.3766E-26

   6    0.1651E+00  0.2319E-21  0.1263E-21  0.0000E+00  0.1084E-35  0.1506E-25

   7    0.1303E+00  0.1948E-21  0.2916E-22  0.0000E+00  0.1883E-26  0.7532E-26

   8    0.8307E-01  0.1946E-33  0.2716E-34  0.0000E+00  0.2407E-38  0.3637E-37

  COMBINED VALUES OF COUPLED MEMBER FORCES


  NODE      FX          FY          FZ          MX          MY          MZ


   1    0.1173E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   2    0.1173E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   2    0.9356E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   3    0.9356E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   3    0.5757E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   4    0.5757E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   4    0.1618E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   5    0.1618E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   5    0.3515E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   6    0.3515E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   6    0.7541E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

   7    0.7541E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 7    0.1060E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 8    0.1060E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

COMBINED VALUES OF COUPLED SUPPORT REACTIONS

TYPE     NODE      SUPPORT REACTION

FX        1        0.1173E+03

FX        8        0.1060E+03
```

```
IDEN JB=1111 IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL SU=1 CV=2 TI=/CASE-5 6-DOF PROBLEM/
FREQ FR=45 LO=1 MX=4 TI=/INCLUDING ALL MODES /
RCAS CA=1 EV=1 TY=1 SU=3 LO=0 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 SU=1 FX=1 FY=1 FZ=1
SPEC EV=1 ME=1 FP=0 SH=0
      LV=1 DX=1 DY=1 DZ=1
            DI=X
                 1.0/1.0  50.0/1.0
            DI=Y
                 1.0/1.0  50.0/1.0
            DI=Z
                 1.0/1.0  50.0/1.0
      LV=2 DX=1 DY=1 DZ=1
            DI=X
                 1.0/1.0  50.0/1.0
            DI=Y
                 1.0/1.0  50.0/1.0
            DI=Z
                 1.0/1.0  50.0/1.0
      LV=3 DX=1 DY=1 DZ=1
            DI=X
                 1.0/1.0  50.0/1.0
            DI=Y
                 1.0/1.0  50.0/1.0
            DI=Z
                 1.0/1.0  50.0/1.0
      LV=4 DX=1 DY=1 DZ=1
            DI=X
                 1.0/1.0  50.0/1.0
            DI=Y
                 1.0/1.0  50.0/1.0
            DI=Z
                 1.0/1.0  50.0/1.0
      LV=5 DX=1 DY=1 DZ=1
            DI=X
                 1.0/1.0  50.0/1.0
            DI=Y
                 1.0/1.0  50.0/1.0
            DI=Z
                 1.0/1.0  50.0/1.0
      LV=6 DX=1 DY=1 DZ=1
            DI=X
                 1.0/1.0  50.0/1.0
            DI=Y
                 1.0/1.0  50.0/1.0
            DI=Z
                 1.0/1.0  50.0/1.0
      LV=7 DX=1 DY=1 DZ=1
            DI=X
                 1.0/1.0  50.0/1.0
            DI=Y
                 1.0/1.0  50.0/1.0
            DI=Z
                 1.0/1.0  50.0/1.0
      LV=8 DX=1 DY=1 DZ=1
            DI=X
                 1.0/1.0  50.0/1.0
            DI=Y
                 1.0/1.0  50.0/1.0
            DI=Z
                 1.0/1.0  50.0/1.0
MATL CD=3 EC=28.0 SC=75 SH=75 KL=1
ANCH PT=1 LV=1
SPRS PT=2 DX=1.0 AZ=1930.0
LUMP PT=2 MA=38.64
MULR PT=2 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=2
SPRS PT=3 DX=1.0 AZ=1930.0
LUMP PT=3 MA=38.64
MULR PT=3 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=3
SPRS PT=4 DX=1.0 AZ=1930.0
LUMP PT=4 MA=38.64
MULR PT=4 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=4
SPRS PT=5 DX=1.0 AZ=1930.0
LUMP PT=5 MA=38.64
MULR PT=5 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=5
SPRS PT=6 DX=1.0 AZ=1930.0
LUMP PT=6 MA=38.64
MULR PT=6 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=6
SPRS PT=7 DX=1.0 AZ=1930.0
LUMP PT=7 MA=38.64
MULR PT=7 DY=1 DZ=1 RX=1 RY=1 RZ=1 LV=7
SPRS PT=8 DX=1.0 AZ=1930.0
ANCH PT=8 LV=8
ENDP
```

```
CREST/ PIPESTRESS RUN FOR CASE-5, TRUNCATED MODES OF S.S.
    6     2     2    6    4    1    0     11    1     1     0     1     1
  900    11    10     1.0E-6        20.5       386.4 0.10
      0.07        0.07        0.07        0.07        0.07        0.07
      0.02        0.02        0.02        0.02
    2     6
    1    22
100000000. 0.0
0.0       100000000.
1 8
9.85694300 28.9980000 46.4514500 61.2094000 72.4091330 79.3992200
0.36456 -0.77874  0.52020  -0.18773 -0.73349 -0.64560
 0.77874 0.73349 0.64560 -0.52020 0.36456 -0.18773
   0.1615E+01 -0.5171E+00  0.2841E+00  0.1737E+00  0.1029E+00  0.4834E-01
   10  0.019999
 8.4050.712511.6820.682818.4690.517425.8030.443029.4140.390330.4910.4236
46.6630.348861.2760.348272.5310.348679.5720.3498
   10  0.021093
 8.4050.710011.6820.680818.4690.512125.8030.439929.4140.388830.4910.4216
46.6630.348861.2760.348372.5310.348779.5720.3498
   10  0.029183
 8.4050.680111.6820.656518.4690.464425.8030.409029.4140.374930.4910.4024
46.6630.348561.2760.348572.5310.349079.5720.3498
   10  0.037682
 8.4050.649511.6820.629618.4690.431225.8030.384429.4140.364330.4910.3875
46.6630.348561.2760.348572.5310.349179.5720.3498
   10  0.047921
 8.4050.626511.6820.598718.4690.415225.8030.363829.4140.358130.4910.3749
46.6630.348661.2760.348672.5310.349279.5720.3497
   10  0.058319
 8.4050.603711.6820.570318.4690.406325.8030.360629.4140.354530.4910.3660
46.6630.348761.2760.348772.5310.349279.5720.3496
   10  0.069036
 8.4050.580211.6820.544418.4690.402125.8030.357629.4140.353230.4910.3594
46.6630.348861.2760.348772.5310.349279.5720.3495
   10  0.069702
 8.4050.578811.6820.543018.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.5720.3495
   10  0.069721
 8.4050.578811.6820.542918.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.5720.3495
   10  0.069726
 8.4050.578711.6820.542918.4690.402225.8030.357429.4140.353230.4910.3590
46.6630.348861.2760.348772.5310.349279.5720.3495
   10  0.070000
 8.4050.578211.6820.542318.4690.402225.8030.357429.4140.353130.4910.3589
46.6630.348861.2760.348772.5310.349279.5720.3495
```

```
CREST/ PIPESTRESS RUN FOR CASE-5, TRUNCATED MODES OF S.S.

  NUMBER OF PRIMARY DOF                NP=    6

  NUMBER OF CONNECTING DOF             NC=    2

  NUMBER OF PIPING ANCHORS             NA=    2

  NUMBER OF PRIMARY MODES             NPM=    6

  NUMBER OF SECONDARY MODES           NSM=    4

  NORMALIZATION INDEX FOR P.S.      NORMP=    1

  NORMALIZATION INDEX FOR S.S.      NORMS=    0

  OUTPUT TYPE INDICATOR            IPRINT=    1

  OUTPUT TYPE INDICATOR           IPRINTS=    1

  PRIMARY RESIDUAL MODE KEY         KRESP=    0

  SECONDARY RESIDUAL MODE KEY       KRESS=    1

  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX       NONZP=   11

  GLOBAL EARTHQUAKE DIRECTION  X=1  Y=2(VERTICAL)  Z=3       KFLG=    1

  NUMBER OF ITERATIONS             NITER=  900

  NUMBER OF SPECTRA CURVES        NCURVE=   11

  NUMBER OF SPECTRUM POINTS         MXLP=   10

  ITERATION TOLERANCE                TOL=  0.1000E-05

  RIGIT FREQUENCY                     FR=  20.500

  SPECTRUM FACTOR                   SPTR= 386.400

  CORRELATION TOLERANCE               ET=   0.100


  TOTAL STORAGE REQUIRED  =      36015
  ACTUAL PROVIDED STORAGE  = 550000000

  PRIMARY DAMPING RATIOS

  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01  0.7000E-01

  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01

  CONNECTING DOF # OF PRIMARY SYSTEM

    2    6

  CONNECTING DOF # OF PIPING SUPPORTS

    1   22

  STIFFNESS OF CONNECTING DOF OF S.S.

  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09

  NODE # OF PIPING ANCHORS

    1    8

  MASS OF EACH SECONDARY DOF

  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+00  0.1000E+00  0.1000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2588E-08  0.2588E-08  0.2588E-08  0.0000E+00  0.0000E+00  0.0000E+00

  ADDRESS OF DIAGONAL ELEMENTS IN S.S. STIFFNESS MATRIX (JDO MATRIX)

    1    3    6   10   15   21   28   36   45   55   66   78   85   93  102  112
  123  135  142  150  159  169  180  192  199  207  216  226  237  249  256  264
  273  283  294  306  313  321  330  340  351  363  370  378  387  397  408  420

  LOWER TRIANGULAR STIFFNESS MATRIX OF SECONDARY SYSTEM

  0.1000E+09  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1930E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.3860E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
```

```
 -0.1930E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3860E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1930E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.3860E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
 -0.1930E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3860E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1930E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.3860E+04  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
 -0.1930E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.3860E+04  0.0000E+00 -0.1000E-03  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00 -0.1000E-03
  0.0000E+00  0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.9996E+10 -0.1930E+04  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00 -0.1000E-03
  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02  0.0000E+00  0.1000E+09
  0.0000E+00  0.0000E+00 -0.1000E-03  0.0000E+00  0.1200E-02  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1200E-02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.9996E+10  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00 -0.1200E-02
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9996E+10

  SECONDARY FREQUENCIES (HZ)

   9.8400596  19.1867123  27.5712860  34.5733415

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        2

  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8571E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.7143E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5714E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4286E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2857E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1429E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2757E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  STATIC DEFORMATION SHAPE OF S.S. FOR P.S. CONNECTING DOF        6

  0.2757E-05  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1429E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.2857E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.4286E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.5714E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.7143E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.8571E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

  UNNORMALIZED MODE SHAPE OF SECONDARY SYSTEM

  0.8589E-05  0.1548E-04  0.1930E-04 -0.1930E-04
  0.1840E-71 -0.7439E-78  0.4445E-88 -0.4154E-96
  0.8573E-72 -0.3466E-78  0.2070E-88 -0.1936E-96
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.1029E-72  0.4160E-79 -0.2485E-89  0.2324E-97
  0.2209E-72 -0.8930E-79  0.5336E-89 -0.4987E-97
  0.4450E+00  0.8019E+00  0.1000E+01 -0.1000E+01
  0.1840E-59 -0.7439E-66  0.4445E-76 -0.4155E-84
  0.8572E-60 -0.3466E-66  0.2071E-76 -0.1936E-84
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.2219E-67  0.8970E-74  0.2132E-80 -0.2498E-88
 -0.7823E-64  0.1064E-69  0.2133E-80 -0.1075E-91
  0.8019E+00  0.1000E+01  0.4450E+00  0.4451E+00
  0.2635E-60 -0.1065E-66  0.6364E-77 -0.5950E-85
  0.1282E-59 -0.5181E-66  0.3096E-76 -0.2894E-84
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.7828E-64  0.3548E-70  0.2132E-80  0.1249E-88
 -0.1957E-64  0.1330E-70 -0.4572E-69 -0.6245E-89
  0.1000E+01  0.4450E+00 -0.8019E+00  0.8019E+00
  0.1253E-58 -0.5065E-66  0.3026E-76 -0.2829E-84
 -0.2150E-60  0.8691E-67 -0.5192E-77  0.4853E-85
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 -0.9785E-65 -0.7264E-79 -0.5331E-81 -0.4057E-97
  0.1188E-73  0.7096E-70  0.2869E-89  0.1259E-88
 0.1000E+01 -0.4450E+00 -0.8019E+00 -0.8019E+00
-0.1324E-59  0.5354E-66 -0.3198E-76  0.2930E-84
 0.2077E-59 -0.8395E-66  0.5015E-76 -0.6669E-84
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.7828E-64  0.1112E-78  0.8529E-80  0.2498E-88
-0.7828E-64  0.3548E-70 -0.2132E-80  0.2498E-88
 0.8019E+00 -0.1000E+01  0.4450E+00 -0.4451E+00
-0.3181E-59  0.1296E-65 -0.7604E-76  0.7182E-84
-0.1242E-59  0.5101E-66 -0.3048E-76  0.2849E-84
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.7828E-64  0.3548E-70  0.2132E-80 -0.2498E-88
 0.3131E-63  0.9015E-79 -0.8529E-80 -0.4996E-88
 0.4450E+00 -0.8019E+00  0.1000E+01  0.1000E+01
 0.4312E-60 -0.1744E-66  0.1042E-76 -0.9736E-85
-0.1076E-60  0.4350E-67 -0.2599E-77  0.2430E-85
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.4893E-65  0.5602E-79 -0.3347E-89  0.3129E-97
 0.4337E-72 -0.1753E-78 -0.1066E-80 -0.9793E-97
 0.8589E-05 -0.1548E-04  0.1930E-04  0.1930E-04
 0.4313E-72 -0.1744E-78  0.1042E-88 -0.9740E-97
-0.1076E-72  0.4350E-79 -0.2599E-89  0.2430E-97
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.4470E-77  0.3328E-83  0.2044E-93  0.3414-102
-0.1797E-76  0.2432E-82  0.1715E-93  0.2815-101


NORMALIZED MODE SHAPE OF SECONDARY SYSTEM

 0.1415E-04  0.2551E-04  0.3180E-04 -0.3180E-04
 0.3032E-71 -0.1226E-77  0.7325E-88 -0.6846E-96
 0.1413E-71 -0.5711E-78  0.3412E-88 -0.3190E-96
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.1696E-72  0.6856E-79 -0.4096E-89  0.3830E-97
 0.3640E-72 -0.1472E-78  0.8793E-89 -0.8218E-97
 0.7334E+00  0.1322E+01  0.1648E+01 -0.1648E+01
 0.3032E-59 -0.1226E-65  0.7325E-76 -0.6847E-84
 0.1413E-59 -0.5711E-66  0.3412E-76 -0.3190E-84
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.3656E-67  0.1478E-73  0.3513E-80 -0.4116E-88
-0.1289E-63  0.1754E-69  0.3516E-80 -0.1772E-91
 0.1322E+01  0.1648E+01  0.7334E+00  0.7334E+00
 0.4342E-60 -0.1756E-66  0.1049E-76 -0.9805E-85
 0.2112E-59 -0.8538E-66  0.5102E-76 -0.4769E-84
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1290E-63  0.5847E-70  0.3514E-80  0.2058E-88
-0.3225E-64  0.2193E-70 -0.7534E-89 -0.1029E-88
 0.1648E+01  0.7334E+00 -0.1322E+01  0.1322E+01
 0.2064E-59 -0.8347E-66  0.4987E-76 -0.4663E-84
-0.3542E-60  0.1432E-66 -0.8555E-77  0.7997E-85
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
-0.1613E-64 -0.1197E-78 -0.8784E-81 -0.6686E-97
 0.1957E-72  0.1169E-69  0.4728E-89  0.2058E-88
 0.1648E+01 -0.7334E+00 -0.1322E+01 -0.1322E+01
-0.2182E-59  0.8822E-66 -0.5271E-76  0.4927E-84
 0.3423E-59 -0.1383E-65  0.8265E-76 -0.7727E-84
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1290E-63  0.1933E-78  0.1406E-79  0.4117E-88
-0.1290E-63  0.5847E-70 -0.3514E-80  0.4117E-88
 0.1322E+01 -0.1648E+01  0.7334E+00 -0.7334E+00
-0.5242E-59  0.2120E-65 -0.1266E-75  0.1184E-83
-0.2079E-59  0.8406E-66 -0.5023E-76  0.4695E-84
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1290E-63  0.5847E-70  0.3514E-80 -0.4117E-88
 0.5160E-63  0.1486E-78 -0.1406E-79 -0.8233E-88
 0.7334E+00 -0.1322E+01  0.1648E+01  0.1648E+01
 0.7106E-60 -0.2874E-66  0.1717E-76 -0.1605E-84
-0.1773E-60  0.7168E-67 -0.4283E-77  0.4004E-85
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.8043E-65  0.9232E-79 -0.5515E-89  0.5156E-97
 0.7147E-72 -0.2890E-78 -0.1757E-80 -0.1614E-96
 0.1415E-04 -0.2551E-04  0.3180E-04  0.3180E-04
 0.7107E-72 -0.2873E-78  0.1717E-88 -0.1605E-96
-0.1773E-72  0.7169E-79 -0.4283E-89  0.4004E-97
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.7366E-77  0.5484E-83  0.3368E-93  0.5626-102
-0.2962E-76  0.4007E-82  0.2826E-93  0.4639-101


PRIMARY FREQUENCIES (HZ)

  9.8569430  28.9980000  46.4514500  61.2094000  72.4091330  79.3992200


MODE SHAPE OF P.S. AT CONNECTING DOF        2

 0.3646E+00 -0.7787E+00  0.5202E+00 -0.1877E+00 -0.7335E+00 -0.6456E+00


MODE SHAPE OF P.S. AT CONNECTING DOF        6

 0.7787E+00  0.7335E+00  0.6456E+00 -0.5202E+00  0.3646E+00 -0.1877E+00


BASE INFLUENCE VECTOR FOR S.S.---UBS

 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


PARTICIPATION FACTOR FOR P.S.---GAMAP

 0.1615E+01 -0.5171E+00  0.2841E+00  0.1737E+00  0.1029E+00  0.4834E-01


INPUT SPECTRUM CURVE NUMBER =  1

NUMBER OF DEFINITION POINTS = 10
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DAMPING RATIO FOR THIS CURVE =    0.19999E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1    0.8405E+01      0.7125E+00
          2    0.1168E+02      0.6828E+00
          3    0.1847E+02      0.5174E+00
          4    0.2580E+02      0.4430E+00
          5    0.2941E+02      0.3903E+00
          6    0.3049E+02      0.4236E+00
          7    0.4666E+02      0.3688E+00
          8    0.6128E+02      0.3482E+00
          9    0.7253E+02      0.3486E+00
         10    0.7957E+02      0.3498E+00


INPUT SPECTRUM CURVE NUMBER =  2

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.21093E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1    0.8405E+01      0.7100E+00
          2    0.1168E+02      0.6008E+00
          3    0.1847E+02      0.5121E+00
          4    0.2580E+02      0.4399E+00
          5    0.2941E+02      0.3886E+00
          6    0.3049E+02      0.4216E+00
          7    0.4666E+02      0.3488E+00
          8    0.6128E+02      0.3483E+00
          9    0.7253E+02      0.3487E+00
         10    0.7957E+02      0.3498E+00


INPUT SPECTRUM CURVE NUMBER =  3

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.29183E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1    0.8405E+01      0.6801E+00
          2    0.1168E+02      0.6565E+00
          3    0.1847E+02      0.4644E+00
          4    0.2580E+02      0.4090E+00
          5    0.2941E+02      0.3749E+00
          6    0.3049E+02      0.4036E+00
          7    0.4666E+02      0.3485E+00
          8    0.6128E+02      0.3485E+00
          9    0.7253E+02      0.3490E+00
         10    0.7957E+02      0.3498E+00


INPUT SPECTRUM CURVE NUMBER =  4

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.37682E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1    0.8405E+01      0.6495E+00
          2    0.1168E+02      0.6296E+00
          3    0.1847E+02      0.4312E+00
          4    0.2580E+02      0.3844E+00
          5    0.2941E+02      0.3643E+00
          6    0.3049E+02      0.3875E+00
          7    0.4666E+03      0.3495E+00
          8    0.6129E+02      0.3485E+00
          9    0.7253E+02      0.3491E+00
         10    0.7957E+02      0.3498E+00


INPUT SPECTRUM CURVE NUMBER =  5

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.47921E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1    0.8405E+01      0.6265E+00
          2    0.1168E+02      0.5987E+00
          3    0.1847E+02      0.4152E+00
          4    0.2580E+02      0.3638E+00
          5    0.2941E+02      0.3581E+00
          6    0.3049E+02      0.3749E+00
          7    0.4666E+02      0.3486E+00
          8    0.6128E+02      0.3486E+00
          9    0.7253E+02      0.3492E+00
         10    0.7957E+02      0.3497E+00


INPUT SPECTRUM CURVE NUMBER =  6

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =    0.58319E-01

      INPUT      FREQUENCY    INPUT SPECTRAL
      POINT        (HZ)       ACCELERATION
          1    0.8405E+01      0.6037E+00
          2    0.1168E+02      0.5703E+00
          3    0.1847E+02      0.4063E+00
          4    0.2580E+02      0.3606E+00
          5    0.2941E+02      0.3545E+00
          6    0.3049E+02      0.3660E+00
          7    0.4666E+02      0.3487E+00
          8    0.6128E+02      0.3487E+00
          9    0.7253E+02      0.3492E+00
         10    0.7957E+02      0.3496E+00
```

```
INPUT SPECTRUM CURVE NUMBER =  7

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69036E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
        1      0.8405E+01     0.5802E+00
        2      0.1168E+02     0.5444E+00
        3      0.1847E+02     0.4021E+00
        4      0.2580E+02     0.3576E+00
        5      0.2941E+02     0.3532E+00
        6      0.3049E+02     0.3594E+00
        7      0.4666E+02     0.3488E+00
        8      0.6128E+02     0.3487E+00
        9      0.7253E+02     0.3492E+00
       10      0.7957E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER =  8

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69702E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
        1      0.8405E+01     0.5783E+00
        2      0.1168E+02     0.5430E+00
        3      0.1847E+02     0.4022E+00
        4      0.2580E+02     0.3574E+00
        5      0.2941E+02     0.3532E+00
        6      0.3049E+02     0.3590E+00
        7      0.4666E+02     0.3488E+00
        8      0.6128E+02     0.3487E+00
        9      0.7253E+02     0.3492E+00
       10      0.7957E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER =  9

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69721E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
        1      0.8405E+01     0.5788E+00
        2      0.1168E+02     0.5429E+00
        3      0.1847E+02     0.4022E+00
        4      0.2580E+02     0.3574E+00
        5      0.2941E+02     0.3532E+00
        6      0.3049E+02     0.3590E+00
        7      0.4666E+02     0.3488E+00
        8      0.6128E+02     0.3487E+00
        9      0.7253E+02     0.3492E+00
       10      0.7957E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER = 10

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.69726E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
        1      0.8405E+01     0.5787E+00
        2      0.1168E+02     0.5429E+00
        3      0.1647E+02     0.4022E+00
        4      0.2580E+02     0.3574E+00
        5      0.2941E+02     0.3532E+00
        6      0.3049E+02     0.3590E+00
        7      0.4666E+03     0.3488E+00
        8      0.6128E+02     0.3487E+00
        9      0.7253E+02     0.3492E+00
       10      0.7957E+02     0.3495E+00

INPUT SPECTRUM CURVE NUMBER = 11

NUMBER OF DEFINITION POINTS = 10

DAMPING RATIO FOR THIS CURVE =     0.70000E-01

     INPUT      FREQUENCY   INPUT SPECTRAL
     POINT        (HZ)      ACCELERATION
        1      0.8405E+01     0.5782E+00
        2      0.1168E+02     0.5423E+00
        3      0.1847E+02     0.4022E+00
        4      0.2580E+02     0.3574E+00
        5      0.2941E+02     0.3531E+00
        6      0.3049E+02     0.3589E+00
        7      0.4666E+02     0.3488E+00
        8      0.6128E+02     0.3487E+00
        9      0.7253E+02     0.3492E+00
       10      0.7957E+02     0.3495E+00



     *******************************************************************
     *                                                                 *
     *                                                                 *
     *                                                                 *
     *                    A COMPUTER PROGRAM FOR                       *
     *                                                                 *
     *                                                                 *
     *   COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS       *
     *                                                                 *
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     *                     * C R E S T *                               *
     *                                                                 *
     *                                                                 *
     *                     DEVELOPED BY                                *
     *                                                                 *
     *                   AJAYA KUMAR GUPTA                             *
     *            JING-WEN JAW   ABHINAV GUPTA                   *     *
     *                                                                 *
     *           NORTH CAROLINA STATE UNIVERSITY                       *
     *               RALEIGH, NORTH CAROLINA                           *
     *                                                                 *
     *                     REVISION-1.0                               *
     *                                                                 *
     *                                                                 *
     *******************************************************************


PARTICIPATION FACTOR FOR S.S.---GAMAS
0.7406E+00  0.1069E-06  0.2120E+00  0.3452E-09


MASS RATIOS

  PRIMARY SYSTEM MODE    1
0.1792E+00  0.5263E-02  0.1468E-01  0.7792E-03

  PRIMARY SYSTEM MODE    2
0.2807E-03  0.7043E-01  0.2300E-04  0.1039E-01

  PRIMARY SYSTEM MODE    3
0.1063E+00  0.4843E-03  0.1526E-01  0.7143E-04

  PRIMARY SYSTEM MODE    4
0.4872E-01  0.3404E-02  0.5629E-02  0.5021E-03

  PRIMARY SYSTEM MODE    5
0.1866E-01  0.3714E-01  0.2529E-02  0.5477E-02

  PRIMARY SYSTEM MODE    6
0.9522E-01  0.6457E-02  0.7799E-03  0.9523E-03

C O U P L E D  F R Q U E N C I E S  A N D  M O D E  S H A P E S  E X T R A C T I O N

NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION   NITER =  900

CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                      TOL = 0.10000E-05


COUPLED   FREQUENCY   DAMPING RATIO
 MODE       (HZ)          (%)

   1     0.83371E+01    0.33081E+01
   2     0.12063E+02    0.47887E+01
   3     0.18777E+02    0.21855E+01
   4     0.27663E+02    0.20958E+01
   5     0.29511E+02    0.62569E+01
   6     0.35133E+02    0.35131E+01
   7     0.46843E+02    0.68456E+01
   8     0.61331E+02    0.69550E+01
   9     0.72645E+02    0.69461E+01
  10     0.79531E+02    0.69541E+01


UNIT DISPLACEMENT & UNIT VELOCITY*W RESPONSE


COUPLED MODE NO.    1


   1     0.39459E+00     0.30257E-01
   2     0.83898E+00     0.67574E-01
   3     0.11043E-04    -0.99066E-06
   4     0.13823E-71    -0.29107E-72
   5     0.64385E-72    -0.13559E-72
   6     0.00000E+00     0.00000E+00
   7    -0.77287E-73     0.16277E-73
   8     0.16595E-72    -0.34943E-73
   9     0.57219E+00    -0.51331E-01
  10     0.13822E-59    -0.29105E-60
  11     0.64385E-60    -0.13559E-60
  12     0.00000E+00     0.00000E+00
  13     0.18010E-64     0.14773E-65
  14    -0.12604E-63     0.69227E-65
  15     0.10137E+01    -0.93222E-01
  16     0.19789E-60    -0.41677E-61
  17     0.96282E-60    -0.20273E-60
  18     0.00000E+00     0.00000E+00
  19     0.41499E-64    -0.13874E-64
  20    -0.28399E-64     0.19948E-65
  21     0.12644E+01    -0.11584E+00
  22     0.94094E-60    -0.19815E-60
  23    -0.16147E-60     0.34003E-61
  24     0.00000E+00     0.00000E+00
  25    -0.16974E-64     0.78489E-66
  26     0.10401E-63     0.82463E-65
  27     0.12873E+01    -0.11524E+00
  28    -0.99463E-60     0.20944E-60
  29     0.15604E-59    -0.32850E-60
  30     0.00000E+00     0.00000E+00
  31     0.56735E-64    -0.12426E-64
  32    -0.11221E-63     0.81780E-65
  33     0.10702E+01    -0.91947E-01
  34    -0.23899E-59     0.50320E-60
  35    -0.94766E-60     0.19956E-60
  36     0.00000E+00     0.00000E+00
  37     0.12193E-63    -0.75269E-65
  38     0.28521E-63    -0.45805E-64
  39     0.62698E+00    -0.50016E-01
  40     0.32396E-60    -0.68213E-61
  41    -0.80828E-61     0.17021E-61
  42     0.00000E+00     0.00000E+00
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   43     0.26795E-65    -0.85472E-66
   44    -0.82195E-65    -0.52442E-66
   45     0.12100E-04    -0.96529E-06
   46     0.32394E-72    -0.68223E-73
   47    -0.80839E-73     0.17021E-73
   48     0.00000E+00     0.00000E+00
   49     0.34947E-77    -0.69614E-78
   50    -0.37535E-76     0.93726E-78


 COUPLED MODE NO.    2


    1     0.21369E+00    -0.39412E-01
    2     0.47624E+00    -0.87747E-01
    3    -0.11028E-04     0.10735E-05
    4    -0.34785E-71     0.42623E-72
    5    -0.16206E-71     0.19856E-72
    6     0.00000E+00     0.00000E+00
    7     0.19452E-72    -0.23836E-73
    8    -0.41758E-72     0.51168E-73
    9    -0.57139E+00     0.55622E-01
   10    -0.34782E-59     0.42619E-60
   11    -0.16204E-59     0.19856E-60
   12     0.00000E+00     0.00000E+00
   13     0.21776E-64    -0.40084E-65
   14     0.67457E-64    -0.33034E-65
   15    -0.10464E+01     0.10367E+00
   16    -0.49806E-60     0.61031E-61
   17    -0.24227E-59     0.29686E-60
   18     0.00000E+00     0.00000E+00
   19    -0.16993E-63     0.22172E-64
   20     0.20749E-64    -0.15397E-65
   21    -0.12972E+01     0.12686E+00
   22    -0.23690E-59     0.29016E-60
   23     0.40635E-60    -0.49792E-61
   24     0.00000E+00     0.00000E+00
   25     0.72325E-65    -0.19036E-66
   26     0.12176E-63    -0.22441E-64
   27    -0.12591E+01     0.11524E+00
   28     0.25029E-59    -0.30649E-60
   29    -0.39257E-59     0.48101E-60
   30     0.00000E+00     0.00000E+00
   31    -0.14872E-63     0.18275E-64
   32     0.85878E-64    -0.66851E-65
   33    -0.95413E+00     0.75261E-01
   34     0.60134E-59    -0.73683E-60
   35     0.23849E-59    -0.29223E-60
   36     0.00000E+00     0.00000E+00
   37    -0.76191E-65     0.48936E-65
   38    -0.53675E-63     0.62350E-64
   39    -0.48515E+00     0.29553E-01
   40    -0.81517E-60     0.99885E-61
   41     0.20341E-60    -0.24924E-61
   42     0.00000E+00     0.00000E+00
   43    -0.10441E-64     0.13528E-65
   44    -0.77248E-65     0.14222E-65
   45    -0.93632E-05     0.57037E-06
   46    -0.81531E-72     0.99904E-73
   47     0.20341E-72    -0.24924E-73
   48     0.00000E+00     0.00000E+00
   49    -0.82886E-77     0.10057E-77
   50     0.58375E-77     0.10227E-77


 COUPLED MODE NO.    3


    1     0.50675E-01     0.43557E-03
    2    -0.14396E-01    -0.43020E-02
    3     0.61920E-05    -0.19769E-06
    4    -0.20444E-72     0.22487E-73
    5    -0.95243E-73     0.10476E-73
    6     0.00000E+00     0.00000E+00
    7     0.11434E-73    -0.12576E-74
    8    -0.24543E-73     0.26995E-74
    9     0.32084E+00    -0.10243E-01
   10    -0.20443E-60     0.22485E-61
   11    -0.95253E-61     0.10476E-61
   12     0.00000E+00     0.00000E+00
   13    -0.56602E-65    -0.64451E-66
   14     0.20929E-64     0.10671E-65
   15     0.38142E+00    -0.11410E-01
   16    -0.29275E-61     0.32200E-62
   17    -0.14239E-60     0.15662E-61
   18     0.00000E+00     0.00000E+00
   19     0.10990E-64     0.21858E-65
   20     0.29152E-65     0.97803E-67
   21     0.14386E+00    -0.20803E-02
   22    -0.13918E-60     0.15309E-61
   23     0.23894E-61    -0.26270E-62
   24     0.00000E+00     0.00000E+00
   25    -0.34799E-66     0.33373E-67
   26     0.15512E-64    -0.16532E-65
   27    -0.21312E+00     0.10493E-01
   28     0.14709E-60    -0.16181E-61
   29    -0.23071E-60     0.25377E-61
   30     0.00000E+00     0.00000E+00
   31    -0.31276E-64     0.35625E-67
   32    -0.48354E-65    -0.34620E-66
   33    -0.42654E+00     0.16676E-01
   34     0.35342E-60    -0.38874E-61
   35     0.14016E-60    -0.15419E-61
   36     0.00000E+00     0.00000E+00
   37     0.28554E-64     0.11457E-65
   38     0.17207E-64     0.49397E-65
   39    -0.33618E+00     0.11877E-01
   40    -0.47910E-61     0.52697E-62
   41     0.11954E-61    -0.13150E-62
   42     0.00000E+00     0.00000E+00
   43    -0.34412E-66     0.90521E-67
   44     0.46369E-65     0.33765E-66
   45    -0.64881E-05     0.22922E-06
   46    -0.47916E-73     0.52712E-74
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   47     0.11955E-73    -0.13149E-74
   48     0.00000E+00     0.00000E+00
   49    -0.47625E-78     0.52437E-79
   50    -0.15802E-77     0.16337E-78


 COUPLED MODE NO.    4


    1    -0.25805E-03     0.44703E-03
    2    -0.43480E-03    -0.16270E-02
    3     0.19870E-06     0.65250E-06
    4     0.70550E-74     0.11979E-73
    5     0.32867E-74     0.55806E-74
    6     0.00000E+00     0.00000E+00
    7    -0.39456E-75    -0.66996E-75
    8     0.84694E-75     0.14380E-74
    9     0.10296E-01     0.33809E-01
   10     0.70545E-62     0.11978E-61
   11     0.32868E-62     0.55804E-62
   12     0.00000E+00     0.00000E+00
   13    -0.96694E-67    -0.57261E-66
   14     0.71027E-67     0.12194E-65
   15     0.47922E-02     0.14460E-01
   16     0.10103E-62     0.17154E-62
   17     0.49136E-62     0.83429E-62
   18     0.00000E+00     0.00000E+00
   19     0.36229E-66     0.17124E-65
   20     0.40351E-68     0.14437E-66
   21    -0.77351E-02    -0.27262E-01
   22     0.48030E-63     0.81552E-63
   23    -0.82420E-63    -0.13996E-62
   24     0.00000E+00     0.00000E+00
   25     0.21970E-67     0.37609E-67
   26    -0.64297E-66    -0.10950E-65
   27    -0.75630E-02    -0.25633E-01
   28    -0.50764E-62    -0.86202E-62
   29     0.79613E-62     0.13518E-61
   30     0.00000E+00     0.00000E+00
   31     0.35780E-66    -0.48508E-66
   32     0.41245E-67    -0.20244E-66
   33     0.50681E-02     0.17175E-01
   34    -0.12196E-61    -0.20708E-61
   35    -0.48372E-62    -0.82139E-62
   36     0.00000E+00     0.00000E+00
   37    -0.14616E-66     0.11207E-65
   38     0.80172E-66     0.35530E-65
   39     0.10387E-01     0.34819E-01
   40     0.16533E-62     0.28072E-62
   41    -0.41256E-63    -0.70055E-63
   42     0.00000E+00     0.00000E+00
   43     0.24213E-67     0.582[illegible]E-67
   44     0.27352E-67     0.37[illegible]81E-66
   45     0.20067E-06     0.[illegible]7199E-06
   46     0.16537E-74     0.28082E-74
   47    -0.41253E-75    -0.70045E-75
   48     0.00000E+00     0.00000E+00
   49     0.16289E-79     0.27648E-79
   50     0.79671E-79     0.13602E-78


 COUPLED MODE NO.    5


    1     0.33290E+00     0.97036E-02
    2    -0.31764E+00    -0.11292E-01
    3    -0.17680E-05    -0.15800E-05
    4    -0.17342E-72     0.18032E-73
    5    -0.80793E-73     0.84005E-74
    6     0.00000E+00     0.00000E+00
    7     0.96989E-74    -0.10085E-74
    8    -0.20819E-73     0.21647E-74
    9    -0.91608E-01    -0.81909E-01
   10    -0.17341E-60     0.18031E-61
   11    -0.80968E-61     0.83953E-62
   12     0.00000E+00     0.00000E+00
   13    -0.17042E-63    -0.56834E-65
   14     0.45885E-63     0.14698E-64
   15    -0.42918E+00    -0.33027E-02
   16    -0.24834E-61     0.25822E-62
   17    -0.12078E-60     0.12559E-61
   18     0.00000E+00     0.00000E+00
   19     0.45184E-63     0.15426E-64
   20     0.57459E-64     0.18266E-65
   21    -0.27826E+00     0.39709E-01
   22    -0.11807E-60     0.12276E-61
   23     0.20260E-61    -0.21066E-62
   24     0.00000E+00     0.00000E+00
   25    -0.56909E-66     0.59280E-67
   26     0.16119E-64    -0.16772E-65
   27     0.28344E+00    -0.26616E-01
   28     0.12444E-60    -0.12986E-61
   29    -0.19570E-60     0.20349E-61
   30     0.00000E+00     0.00000E+00
   31    -0.46960E-63    -0.13580E-64
   32    -0.11637E-63    -0.35009E-65
   33     0.39604E+00    -0.85539E-03
   34     0.29979E-60    -0.31171E-61
   35     0.11856E-60    -0.12374E-61
   36     0.00000E+00     0.00000E+00
   37     0.57978E-63     0.17724E-64
   38     0.90204E-63     0.31022E-64
   39     0.51243E-01     0.69090E-01
   40    -0.40641E-61     0.42256E-62
   41     0.10120E-61    -0.10551E-62
   42     0.00000E+00     0.00000E+00
   43     0.66018E-65     0.28869E-66
   44     0.11453E-63     0.36956E-65
   45     0.98897E-06     0.13334E-05
   46    -0.40526E-73     0.42307E-74
   47     0.10141E-73    -0.10564E-74
   48     0.00000E+00     0.00000E+00
   49    -0.40234E-78     0.41515E-79
   50    -0.20404E-77     0.21115E-78
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COUPLED MODE NO.    6


   1     0.28252E-01    -0.18041E-01
   2    -0.28021E-01     0.18380E-01
   3    -0.42541E-05     0.14722E-05
   4     0.27475E-73    -0.52064E-74
   5     0.12800E-73    -0.24628E-74
   6     0.00000E+00     0.00000E+00
   7    -0.15364E-74     0.29566E-75
   8     0.32984E-74    -0.63463E-75
   9    -0.22042E+00     0.76280E-01
  10     0.27473E-61    -0.52860E-62
  11     0.12780E-61    -0.24493E-62
  12     0.00000E+00     0.00000E+00
  13    -0.20532E-64     0.13672E-64
  14     0.54071E-64    -0.36128E-64
  15     0.69190E-01    -0.13206E-01
  16     0.39345E-62    -0.75705E-63
  17     0.19136E-61    -0.36818E-62
  18     0.00000E+00     0.00000E+00
  19     0.55136E-64    -0.36534E-64
  20     0.67473E-65    -0.45387E-65
  21     0.15562E+00    -0.45944E-01
  22     0.18705E-61    -0.35990E-62
  23    -0.32098E-62     0.61757E-63
  24     0.00000E+00     0.00000E+00
  25     0.99888E-67    -0.18871E-67
  26    -0.26481E-65     0.50783E-66
  27    -0.15465E+00     0.45741E-01
  28    -0.19810E-61     0.38310E-62
  29     0.31005E-61    -0.59655E-62
  30     0.00000E+00     0.00000E+00
  31    -0.52305E-64     0.35990E-64
  32    -0.13191E-64     0.90203E-65
  33    -0.66413E-01     0.12657E-01
  34    -0.47496E-61     0.91386E-62
  35    -0.18870E-61     0.36517E-62
  36     0.00000E+00     0.00000E+00
  37     0.66449E-64    -0.45197E-64
  38     0.11045E-63    -0.73104E-64
  39     0.22293E+00    -0.76770E-01
  40     0.64386E-62    -0.13388E-62
  41    -0.16092E-62     0.31086E-63
  42     0.00000E+00     0.00000E+00
  43     0.93475E-66    -0.58493E-66
  44     0.13540E-64    -0.90866E-65
  45     0.43024E-05    -0.14816E-05
  46     0.64551E-74    -0.12491E-74
  47    -0.16066E-74     0.30911E-75
  48     0.00000E+00     0.00000E+00
  49     0.62975E-79    -0.11987E-79
  50     0.34247E-78    -0.64976E-79

COUPLED MODE NO.    7


   1     0.14633E+00    -0.17620E-02
   2     0.18650E+00    -0.17636E-02
   3     0.26666E-05    -0.54037E-08
   4    -0.88603E-71     0.94838E-73
   5    -0.41278E-71     0.44183E-73
   6     0.00000E+00     0.00000E+00
   7     0.49554E-72    -0.53041E-74
   8    -0.10637E-71     0.11385E-73
   9    -0.13817E+00    -0.27999E-03
  10    -0.88597E-59     0.94832E-61
  11    -0.41280E-59     0.44185E-61
  12     0.00000E+00     0.00000E+00
  13     0.10066E-63    -0.78393E-66
  14    -0.54930E-64    -0.21261E-66
  15    -0.22976E+00     0.12226E-02
  16    -0.12688E-59     0.13581E-61
  17    -0.61709E-59     0.66052E-61
  18     0.00000E+00     0.00000E+00
  19    -0.38319E-63     0.33473E-65
  20    -0.47579E-65    -0.54048E-67
  21    -0.13089E+00     0.37555E-02
  22    -0.60321E-59     0.64566E-61
  23     0.10351E-59    -0.11080E-61
  24     0.00000E+00     0.00000E+00
  25    -0.34823E-64     0.36381E-66
  26     0.88565E-63    -0.93833E-65
  27    -0.12492E+00     0.51775E-02
  28     0.63754E-59    -0.68239E-61
  29    -0.99984E-59     0.10702E-60
  30     0.00000E+00     0.00000E+00
  31    -0.53574E-63     0.64706E-65
  32    -0.11314E-63     0.13460E-65
  33    -0.25154E+00     0.18461E-02
  34     0.15317E-58    -0.16395E-60
  35     0.60749E-59    -0.65024E-61
  36     0.00000E+00     0.00000E+00
  37     0.33702E-63    -0.44715E-65
  38    -0.79966E-63     0.71293E-65
  39    -0.17835E+00    -0.23520E-02
  40    -0.20764E-59     0.22225E-61
  41     0.51813E-60    -0.55459E-62
  42     0.00000E+00     0.00000E+00
  43    -0.29831E-64     0.30685E-66
  44    -0.17835E-64     0.56301E-69
  45    -0.34420E-05    -0.45394E-07
  46    -0.20769E-71     0.22230E-73
  47     0.51809E-72    -0.55455E-74
  48     0.00000E+00     0.00000E+00
  49    -0.20355E-76     0.21800E-78
  50    -0.11812E-75     0.12421E-77

COUPLED MODE NO.    8
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   1    -0.32536E-01    -0.63051E-04
   2    -0.91677E-01    -0.10327E-03
   3     0.44700E-06    -0.58043E-09
   4     0.55794E-71     0.70282E-74
   5     0.25993E-71     0.32743E-74
   6     0.00000E+00     0.00000E+00
   7    -0.31204E-72    -0.39308E-75
   8     0.66979E-72     0.84373E-75
   9     0.23161E-01    -0.30075E-04
  10     0.55790E-59     0.70278E-62
  11     0.25993E-59     0.32744E-62
  12     0.00000E+00     0.00000E+00
  13    -0.11444E-63    -0.10920E-66
  14     0.17271E-63     0.13219E-66
  15     0.76909E-01     0.19698E-03
  16     0.79898E-60     0.10065E-62
  17     0.38850E-59     0.48949E-62
  18     0.00000E+00     0.00000E+00
  19     0.37427E-63     0.36561E-66
  20     0.20807E-64     0.17707E-67
  21     0.50463E-01    -0.20730E-03
  22     0.37984E-59     0.47849E-62
  23    -0.65182E-60    -0.82109E-63
  24     0.00000E+00     0.00000E+00
  25     0.22920E-64     0.32817E-67
  26    -0.56843E-63    -0.75867E-66
  27     0.44407E-01    -0.67527E-03
  28    -0.40147E-59    -0.50573E-62
  29     0.62960E-59     0.79309E-62
  30     0.00000E+00     0.00000E+00
  31     0.20638E-63     0.37377E-66
  32     0.43956E-64     0.10550E-66
  33     0.11216E+00    -0.17128E-05
  34    -0.96450E-59    -0.12150E-61
  35    -0.38255E-59    -0.48189E-62
  36     0.00000E+00     0.00000E+00
  37    -0.54751E-64    -0.23602E-66
  38     0.76076E-63     0.71194E-66
  39     0.69017E-01     0.64199E-03
  40     0.13075E-59     0.16470E-62
  41    -0.32627E-60    -0.41100E-63
  42     0.00000E+00     0.00000E+00
  43     0.20937E-64     0.25018E-67
  44     0.44670E-64     0.30592E-67
  45     0.13320E-05     0.12390E-07
  46     0.13079E-71     0.16475E-74
  47    -0.32624E-72    -0.41096E-75
  48     0.00000E+00     0.00000E+00
  49     0.12803E-76     0.16072E-79
  50     0.76857E-76     0.10667E-78

COUPLED MODE NO.    9


   1    -0.72307E-01    -0.12544E-03
   2     0.37253E-01     0.10122E-03
   3     0.94936E-06     0.62798E-08
   4     0.21854E-71     0.13925E-74
   5     0.10181E-71     0.64875E-75
   6     0.00000E+00     0.00000E+00
   7    -0.12223E-72    -0.77883E-76
   8     0.26235E-72     0.16717E-75
   9     0.49190E-01     0.3[illegible]38E-03
  10     0.21853E-59     0.13924E-62
  11     0.10184E-59     0.64914E-63
  12     0.00000E+00     0.00000E+00
  13     0.15656E-63     0.34970E-66
  14    -0.46908E-63    -0.96317E-66
  15     0.63490E-01    -0.85369E-04
  16     0.31296E-60     0.19942E-63
  17     0.15221E-59     0.96984E-63
  18     0.00000E+00     0.00000E+00
  19    -0.39094E-63    -0.91916E-66
  20    -0.58855E-64    -0.11992E-66
  21     0.52778E-02    -0.31888E-03
  22     0.14870E-59     0.94804E-63
  23    -0.25531E-60    -0.16268E-63
  24     0.00000E+00     0.00000E+00
  25     0.91342E-65     0.69341E-68
  26    -0.22434E-63    -0.15499E-66
  27     0.19901E-01     0.14420E-03
  28    -0.15721E-59    -0.10012E-62
  29     0.24661E-59     0.15714E-62
  30     0.00000E+00     0.00000E+00
  31     0.61870E-63     0.10665E-65
  32     0.15254E-63     0.27140E-66
  33    -0.65337E-02     0.58341E-04
  34    -0.37779E-59    -0.24072E-62
  35    -0.14980E-59    -0.95403E-63
  36     0.00000E+00     0.00000E+00
  37    -0.69475E-63    -0.12901E-65
  38    -0.77847E-63    -0.18460E-65
  39    -0.28031E-01    -0.28694E-03
  40     0.51214E-60     0.32633E-63
  41    -0.12778E-60    -0.81385E-64
  42     0.00000E+00     0.00000E+00
  43    -0.18625E-66    -0.10504E-67
  44    -0.11686E-63    -0.24175E-66
  45    -0.54099E-06    -0.55379E-08
  46     0.51214E-72     0.32615E-75
  47    -0.12779E-72    -0.81424E-76
  48     0.00000E+00     0.00000E+00
  49     0.50153E-77     0.31832E-80
  50     0.30506E-76     0.22234E-79

COUPLED MODE NO.   10


   1    -0.33130E-01     0.92957E-04
   2    -0.92359E-02     0.33054E-04
   3     0.36711E-06    -0.63639E-09
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     4    0.31564E-71    -0.95250E-74
     5    0.14705E-71    -0.44375E-74
     6    0.00000E+00     0.00000E+00
     7   -0.17653E-72     0.53271E-75
     8    0.37892E-72    -0.11435E-74
     9    0.19022E-01    -0.32974E-04
    10    0.31562E-59    -0.95243E-62
    11    0.14706E-59    -0.44378E-62
    12    0.00000E+00     0.00000E+00
    13    0.16701E-64    -0.36179E-67
    14   -0.12417E-63     0.31800E-66
    15    0.44092E-01    -0.20366E-03
    16    0.45201E-60    -0.13640E-62
    17    0.21984E-59    -0.66338E-62
    18    0.00000E+00     0.00000E+00
    19   -0.11000E-64    -0.27946E-67
    20   -0.15789E-64     0.41281E-67
    21    0.12548E-01    -0.16936E-03
    22    0.21499E-59    -0.64846E-62
    23   -0.36876E-60     0.11128E-62
    24    0.00000E+00     0.00000E+00
    25    0.13286E-64    -0.38773E-67
    26   -0.32503E-63     0.96656E-66
    27    0.16425E-01    -0.11083E-03
    28   -0.22711E-59     0.68533E-62
    29    0.35619E-59    -0.10748E-61
    30    0.00000E+00     0.00000E+00
    31    0.34094E-63    -0.96261E-66
    32    0.82664E-64    -0.22565E-66
    33    0.28172E-01    -0.10763E-03
    34   -0.54565E-59     0.16466E-61
    35   -0.21641E-59     0.65304E-62
    36    0.00000E+00     0.00000E+00
    37   -0.31320E-63     0.85409E-66
    38   -0.19487E-64    -0.79895E-67
    39    0.30118E-02    -0.45068E-04
    40    0.73969E-60    -0.22321E-62
    41   -0.18457E-60     0.55698E-63
    42    0.00000E+00     0.00000E+00
    43    0.83762E-65    -0.26170E-67
    44   -0.30549E-64     0.76560E-67
    45    0.58127E-07    -0.86980E-09
    46    0.73995E-72    -0.22326E-74
    47   -0.18457E-72     0.55696E-75
    48    0.00000E+00     0.00000E+00
    49    0.72396E-77    -0.21865E-79
    50    0.44261E-76    -0.13033E-78

 B A S E   R E S P O N S E   S P E C T R A   D A T A

 TOTAL NUMBER OF INPUT SPECTRUM CURVE = 11

 MAXIMUM NUMBER OF DEFINITION POINTS IN INPUT SPECTRUM CURVES = 10

 SPECTRUM SCALE FACTOR = 0.38640E+03

 RIGID FREQUENCY = 0.20500E+02



   SPECTRUM PARAMETERS

   CURVE NO   1  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  1

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.19999E-01

     INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1    0.8405E+01     0.7125E+00            0.7125E+00
         2    0.1168E+02     0.6828E+00            0.7108E+00
         3    0.1847E+02     0.5174E+00            0.3787E+00
         4    0.2580E+02     0.4430E+00            0.2321E+00
         5    0.2941E+02     0.3903E+00            0.1794E+00
         6    0.3049E+02     0.4236E+00            0.1876E+00
         7    0.4666E+02     0.3488E+00            0.1010E+00
         8    0.6128E+02     0.3482E+00            0.7681E-01
         9    0.7253E+02     0.3486E+00            0.6497E-01
        10    0.7957E+02     0.3498E+00            0.5942E-01

   SPECTRUM PARAMETERS

   CURVE NO   2  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  2

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.21093E-01

     INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1    0.8405E+01     0.7100E+00            0.7100E+00
         2    0.1168E+02     0.6808E+00            0.7096E+00
         3    0.1847E+02     0.5121E+00            0.3748E+00
         4    0.2580E+02     0.4399E+00            0.2305E+00
         5    0.2941E+02     0.3888E+00            0.1787E+00
         6    0.3049E+02     0.4216E+00            0.1869E+00
         7    0.4666E+02     0.3488E+00            0.1010E+00
         8    0.6128E+02     0.3483E+00            0.7684E-01
         9    0.7253E+02     0.3487E+00            0.6459E-01
        10    0.7957E+02     0.3498E+00            0.5942E-01
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   SPECTRUM PARAMETERS

   CURVE NO   3  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  3

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.39183E-01

     INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1    0.8405E+01     0.6801E+00            0.6801E+00
         2    0.1168E+02     0.6565E+00            0.6897E+00
         3    0.1847E+02     0.4644E+00            0.3399E+00
         4    0.2580E+02     0.4090E+00            0.2143E+00
         5    0.2941E+02     0.3749E+00            0.1723E+00
         6    0.3049E+02     0.4024E+00            0.1784E+00
         7    0.4666E+02     0.3495E+00            0.1010E+00
         8    0.6128E+02     0.3485E+00            0.7688E-01
         9    0.7253E+02     0.3490E+00            0.6504E-01
        10    0.7957E+02     0.3498E+00            0.5942E-01

   SPECTRUM PARAMETERS

   CURVE NO   4  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  4

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.37682E-01

     INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1    0.8405E+01     0.6495E+00            0.6495E+00
         2    0.1168E+02     0.6296E+00            0.6658E+00
         3    0.1847E+02     0.4312E+00            0.3156E+00
         4    0.2580E+02     0.3844E+00            0.2014E+00
         5    0.2941E+02     0.3643E+00            0.1674E+00
         6    0.3049E+02     0.3875E+00            0.1718E+00
         7    0.4666E+02     0.3485E+00            0.1010E+00
         8    0.6128E+02     0.3485E+00            0.7688E-01
         9    0.7253E+02     0.3491E+00            0.6506E-01
        10    0.7957E+02     0.3498E+00            0.5942E-01

   SPECTRUM PARAMETERS

   CURVE NO   5  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  5

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.47921E-01

     INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1    0.8405E+01     0.6245E+00            0.6265E+00
         2    0.1168E+02     0.5987E+00            0.6373E+00
         3    0.1847E+02     0.4152E+00            0.3039E+00
         4    0.2580E+02     0.3638E+00            0.1906E+00
         5    0.2941E+02     0.3581E+00            0.1646E+00
         6    0.3049E+02     0.3749E+00            0.1662E+00
         7    0.4666E+02     0.3486E+00            0.1010E+00
         8    0.6128E+02     0.3485E+00            0.7690E-01
         9    0.7253E+02     0.3492E+00            0.6508E-01
        10    0.7957E+02     0.3497E+00            0.5941E-01

   SPECTRUM PARAMETERS

   CURVE NO   6  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  6

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.58319E-01

     INPUT      FREQUENCY    INPUT SPECTRAL   CALCULATED VELOCITY
     POINT        (HZ)       ACCELERATION     SPECTRAL ACCELERATION

         1    0.8405E+01     0.6037E+00            0.6037E+00
         2    0.1168E+02     0.5703E+00            0.6104E+00
         3    0.1847E+02     0.4063E+00            0.2974E+00
         4    0.2580E+02     0.3606E+00            0.1889E+00
         5    0.2941E+02     0.3545E+00            0.1629E+00
         6    0.3049E+02     0.3660E+00            0.1623E+00
         7    0.4666E+02     0.3487E+00            0.1010E+00
         8    0.6128E+02     0.3487E+00            0.7692E-01
         9    0.7253E+02     0.3492E+00            0.6508E-01
        10    0.7957E+02     0.3496E+00            0.5939E-01

   SPECTRUM PARAMETERS

   CURVE NO   7  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  7

 NUMBER OF DEFINITION POINTS = 10
 DAMPING RATIO FOR THIS CURVE =    0.69036E-01

      INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
      POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

         1     0.8405E+01     0.5802E+00         0.5802E+00
         2     0.1168E+02     0.5444E+00         0.5056E+00
         3     0.1847E+02     0.4021E+00         0.2943E+00
         4     0.2580E+02     0.3576E+00         0.1873E+00
         5     0.2941E+02     0.3532E+00         0.1623E+00
         6     0.3049E+02     0.3594E+00         0.1593E+00
         7     0.4666E+02     0.3488E+00         0.1010E+00
         8     0.6128E+02     0.3487E+00         0.7592E-01
         9     0.7253E+02     0.3492E+00         0.6508E-01
        10     0.7957E+02     0.3495E+00         0.5937E-01

   SPECTRUM PARAMETERS

   CURVE NO   8  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  8

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69702E-01

      INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
      POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

         1     0.8405E+01     0.5788E+00         0.5788E+00
         2     0.1168E+02     0.5430E+00         0.5842E+00
         3     0.1847E+02     0.4022E+00         0.2944E+00
         4     0.2580E+02     0.3574E+00         0.1872E+00
         5     0.2941E+02     0.3532E+00         0.1623E+00
         6     0.3049E+02     0.3590E+00         0.1592E+00
         7     0.4666E+02     0.3488E+00         0.1010E+00
         8     0.6128E+02     0.3487E+00         0.7692E-01
         9     0.7253E+02     0.3492E+00         0.6508E-01
        10     0.7957E+02     0.3495E+00         0.5937E-01

   SPECTRUM PARAMETERS

   CURVE NO   9  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER =  9

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69721E-01

      INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
      POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

         1     0.8405E+01     0.5788E+00         0.5788E+00
         2     0.1168E+02     0.5429E+00         0.5841E+00
         3     0.1847E+02     0.4022E+00         0.2944E+00
         4     0.2580E+02     0.3574E+00         0.1872E+00
         5     0.2941E+02     0.3532E+00         0.1623E+00
         6     0.3049E+02     0.3590E+00         0.1592E+00
         7     0.4666E+02     0.3488E+00         0.1010E+00
         8     0.6128E+02     0.3487E+00         0.7692E-01
         9     0.7253E+02     0.3492E+00         0.6508E-01
        10     0.7957E+02     0.3495E+00         0.5937E-01

   SPECTRUM PARAMETERS

   CURVE NO  10  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER = 10

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.69726E-01

      INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
      POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

         1     0.8405E+01     0.5787E+00         0.5787E+00
         2     0.1168E+02     0.5429E+00         0.5841E+00
         3     0.1847E+02     0.4022E+00         0.2944E+00
         4     0.2580E+02     0.3574E+00         0.1872E+00
         5     0.2941E+02     0.3532E+00         0.1623E+00
         6     0.3049E+02     0.3590E+00         0.1592E+00
         7     0.4666E+02     0.3488E+00         0.1010E+00
         8     0.6128E+02     0.3487E+00         0.7692E-01
         9     0.7253E+02     0.3492E+00         0.6508E-01
        10     0.7957E+02     0.3495E+00         0.5937E-01

   SPECTRUM PARAMETERS

   CURVE NO  11  F1 =  7.22830  F2 = 17.22000  FL =  8.40500  FH = 13.51770

 INPUT SPECTRUM CURVE NUMBER = 11

 NUMBER OF DEFINITION POINTS = 10

 DAMPING RATIO FOR THIS CURVE =    0.70000E-01

      INPUT     FREQUENCY   INPUT SPECTRAL   CALCULATED VELOCITY
      POINT       (HZ)      ACCELERATION     SPECTRAL ACCELERATION

         1     0.8405E+01     0.5782E+00         0.5782E+00
         2     0.1168E+02     0.5423E+00         0.5836E+00
         3     0.1847E+02     0.4032E+00         0.2944E+00
         4     0.2580E+02     0.3574E+00         0.1872E+00
         5     0.2941E+02     0.3531E+00         0.1623E+00
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         6     0.3049E+02     0.3589E+00         0.1591E+00
         7     0.4666E+02     0.3488E+00         0.1010E+00
         8     0.6128E+02     0.3487E+00         0.7692E-01
         9     0.7253E+02     0.3492E+00         0.6508E-01
        10     0.7957E+02     0.3495E+00         0.5937E-01

 INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS

      FREQUENCY    DAMPING RATIO          SPECTRAL ACCELERATIONS
        (HZ)            (%)                  SAD           SAV

    0.83371E+01    0.33081E+01          0.6666E+00    0.6658E+00
    0.12063E+02    0.47087E+01          0.5836E+00    0.6051E+00
    0.18777E+02    0.21055E+01          0.5039E+00    0.3627E+00
    0.27663E+02    0.20858E+01          0.4126E+00    0.2015E+00
    0.29511E+02    0.62569E+01          0.3548E+00    0.1625E+00
    0.35133E+02    0.25133E+01          0.3897E+00    0.1499E+00
    0.46843E+02    0.68456E+01          0.3486E+00    0.1007E+00
    0.61331E+02    0.69550E+01          0.3487E+00    0.7686E-01
    0.72645E+02    0.69441E+01          0.3492E+00    0.6498E-01
    0.79531E+02    0.69541E+01          0.3495E+00    0.5940E-01

 DISPLACEMENT RESPONSE UD (FROM SD)

   MODE NO.     1
  0.3708E-01  0.7875E-01  0.3708E-01  0.1298E-72  0.6044E-73  0.0000E+00
 -0.7255E-74  0.1558E-73  0.9674E-01  0.1297E-60  0.6046E-61  0.0000E+00
  0.1691E-65 -0.1183E-64  0.1441E+00  0.1858E-61  0.9038E-61  0.0000E+00
  0.3895E-65 -0.2666E-65  0.1736E+00  0.8833E-61 -0.1516E-61  0.0000E+00
 -0.1593E-65  0.9764E-65  0.1017E+00 -0.9337E-61  0.1465E-60  0.0000E+00
  0.5326E-65 -0.1053E-64  0.1673E+00 -0.2243E-60 -0.8896E-61  0.0000E+00
  0.1145E-64  0.2677E-64  0.1317E+00  0.3041E-61 -0.7587E-62  0.0000E+00
  0.2515E-66 -0.5857E-66  0.7876E-01  0.3041E-73 -0.7588E-74  0.0000E+00
  0.3200E-78 -0.3523E-77
   MODE NO.     2
  0.8388E-02  0.1849E-01  0.8388E-02 -0.1365E-72 -0.6361E-73  0.0000E+00
  0.7636E-74 -0.1639E-73 -0.1257E-01 -0.1365E-60 -0.6361E-61  0.0000E+00
  0.8548E-66  0.2668E-65 -0.2974E-01 -0.1955E-61 -0.9510E-61  0.0000E+00
 -0.6670E-65  0.8145E-66 -0.3811E-01 -0.9295E-61  0.1595E-61  0.0000E+00
  0.2839E-66  0.4779E-65 -0.3515E-01  0.9825E-61 -0.1541E-60  0.0000E+00
 -0.5838E-65  0.3371E-65 -0.2170E-01  0.2360E-60  0.9362E-61  0.0000E+00
 -0.2971E-65 -0.2107E-64 -0.1822E-02 -0.3200E-61  0.7984E-62  0.0000E+00
 -0.4098E-66 -0.3032E-66  0.1869E-01 -0.3200E-73  0.7984E-74  0.0000E+00
 -0.3254E-78  0.2291E-78
   MODE NO.     3
  0.7088E-03 -0.2014E-03  0.7089E-03 -0.2860E-74 -0.1332E-74  0.0000E+00
  0.1599E-75 -0.3433E-75  0.5066E-02 -0.2859E-62 -0.1332E-62  0.0000E+00
 -0.7917E-67  0.2927E-66  0.5784E-02 -0.4095E-63 -0.1992E-62  0.0000E+00
  0.1537E-66  0.4077E-67  0.2331E-02 -0.1967E-62  0.3341E-63  0.0000E+00
 -0.4867E-68  0.2170E-66 -0.2792E-02  0.2057E-62 -0.3227E-62  0.0000E+00
 -0.4375E-66 -0.6763E-67 -0.5907E-03  0.4943E-62  0.1960E-62  0.0000E+00
  0.3994E-66  0.2407E-66 -0.4773E-02 -0.6701E-63  0.1672E-63  0.0000E+00
 -0.4813E-68  0.6486E-67 -0.2014E-03 -0.6702E-75  0.1672E-75  0.0000E+00
 -0.6661E-80 -0.2221E-79
   MODE NO.     4
 -0.1361E-05 -0.2294E-05 -0.1360E-05  0.3722E-76  0.1734E-76  0.0000E+00
 -0.2081E-77  0.4466E-77  0.5282E-04  0.3721E-64  0.1734E-64  0.0000E+00
 -0.4995E-69  0.3747E-69  0.2365E-04  0.5329E-65  0.2592E-64  0.0000E+00
  0.1911E-68  0.2129E-70 -0.6257E-04  0.2534E-64 -0.4348E-65  0.0000E+00
  0.1159E-69 -0.3392E-68 -0.4179E-04 -0.2679E-64  0.4200E-64  0.0000E+00
  0.1987E-68  0.2176E-69  0.2471E-04 -0.6434E-64 -0.2552E-64  0.0000E+00
 -0.7710E-69  0.4229E-68  0.5263E-04  0.8731E-65 -0.2176E-65  0.0000E+00
  0.1277E-69  0.1443E-69 -0.2293E-05  0.8724E-77 -0.2176E-77  0.0000E+00
  0.8591E-82  0.4203E-81
   MODE NO.     5
  0.1328E-02 -0.1267E-02  0.1328E-02 -0.6916E-75 -0.3222E-75  0.0000E+00
  0.3068E-76 -0.8302E-76  0.5916E-03 -0.6915E-63 -0.3229E-63  0.0000E+00
 -0.6796E-66  0.1830E-65 -0.1121E-02 -0.9903E-64 -0.4817E-63  0.0000E+00
  0.1802E-65  0.2291E-66 -0.8940E-03 -0.4708E-63  0.8080E-64  0.0000E+00
 -0.2269E-68  0.6428E-67  0.9754E-03  0.4962E-63 -0.7804E-63  0.0000E+00
 -0.1873E-65 -0.4641E-66  0.1054E-02  0.1196E-62  0.4720E-63  0.0000E+00
  0.2312E-65  0.3597E-65 -0.6917E-03 -0.1621E-63  0.4036E-64  0.0000E+00
  0.2633E-67  0.6566E-66 -0.1267E-02 -0.1616E-75  0.4044E-76  0.0000E+00
 -0.1604E-80 -0.8137E-80
   MODE NO.     6
  0.8112E-04 -0.8659E-04  0.8111E-04  0.8490E-76  0.3555E-76  0.0000E+00
 -0.4748E-77  0.1019E-76 -0.6240E-03  0.8492E-64  0.3949E-64  0.0000E+00
 -0.6344E-67  0.1671E-66  0.2470E-03  0.1216E-64  0.5913E-64  0.0000E+00
  0.1704E-66  0.2085E-67  0.4902E-03  0.5780E-64 -0.9919E-65  0.0000E+00
  0.3056E-69 -0.8183E-68 -0.4926E-03 -0.6122E-64  0.9581E-64  0.0000E+00
 -0.1616E-66 -0.4076E-67 -0.2439E-03 -0.1468E-63 -0.5834E-64  0.0000E+00
  0.2054E-66  0.3413E-66  0.6262E-03  0.1990E-64 -0.4973E-65  0.0000E+00
  0.2888E-68  0.4184E-67 -0.8658E-04  0.1995E-76 -0.4964E-77  0.0000E+00
  0.1946E-81  0.1058E-80
   MODE NO.     7
  0.2277E-03  0.2902E-03  0.2277E-03 -0.1379E-73 -0.6422E-74  0.0000E+00
  0.7710E-75 -0.1655E-74  0.2163E-04 -0.1378E-61 -0.6422E-62  0.0000E+00
  0.1566E-66  0.8545E-67 -0.1119E-03 -0.1974E-62 -0.9601E-62  0.0000E+00
 -0.5962E-66 -0.7402E-68  0.5082E-04 -0.9385E-62  0.1619E-62  0.0000E+00
 -0.5418E-67  0.1378E-65  0.6903E-04  0.9919E-62 -0.1556E-61  0.0000E+00
 -0.8335E-66 -0.1760E-66 -0.1190E-03  0.2383E-61  0.9452E-62  0.0000E+00
  0.5243E-66 -0.1244E-65  0.3762E-05 -0.3230E-62  0.8061E-63  0.0000E+00
 -0.4641E-67 -0.2775E-67  0.2902E-03 -0.3231E-74  0.8061E-75  0.0000E+00
 -0.3167E-79 -0.1838E-78
   MODE NO.     8
 -0.2988E-04 -0.8318E-04 -0.2988E-04  0.5062E-74  0.2359E-74  0.0000E+00
 -0.2831E-75  0.6077E-75 -0.1648E-04  0.5062E-62  0.2359E-62  0.0000E+00
 -0.1038E-66  0.1567E-66  0.2467E-04  0.7250E-63  0.3526E-62  0.0000E+00
  0.3396E-66  0.1808E-67 -0.6939E-05  0.3447E-62 -0.5914E-63  0.0000E+00
  0.2080E-67 -0.5158E-66 -0.2005E-04 -0.3643E-62  0.5713E-62  0.0000E+00
  0.1873E-66  0.3988E-67  0.3381E-04 -0.8751E-62 -0.3471E-62  0.0000E+00
 -0.4968E-67  0.6903E-66 -0.1295E-04  0.1186E-62 -0.2960E-63  0.0000E+00
  0.1900E-67  0.4053E-67 -0.8318E-04  0.1187E-74 -0.2960E-75  0.0000E+00
  0.1162E-79  0.6974E-79
   MODE NO.     9
 -0.4683E-04  0.3413E-04 -0.4683E-04  0.1415E-74  0.6594E-75  0.0000E+00
 -0.7916E-76  0.1699E-75 -0.4835E-05  0.1415E-62  0.6595E-63  0.0000E+00
  0.1014E-66 -0.3038E-66  0.1456E-04  0.2027E-63  0.9858E-63  0.0000E+00
 -0.2532E-66 -0.3812E-67 -0.1300E-04  0.9636E-63 -0.1656E-63  0.0000E+00
  0.5916E-68 -0.1453E-66  0.6605E-05 -0.1018E-62  0.1597E-62  0.0000E+00
  0.4007E-66  0.9879E-67 -0.3781E-06 -0.2447E-62 -0.9702E-63  0.0000E+00
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-0.4500E-66 -0.5042E-66 -0.4164E-05  0.3317E-63 -0.8275E-64  0.0000E+00
-0.1206E-69 -0.7568E-67  0.2413E-04  0.3317E-75 -0.8276E-76  0.0000E+00
 0.3248E-80  0.1976E-79
   MODE NO.    10
-0.1792E-04 -0.4995E-05 -0.1792E-04  0.1707E-74  0.7953E-75  0.0000E+00
-0.9567E-76  0.2049E-75 -0.5788E-05  0.1707E-62  0.7953E-63  0.0000E+00
 0.1011E-67 -0.6716E-67  0.9618E-05  0.2445E-63  0.1189E-62  0.0000E+00
-0.6382E-68 -0.8539E-68 -0.5595E-05  0.1142E-62 -0.1994E-63  0.0000E+00
 0.7185E-68 -0.1758E-66 -0.1652E-05 -0.1228E-62  0.1926E-62  0.0000E+00
 0.1848E-66  0.4471E-67  0.6548E-05 -0.2951E-62 -0.1170E-62  0.0000E+00
-0.1596E-66 -0.1054E-67 -0.5213E-05  0.4000E-63 -0.9982E-64  0.0000E+00
 0.4530E-68 -0.1652E-67 -0.4995E-05  0.4001E-75 -0.9982E-76  0.0000E+00
 0.3915E-80  0.2395E-79


 DISPLACEMENT RESPONSE UV (FROM SV)

   MODE NO.     1
 0.2837E-02  0.6135E-02  0.2837E-02 -0.2729E-73 -0.1271E-73  0.0000E+00
 0.1526E-74 -0.3276E-74 -0.1476E-02 -0.2729E-61 -0.1271E-61  0.0000E+00
 0.1385E-66  0.6490E-66 -0.4903E-02 -0.3907E-62 -0.1901E-61  0.0000E+00
-0.1301E-65  0.1070E-66 -0.6524E-02 -0.1858E-61  0.3188E-62  0.0000E+00
 0.7358E-67  0.7731E-66 -0.5968E-02  0.1963E-61 -0.3080E-61  0.0000E+00
-0.3165E-65  0.7667E-66 -0.3285E-02  0.4717E-61  0.1871E-61  0.0000E+00
-0.7056E-66 -0.4294E-65  0.1146E-02 -0.6395E-62  0.1596E-62  0.0000E+00
-0.8013E-67 -0.4916E-67  0.6335E-02 -0.6396E-74  0.1596E-74  0.0000E+00
-0.6526E-79  0.8787E-79
   MODE NO.     2
-0.1604E-02 -0.3571E-02 -0.1604E-02  0.1735E-73  0.8081E-74  0.0000E+00
-0.9701E-75  0.2082E-74  0.3787E-03  0.1735E-61  0.8081E-62  0.0000E+00
-0.1631E-66 -0.1344E-66  0.2053E-02  0.2484E-62  0.1208E-61  0.0000E+00
 0.9024E-66 -0.6266E-67  0.2716E-02  0.1181E-61 -0.2026E-62  0.0000E+00
-0.7747E-68 -0.9133E-66  0.1902E-02 -0.1248E-61  0.1958E-61  0.0000E+00
 0.7439E-66 -0.2721E-66  0.5388E-04 -0.2999E-61 -0.1189E-61  0.0000E+00
 0.3992E-66  0.2538E-65 -0.2087E-02  0.4065E-62 -0.1014E-62  0.0000E+00
 0.5506E-67  0.5788E-67 -0.3571E-02  0.4066E-74 -0.1014E-74  0.0000E+00
 0.4093E-79  0.4162E-79
   MODE NO.     3
 0.4386E-05 -0.4332E-04  0.4384E-05  0.2264E-75  0.1055E-75  0.0000E+00
-0.7266E-76  0.2718E-76 -0.1056E-03  0.2264E-63  0.1055E-63  0.0000E+00
-0.6490E-68  0.1074E-67 -0.1241E-03  0.3242E-64  0.1577E-63  0.0000E+00
 0.2201E-67  0.9848E-69 -0.3701E-04  0.1541E-63 -0.2645E-64  0.0000E+00
 0.3360E-69 -0.1665E-67  0.8278E-04 -0.1629E-63  0.2555E-63  0.0000E+00
 0.3587E-69 -0.3486E-68  0.1382E-03 -0.3914E-63 -0.1553E-63  0.0000E+00
 0.1154E-67  0.4974E-67  0.8309E-04  0.5306E-64 -0.1324E-64  0.0000E+00
 0.9115E-69  0.3400E-68 -0.4331E-04  0.5308E-76 -0.1324E-76  0.0000E+00
 0.5280E-81  0.1635E-80
   MODE NO.     4
 0.1152E-05 -0.4194E-05  0.1154E-05  0.3088E-76  0.1439E-76  0.0000E+00
-0.1727E-77  0.3707E-77  0.8754E-04  0.3088E-64  0.1438E-64  0.0000E+00
-0.1476E-68  0.3143E-68  0.3690E-04  0.4422E-65  0.2151E-64  0.0000E+00
 0.4414E-68  0.3722E-69 -0.7141E-04  0.2102E-64 -0.3607E-65  0.0000E+00
 0.9695E-70 -0.2823E-68 -0.6798E-04 -0.2222E-64  0.3485E-64  0.0000E+00
-0.1261E-68 -0.5218E-69  0.4161E-04 -0.5338E-64 -0.2117E-64  0.0000E+00
 0.2869E-68  0.9159E-68  0.8632E-06  0.7236E-65 -0.1804E-65  0.0000E+00
 0.1502E-69  0.8270E-69 -0.4192E-05  0.7239E-77 -0.1806E-77  0.0000E+00
 0.7127E-82  0.3506E-81
   MODE NO.     5
 0.1773E-04 -0.2063E-04  0.1772E-04  0.3294E-76  0.1534E-76  0.0000E+00
-0.1842E-77  0.3954E-77 -0.1374E-03  0.3294E-64  0.1534E-64  0.0000E+00
-0.1038E-67  0.2685E-67  0.5885E-06  0.4717E-65  0.2294E-64  0.0000E+00
 0.2810E-67  0.1337E-68  0.7382E-04  0.2242E-64 -0.3848E-65  0.0000E+00
 0.1083E-69 -0.3064E-68 -0.5281E-04 -0.2372E-64  0.3717E-64  0.0000E+00
-0.2481E-67 -0.6395E-68 -0.1123E-04 -0.5694E-64 -0.2260E-64  0.0000E+00
 0.3238E-67  0.5667E-67  0.1111E-03  0.7719E-65 -0.1927E-65  0.0000E+00
 0.5273E-69  0.6751E-68 -0.2062E-04  0.7720E-77 -0.1926E-77  0.0000E+00
 0.7583E-82  0.3857E-81
   MODE NO.     6
-0.2145E-04  0.2185E-04 -0.2145E-04 -0.6285E-77 -0.2928E-77  0.0000E+00
 0.3515E-78 -0.7545E-78  0.7543E-04 -0.6285E-65 -0.2912E-65  0.0000E+00
 0.1626E-67 -0.4319E-67 -0.2478E-04 -0.9001E-66 -0.4377E-65  0.0000E+00
-0.4344E-67 -0.5396E-68 -0.5752E-04 -0.4279E-65  0.7343E-66  0.0000E+00
-0.2244E-70  0.6038E-69  0.5768E-04  0.4555E-65 -0.7093E-65  0.0000E+00
 0.4279E-67  0.1072E-67  0.2453E-04  0.1087E-64  0.4342E-65  0.0000E+00
-0.5374E-67 -0.8692E-67 -0.7561E-04 -0.1473E-65  0.3696E-66  0.0000E+00
-0.6954E-69 -0.1089E-67  0.2185E-04 -0.1485E-77  0.3675E-78  0.0000E+00
-0.1425E-82 -0.7725E-82
   MODE NO.     7
-0.7914E-06 -0.7918E-06 -0.7914E-06  0.4258E-76  0.1984E-76  0.0000E+00
-0.2381E-77  0.5112E-77 -0.9172E-06  0.4258E-64  0.1984E-64  0.0000E+00
-0.3520E-69 -0.9546E-70 -0.2426E-06  0.6098E-65  0.2966E-64  0.0000E+00
 0.1503E-68 -0.2427E-70  0.8945E-06  0.2899E-64 -0.4974E-65  0.0000E+00
 0.1633E-69 -0.4213E-68  0.1533E-05 -0.3064E-64  0.4805E-64  0.0000E+00
 0.2905E-68  0.6043E-69  0.3717E-07 -0.7361E-64 -0.2919E-64  0.0000E+00
-0.2008E-68  0.3201E-66 -0.1848E-05  0.9978E-65 -0.2490E-65  0.0000E+00
 0.1378E-69  0.2528E-72 -0.7918E-06  0.9981E-77 -0.2490E-77  0.0000E+00
 0.9788E-82  0.5577E-81
   MODE NO.     8
-0.1261E-07 -0.2065E-07 -0.1261E-07  0.1406E-77  0.6548E-78  0.0000E+00
-0.7861E-79  0.1687E-78 -0.1977E-07  0.1405E-65  0.6548E-66  0.0000E+00
-0.2184E-70  0.2644E-70  0.2449E-07  0.2013E-66  0.9789E-66  0.0000E+00
 0.7312E-70  0.3541E-71 -0.5751E-07  0.9569E-66 -0.1642E-66  0.0000E+00
 0.6563E-71 -0.1517E-69 -0.1522E-06 -0.1011E-65  0.1586E-65  0.0000E+00
 0.7475E-70  0.2110E-70 -0.1870E-07 -0.2430E-65 -0.9437E-66  0.0000E+00
-0.4720E-70  0.1424E-69  0.1089E-06  0.3294E-66 -0.8319E-67  0.0000E+00
 0.5003E-71  0.6118E-71 -0.2065E-07  0.3295E-78 -0.8219E-79  0.0000E+00
 0.3214E-83  0.2133E-82
   MODE NO.     9
-0.1512E-07  0.1220E-07 -0.1512E-07  0.1678E-78  0.7818E-79  0.0000E+00
-0.9386E-80  0.2015E-79  0.2800E-07  0.1678E-66  0.7823E-67  0.0000E+00
 0.4214E-70 -0.1161E-69 -0.1760E-07  0.2403E-67  0.1169E-66  0.0000E+00
-0.1108E-69 -0.1445E-70 -0.4184E-07  0.1143E-66 -0.1961E-67  0.0000E+00
 0.8357E-72 -0.1866E-70  0.1787E-07 -0.1207E-66  0.1894E-66  0.0000E+00
 0.1285E-69  0.3271E-70  0.1142E-07 -0.2901E-66 -0.1150E-66  0.0000E+00
-0.1555E-69 -0.2225E-69 -0.2628E-07  0.3933E-67 -0.9808E-68  0.0000E+00
-0.1266E-71 -0.2913E-70  0.1220E-07  0.3931E-79 -0.9813E-80  0.0000E+00
 0.3836E-84  0.2679E-83
   MODE NO.    10
 0.8545E-08  0.3038E-08  0.8545E-08 -0.8756E-78 -0.4079E-78  0.0000E+00
 0.4897E-79 -0.1051E-78  0.4727E-08 -0.8755E-66 -0.4079E-66  0.0000E+00
-0.3142E-71  0.2923E-70 -0.1175E-07 -0.1254E-66 -0.6098E-66  0.0000E+00
-0.2569E-71  0.3795E-71 -0.9383E-08 -0.5961E-66  0.1023E-66  0.0000E+00
-0.3564E-71  0.8885E-70 -0.4789E-08  0.6300E-66 -0.9880E-66  0.0000E+00
-0.8849E-70 -0.2074E-70 -0.5282E-08  0.1514E-65  0.6003E-66  0.0000E+00
```

```
 0.7851E-70 -0.7344E-71 -0.3178E-09 -0.2052E-66  0.5120E-67  0.0000E+00
-0.2406E-71  0.7038E-71  0.3038E-08 -0.2052E-78  0.5120E-79  0.0000E+00
-0.2010E-83 -0.1198E-82


 CORRELATION EPSD

   MODE NO.     1
 0.1000E+01  0.1498E+00  0.1747E+00  0.1747E+00  0.1747E+00  0.1747E+00
 0.1747E+00  0.1747E+00  0.1747E+00  0.1747E+00
   MODE NO.     2
 0.1498E+00  0.1000E+01  0.6618E+00  0.6618E+00  0.6618E+00  0.6618E+00
 0.6618E+00  0.6618E+00  0.6618E+00  0.6618E+00
   MODE NO.     3
 0.1747E+00  0.6618E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     4
 0.1747E+00  0.6618E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     5
 0.1747E+00  0.6618E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     6
 0.1747E+00  0.6618E+00  0.1000E+01  0.1000E+01  0.1000E-01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.1747E+00  0.6618E+00  0.1000E+01  0.1000E+0   0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+
   MODE NO.     8
 0.1747E+00  0.6618E+00  0.1000E+01  0.1000E+     1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000
   MODE NO.     9
 0.1747E+00  0.6618E+00  0.1000E+01  0.1000E+0     .  00E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    10
 0.1747E+00  0.6618E+00  0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


 CORRELATION EPSV

   MODE NO.     1
 0.1000E+01  0.1712E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
 0.1712E-01  0.1000E+01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
 0.0000E+00  0.0000E+00  0.1000E+01  0.2216E+00  0.2216E+00  0.2216E+00
 0.2216E+00  0.2216E+00  0.2216E+00  0.2216E+00
   MODE NO.     4
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.     9
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01
   MODE NO.    10
 0.0000E+00  0.0000E+00  0.2216E+00  0.1000E+01  0.1000E+01  0.1000E+01
 0.1000E+01  0.1000E+01  0.1000E+01  0.1000E+01


 CORRELATION MU (FOR CROSS TERM OF RD AND RV)

   MODE NO.     1
 0.0000E+00  0.1672E+00  0.3467E-01  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     2
-0.1672E+00  0.0000E+00  0.7297E-01  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     3
-0.3467E-01 -0.7297E-01  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     4
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     5
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     6
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     7
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     8
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.     9
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
   MODE NO.    10
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00


 COMBINED VALUES OF COUPLED MODAL DISPLACEMENTS

 DISPLACEMENTS AT PRIMARY SYSTEM CONNETING DOF

 DOF #     DISPLACEMENT
```

```
  2        0.3993E-01
  6        0.8314E-01

DISPLACEMENTS AT SECONDARY SYSTEM DOF

NODE     DX          DY          DZ         ROT-X       ROT-Y       ROT-Z

  1   0.3993E-01  0.1849E-72  0.8615E-73  0.0000E+00  0.1034E-73  0.2220E-73
  2   0.9636E-01  0.1849E-60  0.8615E-61  0.0000E+00  0.1817E-65  0.1190E-64
  3   0.1436E+00  0.2648E-61  0.1288E-65  0.0000E+00  0.6948E-65  0.2712E-65
  4   0.1729E+00  0.1259E-60  0.2160E-61  0.0000E+00  0.1582E-65  0.1183E-64
  5   0.1804E+00  0.1331E-60  0.2087E-60  0.0000E+00  0.8906E-65  0.1067E-64
  6   0.1652E+00  0.3197E-60  0.1268E-60  0.0000E+00  0.1180E-64  0.3184E-64
  7   0.1304E+00  0.4334E-61  0.1081E-61  0.0000E+00  0.4711E-66  0.6535E-66
  8   0.8314E-01  0.4335E-73  0.1082E-73  0.0000E+00  0.4519E-78  0.3506E-77

COMBINED VALUES OF COUPLED MEMBER FORCES

NODE     FX          FY          FZ          MX          MY          MZ

  1   0.1174E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  2   0.1174E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  2   0.9366E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  3   0.9366E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  3   0.5757E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  4   0.5757E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  4   0.1618E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  5   0.1618E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  5   0.3514E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  6   0.3514E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  6   0.7551E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  7   0.7551E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  7   0.1060E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  8   0.1060E+03  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

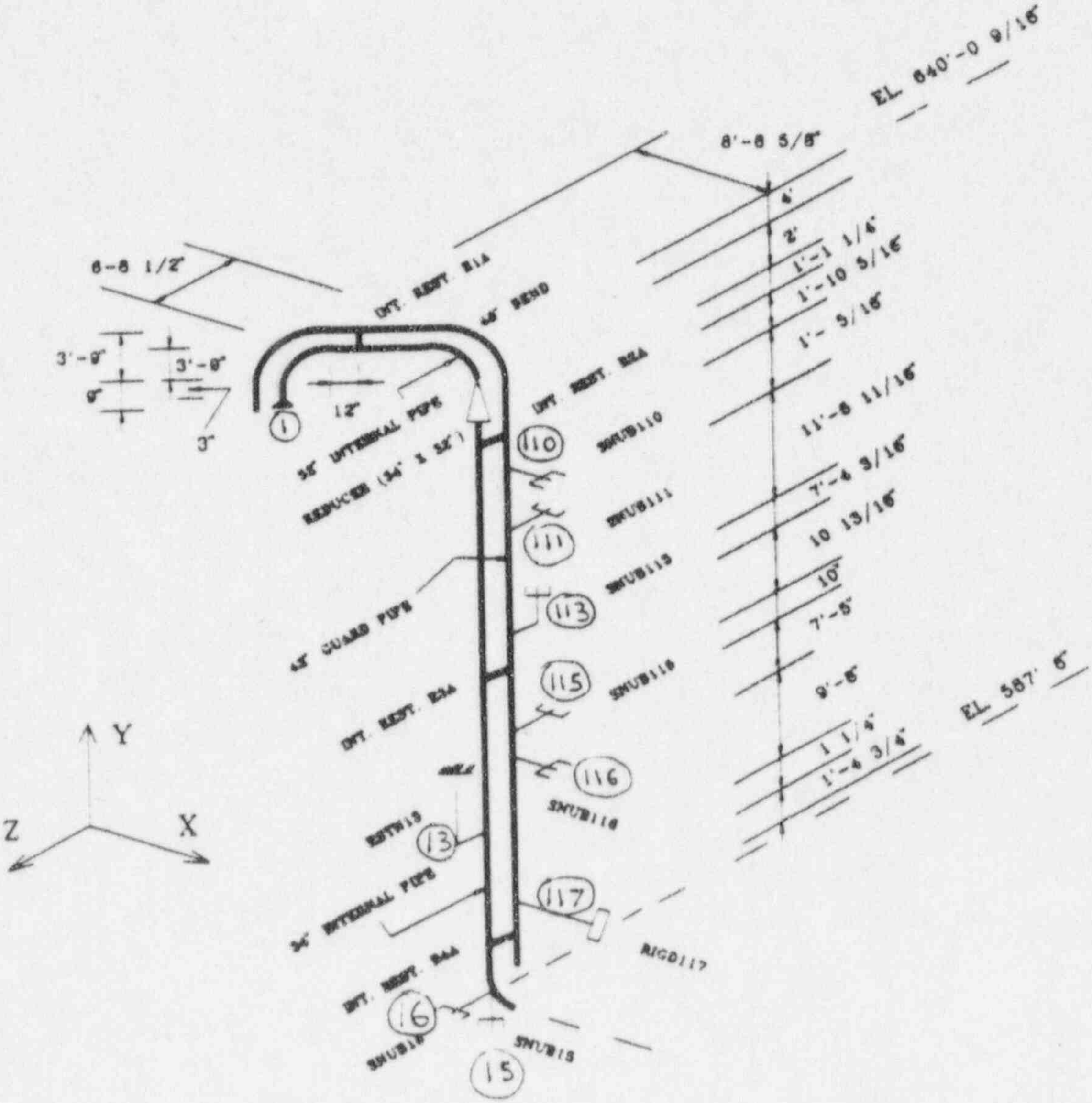
COMBINED VALUES OF COUPLED SUPPORT REACTIONS

TYPE     NODE      SUPPORT REACTION

FX        1          0.1174E+03
FX        8          0.1060E+03
```

Attachment 5

Main Steam Piping (Not to Scale)


EL 640'-0 9/16"
8'-8 5/8"
4"
2'
1'-1 1/4"
1'-10 5/16"
1'- 5/16"
11'-8 11/16"
7'-4 3/16"
10 13/16"
10"
7'-5"
9'-8"
1 1/4"
1'-4 3/4"
EL 587' 6"
8-8 1/2"
3'-9"
9"
3'-9"
3"
12"
1
INT. REST. B1A
45° BEND
32" INTERNAL PIPE
REDUCER (34" x 32")
INT. REST. B2A
110
SNUB110
111
SNUB111
45" GUARD PIPE
113
SNUB113
115
SNUB116
INT. REST. B3A
116
SNUB118
RSTN13
13
34" INTERNAL PIPE
117
RIGD117
INT. REST. B4A
16
SNUB16
SNUB15
15
Y
Z
X

```
IDEN JB=2222 CD=0 GR=-Y IU=1 OU=1 PL=/PIPESTRESS INPUT FILE/
TITL BL=0 GC=0 GL=2 SU=1 CV=1 TI=/LOOP-1 OF MAIN STEAM AT CATAWBA/
FREQ TR=0 LO=1 RP=0 FR=33.33 MP=33.33 MX=7
RCAS CA=1 EV=1 PR=1 TY=1 SU=0 LO=0 FX=1 FY=1 FZ=1
RSEC CA=2 EV=1 PR=1 SU=1 FX=1 FY=1 FZ=1
CCAS CA=3 ME=2 C1=1 C2=2
SPEC EV=1 FP=1 ME=3 RP=1
     LV=1 DX=0.208 DY=0.0000 DZ=0.1180
     DI=X
         0.0301/1.0600    0.0311/1.0600    0.0315/1.0600    0.0333/1.0700
         0.0342/1.0800    0.0348/1.0800    0.0368/1.0900    0.0382/1.1000
         0.0389/1.1000    0.0403/1.1100    0.0420/1.1200    0.0429/1.1300
         0.0446/1.1400    0.0450/1.1400    0.0463/1.1500    0.0474/1.1600
         0.0495/1.1800    0.0500/1.1800    0.0510/1.1900    0.0524/1.2100
         0.0543/1.2400    0.0546/1.2500    0.0556/1.2500    0.0568/1.2700
         0.0575/1.2900    0.0606/1.3700    0.0621/1.4000    0.0633/1.4100
         0.0641/1.4200    0.0699/1.5000    0.0709/1.5200    0.0714/1.5200
         0.0719/1.5300    0.0763/1.5900    0.0769/1.6100    0.0770/1.6000
         0.0781/1.6200    0.0782/1.6200    0.0800/1.6600    0.0855/1.9700
         0.0877/2.0500    0.0893/2.1300    0.0943/3.2900    0.0971/3.6800
         0.0990/4.1100    0.0991/4.0700    0.1057/4.8900    0.1082/5.1500
         0.1089/5.2300    0.1109/5.4200    0.1166/6.9800    0.1196/7.7500
         0.1245/8.9000    0.1263/9.8000    0.1299/9.8000    0.1337/9.8000
         0.1368/9.8000    0.1420/9.8000    0.1543/9.8000    0.1672/9.1800
         0.1684/9.1300    0.1736/8.9000    0.1792/8.7900    0.1825/8.7300
         0.1852/8.3300    0.1916/6.8700    0.1984/5.2500    0.2058/4.1000
         0.2137/3.3000    0.2222/2.6800    0.2315/2.3900    0.2415/1.7800
         0.2525/1.5800    0.2558/1.5000    0.2564/1.4900    0.2646/1.4200
         0.2778/1.1000    0.2924/1.0700    0.3086/1.0300    0.3215/0.8290
         0.3367/0.8190    0.3521/0.7680    0.3704/0.7590    0.3831/0.7530
         0.3968/0.7470    0.4115/0.6910    0.4274/0.6770    0.4444/0.6620
         0.4630/0.6480    0.4831/0.6060    0.5051/0.5630    0.5291/0.5210
         0.5556/0.5170    0.5848/0.5060    0.6173/0.4220    0.6536/0.3970
         0.6944/0.3720    0.7407/0.3370    0.7576/0.3260    0.7937/0.3050
         0.8547/0.3050    0.9259/0.3040    1.0101/0.2740    1.1111/0.1980
         1.2346/0.1700    1.3889/0.1350    1.4286/0.1310    1.5152/0.1240
         1.5873/0.1190    1.8519/0.1140    2.0000/0.1040
     DI=Y
         0.0284/0.0818    0.0311/0.0824    0.0315/0.0825    0.0342/0.0833
         0.0348/0.0835    0.0379/0.0848    0.0382/0.0849    0.0389/0.0854
         0.0417/0.0873    0.0420/0.0875    0.0429/0.0904    0.0435/0.0918
         0.0459/0.0989    0.0463/0.1000    0.0474/0.1030    0.0478/0.1050
         0.0479/0.1050    0.0505/0.1120    0.0508/0.1120    0.0510/0.1130
         0.0515/0.1160    0.0526/0.1220    0.0529/0.1230    0.0562/0.1410
         0.0575/0.1480    0.0576/0.1480    0.0581/0.1570    0.0592/0.1650
         0.0621/0.1990    0.0633/0.2070    0.0641/0.2150    0.0649/0.2190
         0.0658/0.2220    0.0704/0.2370    0.0709/0.2390    0.0714/0.2400
         0.0719/0.2400    0.0730/0.2400    0.0735/0.2400    0.0736/0.2400
         0.0826/0.2400    0.0877/0.2400    0.0885/0.2390    0.0893/0.2390
         0.0901/0.2390    0.0909/0.2390    0.0917/0.2390    0.0926/0.2390
         0.0943/0.2390    0.0962/0.2390    0.0971/0.2390    0.0980/0.2390
         0.0990/0.2420    0.1010/0.2480    0.1048/0.2580    0.1057/0.2600
         0.1062/0.2610    0.1064/0.2610    0.1065/0.2610    0.1068/0.2620
         0.1082/0.2660    0.1089/0.2670    0.1090/0.2670    0.1091/0.2670
         0.1109/0.2720    0.1229/0.2720    0.1245/0.2720    0.1332/0.2720
         0.1355/0.2720    0.1389/0.2700    0.1502/0.2640    0.1515/0.2760
         0.1543/0.2760    0.1567/0.2760    0.1684/0.2780    0.1748/0.2780
         0.1818/0.2780    0.1852/0.2780    0.1894/0.2780    0.1916/0.2780
         0.1984/0.2780    0.2058/0.2780    0.2137/0.2770    0.2222/0.2760
         0.2315/0.2760    0.2415/0.2520    0.2525/0.2780    0.2778/0.2780
         0.2882/0.2780    0.3086/0.2780    0.3135/0.2640    0.3175/0.2860
         0.3247/0.3240    0.3367/0.3240    0.3968/0.3240    0.4115/0.2850
         0.4630/0.2850    0.4831/0.2820    0.5556/0.2740    0.5848/0.2700
         0.6173/0.2270    0.6536/0.2170    0.6944/0.2060    0.7407/0.1970
         0.7576/0.1850    0.7937/0.1850    0.9259/0.1850    1.0101/0.1680
         1.1111/0.1230    1.2346/0.1040    1.3889/0.0830    1.4286/0.0816
         1.5152/0.0789    1.5873/0.0769    1.8519/0.0731    2.0000/0.0673
     DI=Z
         0.0288/0.9500    0.0315/0.9610    0.0321/0.9640    0.0348/0.9770
         0.0355/0.9810    0.0389/1.0000    0.0397/1.0100    0.0435/1.0300
         0.0442/1.0400    0.0478/1.0700    0.0488/1.0800    0.0529/1.1100
         0.0541/1.1300    0.0581/1.1800    0.0599/1.2100    0.0649/1.3000
         0.0662/1.3400    0.0667/1.3600    0.0719/1.5100    0.0769/1.8100
         0.0770/1.8000    0.0781/1.8900    0.0800/1.9600    0.0877/3.0000
         0.0893/3.1700    0.0990/8.7700    0.0991/8.6600    0.1010/10.0000
         0.1089/10.0000   0.1109/10.0000   0.1211/10.0000   0.1235/10.0000
         0.1332/8.6900    0.1355/8.4000    0.1389/8.0600    0.1393/8.0600
```

```
          0.1422/8.0300     0.1425/8.0300     0.1462/7.9900     0.1502/7.9500
          0.1522/7.6900     0.1543/7.1200     0.1587/6.8500     0.1626/6.6200
          0.1634/6.5700     0.1672/6.3600     0.1684/6.2300     0.1736/6.0000
          0.1792/5.0200     0.1825/4.3000     0.1852/3.9400     0.1916/3.2600
          0.1984/2.6500     0.2058/2.2100     0.2137/1.8400     0.2222/1.5200
          0.2315/1.4300     0.2415/1.1500     0.2525/1.0300     0.2558/0.9820
          0.2564/0.9760     0.2646/0.9710     0.2778/0.8120     0.2924/0.7880
          0.3086/0.7630     0.3215/0.6630     0.3367/0.6560     0.3521/0.6480
          0.3704/0.6350     0.3831/0.6260     0.3968/0.6170     0.4115/0.5750
          0.4274/0.5710     0.4630/0.5630     0.4831/0.5240     0.5051/0.5090
          0.5291/0.4940     0.5556/0.4790     0.5848/0.4680     0.6173/0.3930
          0.6536/0.3720     0.6944/0.3510     0.7407/0.3230     0.7576/0.2970
          0.7937/0.2970     0.9259/0.2970     1.0101/0.2650     1.1111/0.1950
          1.2346/0.1640     1.3889/0.1300     1.5873/0.1190     1.8519/0.1120
          2.0000/0.1020
      LV=2 DX=0.000 DY=0.0000 DZ=0.000
      DI=X
          0.0490/0.3800     0.0500/0.3800     0.0800/0.5100     0.1050/0.7100
          0.1380/2.5500     0.1400/3.5800     0.1700/3.5800     0.1710/2.6000
          0.2100/1.0000     0.2300/0.8500     0.4400/0.5600     0.6500/0.4400
          7.0000/0.0000     7.0010/0.0000
      DI=Y
          0.0290/0.0800     0.0300/0.0800     0.1110/0.2830     0.2860/0.3240
          4.0000/0.0310     4.0010/0.0310
      DI=Z
          0.0490/0.3800     0.0500/0.3800     0.0780/0.5300     0.0960/0.9200
          0.1090/2.0500     0.1100/3.0200     0.1490/3.0200     0.1500/2.2000
          0.1880/0.9500     0.2300/0.7000     0.2600/0.6000     0.5300/0.5000
          0.9000/0.3000     7.0000/0.0000     7.0010/0.0000
      LV=3 DX=0.0 DY=0.0000 DZ=0.0
      DI=X
          0.0490/0.3000     0.0500/0.3000     0.0700/0.3800     0.1000/0.5200
          0.1140/0.7300     0.1340/2.0000     0.1350/2.6500     0.1720/2.6500
          0.1730/1.9250     0.2150/0.9250     0.2550/0.7000     0.2900/0.6300
          0.4200/0.6000     0.6000/0.5000     0.6700/0.4000     1.1000/0.2900
          7.0000/0.0000     7.0010/0.0000
      DI=Y
          0.0290/0.0800     0.0300/0.0800     0.1110/0.2830     0.2860/0.3240
          4.0000/0.0310     4.0010/0.0310
      DI=Z
          0.0490/0.3000     0.0500/0.3000     0.0700/0.3500     0.0900/0.4200
          0.1030/0.7200     0.1150/1.4500     0.1200/1.5800     0.1210/2.2000
          0.1480/2.2000     0.1490/1.5800     0.2000/0.7200     0.2350/0.6200
          0.2900/0.5500     0.4800/0.5400     0.8000/0.3200     1.0000/0.2700
          7.0000/0.0000     7.0010/0.0000
      LV=4 DX=0.0 DY=0.0000 DZ=0.0
      DI=X
          0.0490/0.2000     0.0500/0.2000     0.0800/0.2400     0.1100/0.3400
          0.1350/1.1000     0.1360/1.5000     0.1650/1.5000     0.1660/1.0800
          0.2050/0.6300     0.2350/0.5200     0.2650/0.5000     0.3600/0.5100
          0.5200/0.4600     0.9500/0.2700     1.4200/0.1600     2.3000/0.1100
          8.0000/0.0000     8.0010/0.0000
      DI=Y
          0.0290/0.0800     0.0300/0.0800     0.1110/0.2830     0.2860/0.3240
          4.0000/0.0310     4.0010/0.0310
      DI=Z
          0.0490/0.2300     0.0500/0.2300     0.0700/0.2700     0.0900/0.3700
          0.1030/0.4600     0.1140/0.8200     0.1150/0.9300     0.1160/1.3900
          0.1480/1.3900     0.1490/1.0100     0.1700/0.6800     0.1900/0.6300
          0.2000/0.5700     0.2600/0.4700     0.3000/0.4600     0.3700/0.5000
          0.4900/0.4600     0.5500/0.4400     0.6800/0.3300     0.8400/0.3100
          1.3100/0.1500     2.4000/0.1300     7.0000/0.0000     7.0010/0.0000
MATL CD=3  EC=27.09 SC=71.8 SH=75.0 YC=18.6 YH=18.6
CROS TY=0 OD=32.827 WT=1.613 MA=538.220 SO=0.0 KL=1
ANCH PT=1 LO=0 PL=0 LV=1
TANP DY=4.0
BRAD PT=2 RA=4.0 FF=3.544
TANG PT=3 DX=3.17 DZ=-2.44
CROS TY=0 OD=32.680 WT=1.543 MA=513.590 SO=0.0 KL=1
TANG PT=4 DX=0.793 DZ=-0.609
LUMP PT=4 MA=.33815
TANG PT=5 DX=0.794 DZ=-0.610
TANG PT=6 DX=0.396 DZ=-0.304
TANG PT=7 DX=0.396 DZ=-0.304
CROS TY=0 OD=32.827 WT=1.613 MA=538.220 SO=0.0 KL=1
BEND PT=8 X1=3.17 Z1=-2.44 Y2=-4.0 FF=5.191
CROS TY=0 OD=32.653 WT=1.520 MA=539.180 SO=0.0 KL=1
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```
CRED PT=9 DY=-2.0 AN=4.737
CROS TY=0 OD=34.638 WT=1.560 MA=551.620 SO=0.0 KL=1
TANG PT=10 DY=-1.104
LUMP PT=10 MA=.20416
TANG PT=11 DY=-18.896
TANG PT=12 DY=-2.896
LUMP PT=12 MA=.20416
TANG PT=13 DY=-9.151
RSTN PT=13 DY=1 SP=9.4 LV=3
TANG PT=14 DY=-9.771
LUMP PT=14 MA=.33815
TANG PT=15 DY=-1.896
SNUB PT=15 DY=1 SP=1044.0 LV=4
CROS TY=0 OD=34.863 WT=1.635 MA=629.760 SO=0.0 KL=1
BEND PT=16 Y1=-1.173 X2=0.830 Y2=-0.830 FF=8.194
SNUB PT=16 DZ=1 SP=3500.0 LV=4
BEND PT=17 X1=0.830 Y1=-0.830 X2=1.173 FF=8.194
MATL CD=3  EC=27.09 SC=71.8 SH=75.0 YC=18.6 YH=18.6
CROS TY=0 OD=41.960 WT=1.563 MA=736.970 SO=0.0 KL=1
JUNC PT=101
TANG PT=102 DY=0.5
LUMP PT=102 MA=1.6600
CROS TY=0 OD=42.298 WT=1.763 MA=825.940 SO=0.0 KL=1
BEND PT=103 Y1=4.0 X2=3.17 Z2=-2.44 FF=8.009
CROS TY=0 OD=41.960 WT=1.563 MA=736.970 SO=0.0 KL=1
TANG PT=104 DX=0.801 DZ=-0.615
LUMP PT=104 MA=.37215
TANG PT=105 DX=0.786 DZ=-0.604
TANG PT=106 DX=0.792 DZ=-0.610
LUMP PT=106 MA=2.6260
CROS TY=0 OD=42.298 WT=1.763 MA=825.940 SO=0.0 KL=1
BEND PT=107 X1=3.17 Z1=-2.44 Y2=-4.0 FF=8.009
LUMP PT=107 MA=1.660
CROS TY=0 OD=41.960 WT=1.563 MA=736.970 SO=0.0 KL=1
TANG PT=108 DY=-1.167
LUMP PT=108 MA=5.2520
TANG PT=109 DY=-1.947
LUMP PT=109 MA=.12187
TANG PT=110 DY=-1.85
SNUB PT=110 DX=2.624 DZ=1.440 SP=700.0 LV=2
TANG PT=111 DY=-1.026
SNUB PT=111 DZ=1.0 SP=700.0 LV=2
TANG PT=112 DY=-11.557
TANG PT=113 DY=-3.5
SNUB PT=113 DY=1.0 SP=129.0 LV=2
TANG PT=114 DY=-3.859
LUMP PT=114 MA=.12187
TANG PT=115 DY=-0.891
SNUB PT=115 DZ=1.0 SP=700.0 LV=3
TANG PT=116 DY=-0.833
SNUB PT=116 DX=2.630 DZ=1.443 SP=700.0 LV=3
TANG PT=117 DY=-17.084
RSUP PT=117 DX=1 SP=1E8 LV=4
TANG PT=118 DY=-0.114
LUMP PT=118 MA=.20491
TANG PT=119 DY=-1.386
JUNC PT=4
SPRS PT=104 MP=1 DX=0.008 DZ=-0.006 XY=1.0 AX=1.0E6 AY=1.0E6 KL=1
JUNC PT=10
SPRS PT=109 MP=1 DY=-0.01 XZ=1.0 AX=1.0E6 AY=1.0E6 KL=1
JUNC PT=12
SPRS PT=114 MP=1 DY=-0.01 XZ=1.0 AX=1.0E6 AY=1.0E6 KL=1
JUNC PT=14
SPRS PT=118 MP=1 DY=-0.01 XZ=1.0 AX=1.0E6 AY=1.0E6 KL=1
ENDP
```

```
CREST/ PIPESTRESS FILE - LOOP1 OF MS AT CATAWBA - GLOBAL X (KIP, FT-KIP, INCH)
2430   12  1  50  7    1     0  10   0     0   0    1    1
  900    2     5    1.0E-6        33.3        386.4 0.10
       0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05
       0.05         0.05      0.05000      0.05000      0.05000      0.05000      0.05000      0.05000
   0.050000     0.050000      0.05000         0.05         0.05         0.05         0.05         0.05
       0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05
       0.05         0.05      0.05000      0.05000      0.05000      0.05000      0.05000      0.05000
   0.050000     0.050000      0.05000         0.05         0.05         0.05         0.05         0.05
       0.05         0.05
       0.02         0.02         0.02         0.02         0.02         0.02         0.02
  403  404  405   85   86   87   49   50   51  109  110  111
    1    2    3    4    5    6    7    8    9   10   11   12
100000000.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 100000000.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 100000000.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 525.0 0.0 303.1 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 9.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 303.1 0.0 875.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 100000000.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 1044.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 3500.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 525.0 0.0 303.1
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 129.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 303.1 0.0 875.0
1
     4.4472000    4.4656000    5.7132000    5.7460000    6.1012000    6.4713000
     6.5905000    6.7173000    6.8481000    6.8483000    7.5015000    7.8799000
     9.1827000    9.4130000   11.7480000   11.8730000   12.1540000   12.8280000
    13.4560000   14.0360000   14.8610000   15.2500000   17.5630000   17.5710000
    17.5760000   17.5780000   17.9380000   18.1400000   18.7190000   18.8340000
    19.6260000   19.9940000   20.1110000   20.8090000   21.0790000   21.2960000
    22.1030000   22.3120000   22.3870000   24.0730000   24.7520000   26.6740000
    26.7390000   27.4170000   27.5000000   29.3010000   29.4000000   30.2430000
    30.3900000   32.7240000
   -0.1017E-03   0.9600E-04   0.1447E-03   0.1422E-02   0.1508E-01   0.5191E-02
    0.2008E-02  -0.1430E-01   0.1435E-01   0.2206E-01  -0.1192E-01   0.9164E-02
    0.1166E-01  -0.1077E-01   0.3206E-03  -0.2944E-03  -0.9305E-05  -0.6343E-03
   -0.5252E-04   0.3328E-03  -0.8789E-03  -0.5480E-03  -0.2598E-03  -0.3817E-03
    0.4381E-03   0.5088E-03  -0.5035E-03   0.3214E-03   0.4865E-03   0.1134E-02
   -0.8617E-03   0.3820E-02   0.6456E-02  -0.4344E-03   0.7085E-02   0.1797E-01
   -0.5251E-02  -0.4448E-02  -0.3127E-02   0.4686E-02   0.9407E-03   0.6398E-03
   -0.2642E-02   0.5661E-04  -0.1568E-04  -0.1262E-03  -0.1340E-03   0.2400E-03
    0.1068E-04  -0.7934E-03
    0.1080E-05  -0.8980E-06  -0.3573E-05  -0.3402E-04  -0.2237E-04  -0.5682E-05
   -0.2536E-05   0.1200E-04  -0.1197E-04  -0.1891E-04   0.1389E-04  -0.6841E-05
   -0.1607E-04   0.1604E-04  -0.1749E-05   0.4694E-05   0.2467E-05   0.1520E-04
    0.4848E-04  -0.1329E-03   0.3676E-03   0.1476E-03  -0.7719E-02  -0.1034E-01
    0.1167E-01   0.1177E-01  -0.2955E-03   0.5393E-04  -0.1191E-03  -0.8588E-05
    0.1447E-03   0.9612E-04   0.1814E-03  -0.1689E-03  -0.7037E-03  -0.5223E-03
    0.4187E-03   0.1884E-03  -0.3524E-03   0.5421E-04   0.4657E-03  -0.3451E-03
    0.1395E-02  -0.1722E-04  -0.6222E-04  -0.1010E-04  -0.2604E-04   0.6470E-04
    0.2259E-04  -0.6409E-04
   -0.3256E-04   0.8219E-05  -0.2850E-03  -0.1859E-02   0.3629E-02   0.5146E-02
   -0.5483E-04  -0.9251E-02   0.5802E-02   0.8972E-02   0.8071E-02   0.1009E-01
   -0.2507E-01   0.2883E-01  -0.2319E-03   0.1415E-02   0.8544E-04   0.1476E-02
   -0.1101E-03   0.1358E-03  -0.3659E-03  -0.2536E-03  -0.6745E-04  -0.5644E-04
    0.1348E-03   0.1371E-03  -0.1131E-03   0.4002E-03   0.4176E-03   0.5713E-03
   -0.1606E-02   0.2742E-02   0.1477E-02  -0.2025E-02   0.4958E-02   0.4763E-02
   -0.4754E-02  -0.5283E-02   0.5828E-02   0.5327E-04  -0.4688E-02  -0.1135E-02
    0.6259E-02  -0.4532E-03  -0.1031E-03   0.3120E-03  -0.2750E-03  -0.1144E-03
    0.7692E-03   0.3653E-03
   -0.1828E-04   0.1631E-04   0.1603E-04  -0.2188E-04   0.1881E-02   0.4416E-04
    0.1470E-03  -0.3684E-05   0.9337E-05   0.2344E-05  -0.2449E-04  -0.2348E-02
   -0.5703E-03   0.4386E-04  -0.2193E-03  -0.1078E-04  -0.9663E-05   0.1300E-04
   -0.2633E-04   0.1157E-04   0.5224E-04  -0.4736E-06   0.1005E-04   0.1183E-04
    0.1531E-05  -0.5296E-05   0.1035E-03   0.6616E-05   0.8062E-05  -0.6474E-04
   -0.4326E-04  -0.2357E-03  -0.3973E-03  -0.3548E-03  -0.5740E-03  -0.2839E-03
   -0.3380E-03  -0.4238E-03   0.8254E-03   0.2864E-02   0.5185E-03  -0.2598E-04
    0.4845E-04   0.2674E-05  -0.2430E-04   0.1313E-04   0.1881E-04  -0.1688E-03
   -0.5507E-04   0.3571E-03
    0.2160E-06   0.3303E-06   0.4324E-06   0.5444E-06  -0.8595E-05  -0.5612E-04
    0.1041E-04   0.5842E-04   0.4487E-06  -0.4463E-06  -0.1697E-03   0.1715E-04
    0.1432E-04   0.1048E-03  -0.5175E-05   0.1205E-03   0.8813E-05   0.9090E-05
   -0.1729E-04  -0.3245E-04  -0.1261E-04   0.1000E-03   0.1066E-04  -0.1118E-04
   -0.1086E-04   0.1525E-04   0.7392E-05  -0.9808E-04  -0.6831E-04  -0.1019E-03
    0.9876E-03  -0.2607E-02   0.1776E-02  -0.7887E-03   0.8915E-03  -0.4156E-03
   -0.1181E-03  -0.1305E-03   0.2559E-03  -0.2734E-04   0.2467E-03  -0.1217E-04
   -0.1753E-04   0.9767E-05   0.5155E-05  -0.6946E-05   0.4208E-05  -0.1781E-05
   -0.7802E-05  -0.2236E-05
   -0.3236E-05  -0.4338E-05   0.7565E-05   0.7436E-05  -0.2980E-04   0.8886E-03
   -0.1826E-03  -0.9247E-03   0.3859E-07   0.8400E-05   0.2413E-02  -0.1897E-04
   -0.1075E-03  -0.1087E-02   0.3664E-04  -0.5685E-03  -0.3384E-04  -0.2515E-04
    0.1235E-04   0.5412E-05  -0.8025E-05   0.9136E-04   0.1039E-04  -0.1234E-04
   -0.1569E-04  -0.2908E-05  -0.6348E-05  -0.1406E-03  -0.8913E-04  -0.4999E-04
    0.5983E-03  -0.7315E-03   0.3540E-03   0.5234E-03  -0.9608E-03   0.5683E-03
    0.2782E-03   0.4019E-03  -0.7902E-03   0.6790E-03  -0.2477E-02   0.2376E-03
  0.3016E-03 -0.1351E-03 -0.4935E-04  0.9753E-04 -0.6835E-04 -0.2611E-04
  0.1260E-03 -0.4176E-03
 -0.9284E-05  0.8303E-05  0.1992E-04 -0.2653E-04  0.9789E-03  0.2633E-04
  0.8230E-04 -0.4137E-05  0.5031E-05  0.1276E-05 -0.9022E-05 -0.1259E-02
 -0.3212E-03  0.2619E-04 -0.1015E-03 -0.3215E-05 -0.2164E-05 -0.4569E-05
  0.1268E-03 -0.2081E-03  0.4153E-03  0.8352E-06  0.5077E-05  0.1333E-04
  0.6963E-06 -0.2523E-04  0.1591E-03  0.1201E-04  0.3018E-04 -0.1682E-03
 -0.7964E-04 -0.4536E-03 -0.6767E-03 -0.4613E-03 -0.7334E-03 -0.3861E-03
 -0.5846E-03 -0.6594E-03  0.9097E-03  0.3526E-02  0.6477E-03  0.8295E-04
 -0.2890E-04  0.5915E-04 -0.1634E-03 -0.1312E-03 -0.1572E-03 -0.2158E-03
 -0.9924E-04 -0.5355E-04
 -0.6881E-07  0.9120E-07 -0.2542E-06  0.1004E-06 -0.2738E-05 -0.6341E-05
  0.8128E-06  0.6812E-05  0.4604E-06  0.3371E-07 -0.2087E-04  0.4144E-05
  0.2357E-05  0.1555E-04 -0.1406E-05  0.2233E-04  0.1778E-05  0.1810E-05
 -0.4994E-05 -0.4860E-05 -0.8199E-05  0.2633E-04  0.4944E-05 -0.5426E-05
 -0.4164E-05  0.1137E-04  0.4532E-05 -0.3968E-04 -0.2815E-04 -0.5613E-04
  0.5063E-03 -0.1414E-02  0.9785E-03 -0.4803E-03  0.5748E-03 -0.2723E-03
 -0.8272E-04 -0.9392E-04  0.1853E-03 -0.7729E-04  0.2700E-03 -0.2218E-04
 -0.2920E-04  0.1658E-04  0.5052E-05 -0.1496E-04  0.1114E-04  0.1091E-04
 -0.2437E-04  0.7438E-05
 -0.7899E-06 -0.1098E-05  0.2148E-04  0.1769E-04 -0.9896E-05  0.4894E-03
 -0.1019E-03 -0.5285E-03  0.6132E-07  0.4660E-05  0.1372E-02 -0.1729E-04
 -0.6460E-04 -0.6464E-03  0.1378E-04 -0.2470E-03 -0.1151E-04 -0.3745E-06
 -0.5966E-04 -0.1069E-03 -0.4669E-04  0.4160E-03  0.1914E-04 -0.2041E-04
 -0.3058E-04 -0.7520E-05 -0.1210E-04 -0.2414E-03 -0.1991E-03 -0.8224E-04
  0.9210E-03 -0.9035E-03  0.3631E-03  0.7413E-03 -0.1292E-02  0.7982E-03
  0.4301E-03  0.4794E-03 -0.9948E-03  0.8672E-03 -0.3048E-02  0.3653E-03
  0.5022E-03 -0.3271E-03 -0.9028E-04  0.3669E-03 -0.2560E-03 -0.2552E-03
  0.6014E-03  0.1319E-04
 -0.2283E-04  0.2037E-04  0.1835E-04 -0.2534E-04  0.2500E-02  0.6022E-04
  0.1982E-03 -0.5714E-05  0.1277E-04  0.3213E-05 -0.3329E-04 -0.3447E-02
 -0.9285E-03  0.7274E-04 -0.5236E-03 -0.2303E-04 -0.2612E-04  0.4869E-04
 -0.2288E-03  0.3268E-03 -0.5174E-03 -0.8135E-05 -0.2235E-04 -0.2154E-04
 -0.3082E-05 -0.3812E-06 -0.1332E-03 -0.3806E-05 -0.7982E-06  0.3182E-04
  0.9124E-05  0.1344E-03  0.1567E-03  0.1460E-03  0.1972E-03  0.8983E-04
  0.5100E-04  0.6276E-04 -0.1659E-03 -0.7691E-04  0.7310E-05  0.3385E-06
  0.7113E-05 -0.5844E-06 -0.7434E-05  0.6006E-05  0.7973E-06 -0.4841E-04
 -0.9304E-05  0.1656E-03
  0.2849E-06  0.3985E-06  0.5522E-06  0.6241E-06 -0.9374E-05 -0.7017E-04
  0.1321E-04  0.7313E-04  0.4562E-06 -0.5796E-06 -0.2128E-03  0.1917E-04
  0.1729E-04  0.1319E-03 -0.7054E-05  0.1518E-03  0.1104E-04  0.1155E-04
 -0.2189E-04 -0.4045E-04 -0.1627E-04  0.1254E-03  0.1301E-04 -0.1382E-04
 -0.1358E-04  0.1772E-04  0.8005E-05 -0.1229E-03 -0.8593E-04 -0.1245E-03
  0.1234E-02 -0.3253E-02  0.2221E-02 -0.9827E-03  0.1115E-02 -0.5172E-03
 -0.1465E-03 -0.1615E-03  0.3173E-03 -0.4286E-04  0.3082E-03 -0.1492E-04
 -0.2255E-04  0.1267E-04  0.7784E-05 -0.9633E-05  0.5571E-05 -0.3333E-05
 -0.9482E-05 -0.6511E-05
 -0.4138E-05 -0.5486E-05  0.6601E-05  0.7125E-05 -0.3590E-04  0.1164E-02
 -0.2402E-03 -0.1223E-02  0.2017E-07  0.1117E-04  0.3347E-02 -0.3021E-04
 -0.1708E-03 -0.1763E-02  0.8936E-04 -0.1387E-02 -0.9043E-04 -0.8711E-04
  0.1077E-03  0.1727E-03  0.4983E-04 -0.3569E-03 -0.1259E-04  0.1358E-04
  0.1850E-04  0.7307E-05  0.4015E-05  0.1241E-03  0.3786E-04  0.1484E-04
 -0.1578E-03 -0.4519E-04  0.9995E-04 -0.3060E-03  0.4624E-03 -0.2181E-03
 -0.5700E-04 -0.9297E-04  0.1559E-03 -0.3691E-04 -0.5435E-04  0.4208E-04
  0.5205E-04 -0.3647E-04 -0.1373E-04  0.4147E-04 -0.3498E-04 -0.2269E-04
  0.6664E-04 -0.1566E-03
-.43240E+01  .37733E+01  .16770E+02 -.21695E+02  .21105E+03  .61476E+01
 .21936E+02 -.99462E+00  .14386E+01  .37113E+00 -.14094E+01 -.17915E+03
-.36449E+02  .30945E+01 -.14025E+01 -.45026E+00  .55006E+00 -.29686E+01
 .35658E+02 -.48735E+02  .75684E+02 -.69418E-01 -.33168E+00  .64166E+00
-.77090E-01 -.29025E+01  .12701E+02  .11912E+01  .30306E+01 -.15820E+02
-.58897E+01 -.27769E+02 -.41155E+02 -.19619E+02 -.30140E+02 -.16340E+02
-.29485E+02 -.30009E+02  .25344E+02  .10186E+03  .17177E+02  .39131E+01
-.21317E+01  .23024E+01 -.62230E+01 -.45933E+01 -.60349E+01 -.21907E+01
-.10689E+01 -.77332E+01
  5    0.020
0.333 0.048  2.00   0.28   5.88   0.28 33.33   0.08 50.00   0.08
  5    0.050
0.333 0.034  2.00   0.20   5.88   0.20 33.33   0.08 50.00   0.08
```

```
CREST/ PIPESTRESS FILE - LOOP1 OF MS AT CATAWBA - GLOBAL X (KIP, FT-KIP, INCH)

  NUMBER OF PRIMARY DOF               NP= 2430

  NUMBER OF CONNECTING DOF            NC=   12

  NUMBER OF PIPING ANCHORS            NA=    1

  NUMBER OF PRIMARY MODES            NPM=   50

  NUMBER OF SECONDARY MODES          NSM=    7

  NORMALIZATION INDEX FOR P.S.     NORMP=    1

  NORMALIZATION INDEX FOR S.S.     NORMS=    0

  OUTPUT TYPE INDICATOR           IPRINT=    0

  OUTPUT TYPE INDICATOR          IPRINTS=    0

  PRIMARY RESIDUAL MODE KEY        KRESP=    0

  SECONDARY RESIDUAL MODE KEY      KRESS=    1

  NUMBER OF NONZERO IN PRIMARY SYSTEM STIFFNESS MATRIX       NONZP=   10

  GLOBAL EARTHQUAKE DIRECTION  X=1  Y=2(VERTICAL)  Z=3       KFLG=    1

  NUMBER OF ITERATIONS            NITER=  900

  NUMBER OF SPECTRA CURVES       NCURVE=    2

  NUMBER OF SPECTRUM POINTS        MXLP=    5

  ITERATION TOLERANCE               TOL=  0.1000E-05

  RIGID FREQUENCY                    FR=  33.300

  SPECTRUM FACTOR                  SPTR= 386.400

  CORRELATION TOLERANCE              ET=   0.100


  TOTAL STORAGE REQUIRED  =      636831
  ACTUAL PROVIDED STORAGE  = 550000000


  PRIMARY DAMPING RATIOS

  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01
  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01
  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01
  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01
  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01
  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01
  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01
  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01  0.5000E-01
  0.5000E-01  0.5000E-01


  SECONDARY DAMPING RATIOS

  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01  0.2000E-01
  0.2000E-01


  CONECTING DOF # OF PRIMARY SYSTEM

  403  404  405   85   86   87   49   50   51  109  110  111


  CONECTING DOF # OF PIPING SUPPORTS

    1    2    3    4    5    6    7    8    9   10   11   12


  STIFFNESS OF CONNECTING DOF OF S.S.

  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.5250E+03  0.0000E+00  0.3031E+03
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.9400E+01  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.3031E+03  0.0000E+00  0.8750E+03
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.1000E+09  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.1044E+04  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.3500E+04  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.5250E+03  0.0000E+00  0.3031E+03
```

```
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.1290E+03  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
  0.0000E+00  0.0000E+00  0.0000E+00  0.3031E+03  0.0000E+00  0.8750E+03


  NODE # OF PIPING ANCHORS

    1


  SECONDARY FREQUENCIES (HZ)

   9.6517918  14.5002218  15.8498132  18.5338365  19.8413395  20.7905098
  22.9585626


  PRIMARY FREQUENCIES (HZ)

   4.4472000   4.4656000   5.7132000   5.7460000   6.1012000   6.4713000
   6.5905000   6.7173000   6.8481000   6.8483000   7.5015000   7.8799000
   9.1827000   9.4110000  11.7480000  11.8730000  12.1540000  12.8280000
  13.4560000  14.0360000  14.8610000  15.2500000  17.5630000  17.5710000
  17.5760000  17.5780000  17.9380000  18.1400000  18.7190000  18.8340000
  19.6260000  19.9940000  20.1110000  20.8090000  21.0790000  21.2960000
  22.1030000  22.3120000  22.3870000  24.0730000  24.7520000  26.6740000
  26.7390000  27.4170000  27.5000000  29.3010000  29.4000000  30.2430000
  30.3900000  32.7240000


  MODE SHAPE OF P.S. AT CONNECTING DOF      403

 -0.1017E-01  0.9600E-04  0.1447E-03  0.1422E-02  0.1508E-01  0.5191E-02
  0.2008E-02 -0.1830E-01  0.1435E-01  0.2206E-01 -0.1192E-01  0.9164E-02
  0.1166E-01 -0.1077E-01  0.3206E-03 -0.2944E-03 -0.9305E-05 -0.6343E-03
 -0.5252E-04  0.3326E-03 -0.8789E-03 -0.5480E-03 -0.2598E-03 -0.3817E-03
  0.4381E-03  0.5088E-03 -0.5035E-03  0.3214E-03  0.4865E-03  0.1134E-02
 -0.8617E-03  0.3820E-02  0.6856E-02 -0.4344E-03  0.7085E-02  0.1797E-01
 -0.5251E-02 -0.4448E-02 -0.3127E-02  0.4686E-02  0.9407E-03  0.6398E-03
 -0.2642E-02  0.5661E-04 -0.1568E-04 -0.1262E-03 -0.1340E-03  0.2400E-03
  0.1068E-04 -0.7934E-03


  MODE SHAPE OF P.S. AT CONNECTING DOF      404

  0.1080E-05 -0.8980E-06 -0.3573E-05 -0.3402E-04 -0.2237E-04 -0.5682E-05
  0.2536E-05  0.1200E-04 -0.1197E-04 -0.1891E-04  0.1389E-04 -0.6841E-05
 -0.1607E-04  0.1604E-04 -0.1749E-05  0.4694E-05  0.2467E-05  0.1520E-04
  0.4848E-04 -0.1329E-03  0.3676E-03  0.1476E-03 -0.7719E-02 -0.1034E-03
  0.1167E-01  0.1177E-01 -0.2955E-03  0.5393E-04 -0.1191E-03 -0.8568E-05
  0.1447E-03  0.9612E-04  0.1414E-03 -0.1689E-03 -0.7037E-03 -0.5223E-03
  0.4187E-03  0.1884E-03 -0.3524E-03  0.5421E-04  0.4657E-03 -0.3451E-03
  0.1395E-02 -0.1722E-04 -0.6222E-04 -0.1010E-04 -0.2604E-04  0.6470E-04
  0.2259E-04 -0.6409E-04


  MODE SHAPE OF P.S. AT CONNECTING DOF      405

 -0.3256E-04  0.8219E-05 -0.2850E-03 -0.1859E-02  0.3629E-02  0.5146E-02
 -0.5483E-04 -0.9251E-02  0.5802E-02  0.8972E-02  0.8071E-02  0.1009E-01
 -0.2507E-01  0.2883E-01 -0.2319E-03  0.1415E-02  0.8544E-04  0.1476E-02
 -0.1101E-01  0.1358E-03 -0.3659E-03 -0.2536E-03 -0.6745E-04 -0.5644E-04
  0.1348E-03  0.1171E-03 -0.1131E-03  0.4002E-03  0.4176E-03  0.5713E-03
 -0.1606E-02  0.2742E-02  0.1477E-02 -0.2025E-02  0.4958E-02  0.4763E-02
 -0.4754E-02 -0.5283E-02  0.5828E-02  0.5327E-04 -0.4688E-02 -0.1135E-02
  0.6259E-02 -0.4532E-03 -0.1031E-03  0.3120E-03 -0.2750E-03 -0.1144E-03
  0.7692E-03  0.3653E-03


  MODE SHAPE OF P.S. AT CONNECTING DOF       85

 -0.1828E-04  0.1631E-04  0.1603E-04 -0.2188E-06  0.1881E-02  0.4426E-04
  0.1470E-03 -0.3684E-05  0.9337E-05  0.2344E-05 -0.2449E-04 -0.2388E-02
 -0.5703E-03  0.4386E-04 -0.2193E-03 -0.1078E-04 -0.9663E-05  0.1300E-04
 -0.2633E-04  0.1157E-04  0.5224E-04 -0.4736E-06  0.1005E-04  0.1183E-04
  0.1531E-05 -0.5296E-05  0.1035E-03  0.6616E-05  0.8067E-05 -0.6476E-04
 -0.4326E-04 -0.2357E-03 -0.3973E-03 -0.3548E-03 -0.5740E-03 -0.2839E-03
 -0.3380E-03 -0.4238E-03  0.8254E-03  0.2864E-02  0.5185E-03 -0.2598E-04
  0.4845E-04  0.2674E-05 -0.2430E-04  0.1313E-04  0.1881E-04 -0.1688E-03
 -0.5507E-04  0.3571E-03


  MODE SHAPE OF P.S. AT CONNECTING DOF       86

  0.2160E-06  0.3303E-06  0.4324E-06  0.5444E-06 -0.8595E-05 -0.5612E-04
  0.1041E-04  0.5842E-04  0.4487E-06 -0.4463E-06 -0.1697E-03  0.1715E-04
  0.1432E-04  0.1048E-01 -0.5175E-05  0.1205E-03  0.8813E-05  0.9090E-05
 -0.1729E-04 -0.3245E-04 -0.1261E-04  0.1000E-03  0.1066E-04 -0.1118E-04
 -0.1086E-04  0.1525E-04  0.7392E-05 -0.9808E-04 -0.6831E-04 -0.1019E-03
  0.9876E-03 -0.2607E-02  0.3776E-02 -0.7887E-03  0.8915E-03 -0.4156E-03
 -0.1181E-03 -0.1305E-03  0.2559E-03 -0.2734E-04  0.2467E-03 -0.1217E-04
 -0.1753E-04  0.9767E-05  0.5155E-05 -0.6946E-05  0.4208E-05 -0.1782E-05
 -0.7802E-05 -0.2236E-05


  MODE SHAPE OF P.S. AT CONNECTING DOF       87

 -0.3236E-05 -0.4338E-05  0.7565E-05  0.7436E-05 -0.2980E-04  0.8886E-03
 -0.1826E-03 -0.9247E-03  0.3859E-07  0.8400E-05  0.2413E-02 -0.1897E-04
 -0.1075E-03 -0.1087E-02  0.3664E-04 -0.5685E-03 -0.3384E-04 -0.2515E-04
  0.1235E-04  0.5412E-05 -0.8025E-05  0.9116E-04  0.1039E-04 -0.1234E-04
```

```
-0.1569E-04 -0.2908E-05 -0.6348E-05 -0.1406E-03 -0.8513E-04 -0.4999E-04
 0.5983E-03 -0.7315E-03  0.3540E-03  0.5234E-03 -0.9608E-03  0.5683E-03
 0.2782E-03  0.4019E-03 -0.7902E-03  0.6790E-03 -0.2477E-02  0.2376E-03
 0.3016E-03 -0.1351E-03 -0.4935E-04  0.9753E-04 -0.6835E-04 -0.2611E-04
 0.1260E-03 -0.4176E-03

 MODE SHAPE OF P.S. AT CONNECTING DOF       49

-0.9284E-05  0.8303E-05  0.1992E-04 -0.2653E-04  0.9789E-03  0.2633E-04
 0.8230E-04 -0.4137E-05  0.5031E-05  0.1276E-05 -0.9022E-05 -0.1259E-02
-0.3212E-03  0.2619E-04 -0.1015E-03 -0.3215E-05 -0.2164E-05 -0.4569E-05
 0.1248E-03 -0.2081E-03  0.4153E-03  0.8352E-06  0.5077E-05  0.1333E-04
 0.6963E-06 -0.2523E-04  0.1591E-03  0.1201E-04  0.3018E-04 -0.1682E-03
-0.7964E-04 -0.4536E-03 -0.6767E-03 -0.4613E-03 -0.7334E-03 -0.3861E-03
-0.5846E-03 -0.6594E-03  0.9097E-03  0.3526E-02  0.6477E-03  0.8295E-04
-0.2890E-04  0.5915E-04 -0.1634E-03 -0.1312E-03 -0.1572E-03 -0.2158E-03
-0.9924E-04 -0.5355E-04

 MODE SHAPE OF P.S. AT CONNECTING DOF       50

-0.6881E-07  0.9120E-07 -0.2542E-06  0.1004E-06 -0.2738E-05 -0.6341E-05
 0.8128E-06  0.6812E-05  0.4604E-06  0.3371E-07 -0.2087E-04  0.4144E-05
 0.2357E-05  0.1555E-04 -0.1406E-05  0.2233E-04  0.1770E-05  0.1810E-05
-0.4994E-05 -0.4860E-05 -0.8199E-05  0.2633E-04  0.4944E-05 -0.5426E-05
-0.4164E-05  0.1137E-04  0.4532E-05 -0.3968E-04 -0.2815E-04 -0.5613E-04
 0.5063E-03 -0.1414E-02  0.9785E-03 -0.1803E-03  0.5748E-03 -0.2723E-03
-0.8272E-04 -0.9392E-04  0.1853E-03 -0.7729E-04  0.2700E-03 -0.2218E-04
-0.2920E-04  0.1658E-04  0.5052E-05 -0.1496E-04  0.1114E-04  0.1091E-04
-0.2437E-04  0.7438E-05

 MODE SHAPE OF P.S. AT CONNECTING DOF       51

-0.7899E-06 -0.1098E-05  0.2148E-04  0.1769E-04 -0.9896E-05  0.4894E-03
-0.1019E-03 -0.5285E-03  0.6132E-07  0.4660E-05  0.1372E-02 -0.1729E-04
-0.6460E-04 -0.6464E-03  0.1378E-04 -0.2470E-03 -0.1151E-04 -0.3745E-06
-0.5966E-04 -0.1069E-03 -0.4669E-04  0.4160E-03  0.1914E-04 -0.2041E-04
-0.3058E-04 -0.7520E-05 -0.1210E-04 -0.2614E-03 -0.1991E-03 -0.8224E-04
 0.9210E-03 -0.9035E-03  0.3631E-03  0.7413E-03 -0.1292E-02  0.7982E-03
 0.4301E-03  0.4794E-03 -0.9948E-03  0.8672E-03 -0.3048E-02  0.3653E-03
 0.5022E-03 -0.3271E-03 -0.9028E-04  0.3669E-03 -0.2560E-03 -0.2552E-03
 0.6014E-03  0.1319E-04

 MODE SHAPE OF P.S. AT CONNECTING DOF      109

-0.2283E-04  0.2017E-04  0.1835E-04 -0.2534E-04  0.2500E-02  0.6022E-04
 0.1982E-03 -0.5714E-05  0.1277E-04  0.3213E-05 -0.3129E-04 -0.3447E-02
 0.9285E-03  0.7274E-04 -0.5236E-03 -0.2303E-04 -0.2612E-04  0.4869E-04
-0.2288E-03  0.3268E-03 -0.5174E-03 -0.8135E-05 -0.2235E-04 -0.2154E-04
-0.3082E-05 -0.3812E-06 -0.1332E-03 -0.3806E-05 -0.7982E-06  0.3182E-04
 0.9124E-05  0.1344E-03  0.1567E-03  0.1460E-03  0.1972E-03  0.8983E-04
 0.5100E-04  0.6276E-04 -0.1659E-03 -0.7691E-04  0.7310E-05  0.3385E-06
 0.7113E-05 -0.5844E-06 -0.7434E-05  0.6006E-05  0.7973E-06 -0.4841E-04
-0.9304E-05  0.1656E-03

 MODE SHAPE OF P.S. AT CONNECTING DOF      110

 0.2849E-06  0.1985E-06  0.5522E-06  0.6241E-06 -0.9374E-05 -0.7017E-04
 0.1321E-04  0.7313E-04  0.4562E-06 -0.5796E-06 -0.2128E-03  0.1917E-04
 0.1729E-04  0.1319E-03 -0.7054E-05  0.1518E-03  0.1104E-04  0.1155E-04
-0.2189E-04 -0.4045E-04 -0.1627E-04  0.1254E-03  0.1301E-04 -0.1382E-04
-0.1358E-04  0.1772E-04  0.8005E-05 -0.1229E-03 -0.8593E-04 -0.1245E-03
 0.1234E-02 -0.3253E-02  0.2221E-02 -0.9827E-03  0.1115E-02 -0.5172E-03
-0.1465E-03 -0.1615E-03  0.3173E-03 -0.4286E-04  0.3082E-03 -0.1492E-04
-0.2255E-04  0.1267E-04  0.7784E-05 -0.9633E-05  0.5571E-05 -0.3333E-05
-0.9482E-05 -0.6511E-05

 MODE SHAPE OF P.S. AT CONNECTING DOF      111

-0.4138E-05 -0.5486E-05  0.6601E-05  0.7125E-05 -0.3590E-04  0.1164E-02
-0.2402E-03 -0.1223E-02  0.2017E-07  0.1117E-04  0.3347E-02 -0.3021E-04
-0.1708E-03 -0.1763E-02  0.8936E-04 -0.1387E-02 -0.9043E-04 -0.8711E-04
 0.1077E-03  0.1727E-03  0.4983E-04 -0.3569E-03 -0.1259E-04  0.1358E-04
 0.1850E-04  0.7307E-05  0.8015E-05  0.1241E-03  0.3786E-04  0.1484E-04
-0.1578E-03 -0.4519E-04  0.9995E-04 -0.3060E-03  0.4624E-03 -0.2181E-03
-0.5700E-04 -0.9297E-04  0.1559E-03 -0.3691E-04 -0.5435E-04  0.4208E-04
 0.5205E-04 -0.3647E-04 -0.1373E-04  0.4147E-04 -0.3498E-04 -0.2269E-04
 0.6664E-04 -0.1566E-03

 PARTICIPATION FACTOR FOR P.S. --- GAMAP

-0.4324E+01  0.3773E+01  0.1677E+02 -0.2170E+02  0.2111E+03  0.6148E+01
 0.2194E+02 -0.9946E+00  0.1439E+01  0.1711E+00  0.1409E+01 -0.1792E+03
-0.3645E+02  0.1095E+01 -0.1403E+01 -0.4503E+00  0.5501E+00 -0.2969E+01
 0.1566E+02 -0.4873E+02  0.7568E+02 -0.6942E-01 -0.3317E+00  0.6417E+00
 0.7709E-01  0.2902E+01  0.1270E+02  0.1191E+01  0.3031E+01 -0.1582E+02
-0.5890E+01 -0.2777E+02 -0.4116E+02  0.1962E+02 -0.3014E+02 -0.1634E+02
-0.2948E+02 -0.3001E+02  0.2534E+02  0.1019E+03  0.1718E+02  0.3913E+01
-0.2132E+01  0.2302E+01 -0.6223E+01 -0.4593E+01 -0.6035E+01 -0.2191E+01
-0.1069E+01 -0.7733E+01
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 ****************************************************************
 *                                                              *
 *                                                              *
 *                                                              *
 *                 A COMPUTER PROGRAM FOR                       *
 *                                                              *
 *                                                              *
 *   COUPLED RESPONSE SPECTRUM ANALYSIS OF SECONDARY SYSTEMS    *
 *                                                              *
 *                     " C R E S T "                            *
 *                                                              *
 *                                                              *
 *                      DEVELOPED BY                            *
 *                                                              *
 *                   AJAYA KUMAR GUPTA                          *
 *             JING-WEN JAW    ABHINAV GUPTA                    *
 *                                                              *
 *            NORTH CAROLINA STATE UNIVERSITY                   *
 *               RALEIGH, NORTH CAROLINA                        *
 *                                                              *
 *                     REVISION-1.0                             *
 *                                                              *
 *                                                              *
 ****************************************************************


 C O U P L E D   F R E Q U E N C I E S   A N D   M O D E   S H A P E S   E X T R A C T I O N

 NUMBER OF ITERATIONS TO BE APPLIED FOR COUPLED FREQUENCIES EXTRACTION    NITER =  900

 CONVERGENCE TOLERANCE FOR COUPLED FREQUENCIES                        TOL = 0.10000E-05

 COUPLED   FREQUENCY   DAMPING RATIO
  MODE       (HZ)          (%)

    1     0.44472E+01    0.50000E+01
    2     0.44656E+01    0.50000E+01
    3     0.57132E+01    0.50000E+01
    4     0.57460E+01    0.50000E+01
    5     0.61012E+01    0.49999E+01
    6     0.64713E+01    0.50000E+01
    7     0.65905E+01    0.50000E+01
    8     0.67173E+01    0.49999E+01
    9     0.68481E+01    0.49999E+01
   10     0.68484E+01    0.49998E+01
   11     0.75015E+01    0.49999E+01
   12     0.78799E+01    0.49999E+01
   13     0.91825E+01    0.49981E+01
   14     0.94127E+01    0.49957E+01
   15     0.96544E+01    0.20059E+01
   16     0.11748E+02    0.50000E+01
   17     0.11873E+02    0.50000E+01
   18     0.12154E+02    0.50000E+01
   19     0.12828E+02    0.50000E+01
   20     0.13456E+02    0.50000E+01
   21     0.14036E+02    0.50000E+01
   22     0.14501E+02    0.20004E+01
   23     0.14861E+02    0.50000E+01
   24     0.15250E+02    0.50000E+01
   25     0.15850E+02    0.20000E+01
   26     0.17563E+02    0.49998E+01
   27     0.17571E+02    0.49996E+01
   28     0.17576E+02    0.49996E+01
   29     0.17578E+02    0.49995E+01
   30     0.17938E+02    0.50000E+01
   31     0.18140E+02    0.50000E+01
   32     0.18534E+02    0.20015E+01
   33     0.18719E+02    0.50000E+01
   34     0.19083E+02    0.50000E+01
   35     0.19626E+02    0.49999E+01
   36     0.19861E+02    0.20018E+01
   37     0.19994E+02    0.49997E+01
   38     0.20111E+02    0.49995E+01
   39     0.20791E+02    0.20006E+01
   40     0.20809E+02    0.49999E+01
   41     0.21079E+02    0.49996E+01
   42     0.21296E+02    0.49988E+01
   43     0.22103E+02    0.49998E+01
   44     0.22312E+02    0.49998E+01
   45     0.22387E+02    0.49999E+01
   46     0.22959E+02    0.20010E+01
   47     0.24073E+02    0.50000E+01
   48     0.24752E+02    0.50000E+01
   49     0.26674E+02    0.50000E+01
   50     0.26739E+02    0.50000E+01
   51     0.27417E+02    0.50000E+01
   52     0.27500E+02    0.50000E+01
   53     0.29301E+02    0.50000E+01
   54     0.29600E+02    0.50000E+01
   55     0.30243E+02    0.50000E+01
   56     0.30390E+02    0.50000E+01
   57     0.32724E+02    0.50000E+01


 INTERPOLATED SPECTRAL ACCELERATIONS FOR CORRESPONDING FREQUENCIES & DAMPING RATIOS


     FREQUENCY   DAMPING RATIO            SPECTRAL ACCELERATIONS
       (HZ)          (%)                  SAD              SAV
   0.44472E+01    0.50000E+01        0.2000E+00   0.2043E+00
   0.44656E+01    0.50000E+01        0.2000E+00   0.2043E+00
   0.57112E+01    0.50000E+01        0.2000E+00   0.2040E+00
   0.57460E+01    0.50000E+01        0.2500E+00   0.2039E+00
   0.61012E+01    0.49999E+01        0.1961E+00   0.1929E+00
   0.64713E+01    0.50000E+01        0.1901E+00   0.1766E+00
   0.65905E+01    0.50000E+01        0.1883E+00   0.1718E+00
   0.67173E+01    0.49999E+01        0.1864E+00   0.1670E+00
   0.68481E+01    0.49999E+01        0.1845E+00   0.1622E+00
   0.68484E+01    0.49998E+01        0.1845E+00   0.1622E+00
   0.75015E+01    0.49999E+01        0.1759E+00   0.1415E+00
   0.78799E+01    0.49999E+01        0.1713E+00   0.1314E+00
   0.91825E+01    0.49981E+01        0.1581E+00   0.1045E+00
   0.94127E+01    0.49957E+01        0.1561E+00   0.1007E+00
   0.96584E+01    0.20059E+01        0.1956E+00   0.1222E+00
   0.11748E+02    0.50000E+01        0.1388E+00   0.7217E-01
   0.11873E+02    0.50000E+01        0.1380E+00   0.7103E-01
   0.12154E+02    0.50000E+01        0.1363E+00   0.6850E-01
   0.12828E+02    0.50000E+01        0.1325E+00   0.6325E-01
   0.13456E+02    0.50000E+01        0.1292E+00   0.5887E-01
   0.14036E+02    0.50000E+01        0.1263E+00   0.5526E-01
   0.14501E+02    0.20004E+01        0.1459E+00   0.6145E-01
   0.14861E+02    0.50000E+01        0.1226E+00   0.5072E-01
   0.15250E+02    0.50000E+01        0.1209E+00   0.4879E-01
   0.15850E+02    0.20000E+01        0.1368E+00   0.5287E-01
   0.17563E+02    0.49998E+01        0.1122E+00   0.3947E-01
   0.17571E+02    0.49996E+01        0.1122E+00   0.3945E-01
   0.17576E+02    0.49996E+01        0.1122E+00   0.3943E-01
   0.17578E+02    0.49995E+01        0.1122E+00   0.3942E-01
   0.17938E+02    0.50000E+01        0.1110E+00   0.3824E-01
   0.18140E+02    0.50000E+01        0.1103E+00   0.3760E-01
   0.18534E+02    0.20015E+01        0.1222E+00   0.4058E-01
   0.18719E+02    0.50000E+01        0.1085E+00   0.3587E-01
   0.18834E+02    0.50000E+01        0.1081E+00   0.3554E-01
   0.19626E+02    0.49999E+01        0.1058E+00   0.3341E-01
   0.19841E+02    0.20018E+01        0.1163E+00   0.3616E-01
   0.19994E+02    0.49997E+01        0.1048E+00   0.3249E-01
   0.20111E+02    0.49995E+01        0.1045E+00   0.3221E-01
   0.20791E+02    0.20006E+01        0.1125E+00   0.3341E-01
   0.20809E+02    0.49999E+01        0.1026E+00   0.3060E-01
   0.21079E+02    0.49996E+01        0.1019E+00   0.3002E-01
   0.21296E+02    0.49988E+01        0.1014E+00   0.2956E-01
   0.22103E+02    0.49998E+01        0.9938E-01   0.2795E-01
   0.22312E+02    0.49998E+01        0.9889E-01   0.2756E-01
   0.22387E+02    0.49999E+01        0.9871E-01   0.2742E-01
   0.22959E+02    0.20010E+01        0.1047E+00   0.2825E-01
   0.24073E+02    0.50000E+01        0.9500E-01   0.2459E-01
   0.24752E+02    0.50000E+01        0.9361E-01   0.2359E-01
   0.26674E+02    0.50000E+01        0.8999E-01   0.2108E-01
   0.26739E+02    0.50000E+01        0.8987E-01   0.2101E-01
   0.27417E+02    0.50000E+01        0.8869E-01   0.2023E-01
   0.27500E+02    0.50000E+01        0.8855E-01   0.2014E-01
   0.29301E+02    0.50000E+01        0.8563E-01   0.1831E-01
   0.29400E+02    0.50000E+01        0.8548E-01   0.1822E-01
   0.30243E+02    0.50000E+01        0.8421E-01   0.1746E-01
   0.30390E+02    0.50000E+01        0.8400E-01   0.1734E-01
   0.32724E+02    0.50000E+01        0.8078E-01   0.1551E-01

 COMBINED VALUES OF COUPLED NODAL DISPLACEMENTS

 DISPLACEMENTS AT PRIMARY SYSTEM CONNETING DOF

 DOF #      DISPLACEMENT

403         0.1456E+00

404         0.2232E-03

405         0.5381E-01

 85         0.2524E-01

 86         0.1498E-03

 87         0.1587E-03

 49         0.1341E-01

 50         0.5005E-04

 51         0.1718E-03

109         0.3467E-01

110         0.1665E-03

111         0.2065E-03

 DISPLACEMENTS AT SECONDARY SYSTEM DOF

 NODE      DX          DY          DZ        ROT X       ROT Y       ROT Z

  1    0.1456E+00  0.2232E-03  0.5381E-01  0.4690E-07  0.1626E-06  0.3879E-07

  2    0.1388E+00  0.4037E-02  0.4624E-01  0.4527E-04  0.4613E-03  0.4684E-04
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   4    0.1357E+00  0.4805E-02  0.4220E-01  0.5066E-04  0.4923E-03  0.4965E-04

   5    0.1323E+00  0.5310E-02  0.3794E-01  0.5904E-04  0.5200E-03  0.5728E-04

   6    0.1305E+00  0.5527E-02  0.3582E-01  0.6408E-04  0.5320E-03  0.6278E-04

   7    0.1288E+00  0.5722E-02  0.3171E-01  0.6948E-04  0.5427E-03  0.6912E-04

   8    0.1008E+00  0.5848E-02  0.2144E-01  0.1073E-03  0.8036E-03  0.2988E-03

   9    0.9401E-01  0.5823E-02  0.2162E-01  0.9384E-04  0.8035E-03  0.2934E-03

  10    0.9038E-01  0.5810E-02  0.2171E-01  0.8372E-04  0.8035E-03  0.2852E-03

9001    0.6447E-01  0.5692E-02  0.1757E-01  0.6996E-04  0.8030E-03  0.2207E-03

  11    0.4379E-01  0.5569E-02  0.9008E-03  0.8190E-04  0.8025E-03  0.1705E-03

  12    0.3855E-01  0.5530E-02  0.6709E-02  0.7311E-04  0.8023E-03  0.1522E-03

  13    0.2520E-01  0.5404E-02  0.3762E-02  0.4817E-04  0.8019E-03  0.1137E-03

  14    0.1329E-01  0.5265E-02  0.6078E-02  0.4715E-04  0.8014E-03  0.1042E-03

  15    0.1122E-01  0.5237E-02  0.6906E-02  0.4804E-04  0.8013E-03  0.1038E-03

  16    0.9208E-02  0.5583E-02  0.3936E-03  0.5086E-04  0.8011E-03  0.1028E-03

  17    0.8453E-02  0.6987E-02  0.1896E-01  0.5078E-04  0.8013E-03  0.1027E-03

 101    0.1598E+00  0.3633E-01  0.8462E-01  0.4003E-03  0.9058E-03  0.5359E-03

 102    0.1614E+00  0.3633E-01  0.8403E-01  0.4003E-03  0.9058E-03  0.5359E-03

 103    0.1537E+00  0.4863E-02  0.5315E-01  0.3963E-03  0.8714E-03  0.5472E-03

 104    0.1483E+00  0.4822E-02  0.4712E-01  0.3956E-03  0.8694E-03  0.5476E-03

 105    0.1431E+00  0.1245E-01  0.4207E-01  0.3945E-03  0.8675E-03  0.5474E-03

 106    0.1380E+00  0.2050E-01  0.3809E-01  0.3925E-03  0.8661E-03  0.5461E-03

 107    0.1018E+00  0.4862E-01  0.2723E-01  0.1709E-03  0.8748E-03  0.3357E-03

 108    0.9743E-01  0.4865E-01  0.2505E-01  0.1618E-03  0.8748E-03  0.3288E-03

 109    0.9034E-01  0.4867E-01  0.2172E-01  0.1444E-03  0.8748E-03  0.3147E-03

 110    0.8366E-01  0.4869E-01  0.1916E-01  0.1274E-03  0.8748E-03  0.2957E-03

 111    0.8043E-01  0.4871E-01  0.1777E-01  0.1179E-03  0.8748E-03  0.2832E-03

 112    0.5174E-01  0.4879E-01  0.9715E-02  0.4490E-04  0.8748E-03  0.1821E-03

 113    0.4510E-01  0.4880E-01  0.8278E-02  0.3837E-04  0.8748E-03  0.1627E-03

 114    0.3853E-01  0.4885E-01  0.6699E-02  0.3864E-04  0.8748E-03  0.1447E-03

 115    0.3707E-01  0.4886E-01  0.6289E-02  0.3950E-04  0.8748E-03  0.1408E-03

 116    0.3575E-01  0.4887E-01  0.5946E-02  0.4044E-04  0.8748E-03  0.1370E-03

9002    0.2394E-01  0.4895E-01  0.2841E-02  0.5085E-04  0.8748E-03  0.1120E-03

 117    0.1341E-01  0.4899E-01  0.6013E-02  0.5512E-04  0.8748E-03  0.1065E-03

 118    0.1328E-01  0.4899E-01  0.6081E-02  0.5513E-04  0.8748E-03  0.1065E-03

 119    0.1166E-01  0.4899E-01  0.6908E-02  0.5513E-04  0.8748E-03  0.1065E-03

 COMBINED VALUES OF COUPLED MEMEBER FORCES

 NODE      FX          FY          FZ          MX          MY          MZ

   1    0.8067E+01  0.8385E+01  0.6010E+01  0.3907E+02  0.1355E+03  0.3231E+02

   2    0.8067E+01  0.8385E+01  0.6010E+01  0.4013E+02  0.1107E+03  0.4453E+02

   2    0.8633E+01  0.8313E+01  0.6018E+01  0.4013E+02  0.1107E+03  0.4453E+02

   4    0.8633E+01  0.8313E+01  0.6018E+01  0.4062E+02  0.1036E+03  0.4883E+02

   4    0.1377E+02  0.4236E+01  0.1207E+02  0.4065E+02  0.1037E+03  0.4887E+02

   5    0.1377E+02  0.4236E+01  0.1207E+02  0.3846E+02  0.8705E+02  0.4956E+02

   5    0.1391E+02  0.4249E+01  0.1212E+02  0.3866E+02  0.8705E+02  0.4956E+02

   6    0.1391E+02  0.4249E+01  0.1212E+02  0.3738E+02  0.7665E+02  0.4999E+02

   6    0.1400E+02  0.4259E+01  0.1214E+02  0.3738E+02  0.7865E+02  0.4999E+02

   7    0.1400E+02  0.4259E+01  0.1214E+02  0.3632E+02  0.7021E+02  0.5046E+02

   7    0.1466E+02  0.4327E+01  0.1233E+02  0.3632E+02  0.7021E+02  0.5046E+02

   8    0.1466E+02  0.4327E+01  0.1233E+02  0.2221E+02  0.1056E+01  0.1782E+02
   8    0.1517E+02  0.4416E+01  0.1225E+02  0.2221E+02  0.1056E+01  0.1782E+02
9999    0.1517E+02  0.4416E+01  0.1225E+02  0.3414E+02  0.1056E+01  0.2625E+02
9999    0.1517E+02  0.4416E+01  0.1225E+02  0.3414E+02  0.1056E+01  0.2625E+02
   9    0.1517E+02  0.4416E+01  0.1225E+02  0.4623E+02  0.1056E+01  0.3900E+02
   9    0.1535E+02  0.4450E+01  0.1221E+02  0.4623E+02  0.1056E+01  0.3900E+02
  10    0.1535E+02  0.4450E+01  0.1221E+02  0.5960E+02  0.1056E+01  0.5464E+02
  10    0.2650E+01  0.4574E+01  0.3232E+01  0.5975E+02  0.1056E+01  0.5481E+02
9001    0.2650E+01  0.4574E+01  0.3232E+01  0.3007E+02  0.1056E+01  0.3378E+02
9001    0.2973E+01  0.4780E+01  0.3614E+01  0.3007E+02  0.1056E+01  0.3378E+02
  11    0.2973E+01  0.4780E+01  0.3614E+01  0.1290E+02  0.1056E+01  0.2971E+02
  11    0.3207E+01  0.4912E+01  0.3722E+01  0.1290E+02  0.1056E+01  0.2971E+02
  12    0.3207E+01  0.4912E+01  0.3722E+01  0.2043E+02  0.1056E+01  0.3429E+02
  12    0.1908E+01  0.5049E+01  0.8973E+00  0.2047E+02  0.1056E+01  0.3433E+02
  13    0.1908E+01  0.5049E+01  0.8973E+00  0.1297E+02  0.1056E+01  0.1723E+02
  13    0.1751E+01  0.5199E+01  0.9336E+00  0.1297E+02  0.1056E+01  0.1723E+02
  14    0.1751E+01  0.5199E+01  0.9336E+00  0.5061E+01  0.1056E+01  0.1938E+01
  14    0.5553E+00  0.5332E+01  0.1302E+01  0.5067E+01  0.1056E+01  0.1949E+01
  15    0.5553E+00  0.5332E+01  0.1302E+01  0.2600E+01  0.1056E+01  0.9016E+00
  15    0.3647E+00  0.8873E-01  0.1305E+01  0.2600E+01  0.1056E+01  0.9016E+00
  16    0.3647E+00  0.8873E-01  0.1305E+01  0.4925E-01  0.1189E+00  0.1499E+00
  16    0.1247E+00  0.3364E-01  0.5934E-01  0.4925E-01  0.1189E+00  0.1499E+00
  17    0.1247E+00  0.3364E-01  0.5934E-01  0.0000E+00  0.0000E+00  0.0000E+00
 101    0.1143E+00  0.5263E-01  0.8903E-01  0.0000E+00  0.0000E+00  0.0000E+00
 102    0.1143E+00  0.5263E-01  0.8903E-01  0.4451E-01  0.0000E+00  0.5716E-01
 102    0.2897E+01  0.1321E+01  0.2223E+01  0.4451E-01  0.0000E+00  0.5716E-01
 103    0.2897E+01  0.1321E+01  0.2223E+01  0.9439E+01  0.1278E+02  0.1108E+02
 103    0.4657E+01  0.1395E+01  0.3185E+01  0.9439E+01  0.1278E+02  0.1108E+02
 104    0.4657E+01  0.1395E+01  0.3185E+01  0.9758E+01  0.1742E+02  0.1118E+02
 104    0.2802E+01  0.1238E+02  0.5149E+01  0.9758E+01  0.1742E+02  0.1118E+02
 105    0.2802E+01  0.1238E+02  0.5149E+01  0.1410E+02  0.1313E+02  0.1679E+02
 105    0.2986E+01  0.1230E+02  0.5125E+01  0.1410E+02  0.1313E+02  0.1679E+02
 106    0.2986E+01  0.1230E+02  0.5125E+01  0.2037E+02  0.9113E+01  0.2507E+02
 106    0.5365E+01  0.1133E+02  0.5426E+01  0.2037E+02  0.9113E+01  0.2507E+02
 107    0.5365E+01  0.1133E+02  0.5426E+01  0.6192E+02  0.2603E-07  0.7329E+02
 107    0.7086E+01  0.9501E+01  0.6047E+01  0.6192E+02  0.2603E-07  0.7329E+02
 108    0.7086E+01  0.9501E+01  0.6047E+01  0.6779E+02  0.2603E-07  0.7905E+02
 108    0.9355E+01  0.7029E+01  0.6865E+01  0.6779E+02  0.2603E-07  0.7905E+02
 109    0.9355E+01  0.7029E+01  0.6865E+01  0.7956E+02  0.2603E-07  0.9232E+02
 109    0.2308E+02  0.6449E+01  0.1014E+02  0.7956E+02  0.1761E-07  0.9232E+02
 110    0.2308E+02  0.6449E+01  0.1014E+02  0.7155E+02  0.1761E-07  0.1079E+03
 110    0.5558E+01  0.6047E+01  0.9198E+01  0.7155E+02  0.1761E-07  0.1079E+03
 111    0.5558E+01  0.6047E+01  0.9198E+01  0.7569E+02  0.1761E-07  0.1025E+03
 111    0.4598E+01  0.4327E+01  0.4221E+01  0.7569E+02  0.1761E-07  0.1025E+03
 112    0.4598E+01  0.4327E+01  0.4221E+01  0.3117E+02  0.1761E-07  0.5759E+02
 112    0.4190E+01  0.2499E+01  0.4130E+01  0.3117E+02  0.1761E-07  0.5759E+02
 113    0.4190E+01  0.2499E+01  0.4130E+01  0.2165E+02  0.1761E-07  0.4900E+02
 113    0.4093E+01  0.6670E+01  0.4112E+01  0.2165E+02  0.1761E-07  0.4900E+02
 114    0.4093E+01  0.6670E+01  0.4112E+01  0.1985E+02  0.1761E-07  0.4407E+02
 114    0.2667E+01  0.5925E+01  0.2122E+01  0.1985E+02  0.8927E-08  0.4407E+02
 115    0.2667E+01  0.5925E+01  0.2122E+01  0.1880E+02  0.8927E-08  0.4488E+02
 115    0.2759E+01  0.5671E+01  0.2645E+01  0.1880E+02  0.8926E-08  0.4488E+02
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 116    0.2759E+01  0.5671E+01  0.2645E+01  0.1902E+02  0.8926E-08  0.4577E+02
 116    0.2804E+01  0.4295E+01  0.1116E+01  0.1902E+02  0.8927E-08  0.4577E+02
9002    0.2804E+01  0.4295E+01  0.1116E+01  0.9636E+01  0.8927E-08  0.2225E+02
9002    0.2621E+01  0.1781E+01  0.1112E+01  0.9636E+01  0.8927E-08  0.2225E+02
 117    0.2621E+01  0.1781E+01  0.1112E+01  0.1351E+00  0.8927E-08  0.3118E+00
 117    0.2096E+01  0.5068E+00  0.1068E+01  0.1351E+00  0.8922E-08  0.3118E+00
 118    0.2096E+01  0.5068E+00  0.1068E+01  0.2591E-01  0.8922E-08  0.1071E+00
 118    0.7726E-01  0.2041E+00  0.1870E-01  0.2591E-01  0.0000E+00  0.1071E+00
 119    0.7726E-01  0.2041E+00  0.1870E-01  0.0000E+00  0.0000E+00  0.0000E+00
   4  JUNCTION
   4    0.5654E+01  0.1109E+02  0.7539E+01  0.6652E-01  0.9424E-01  0.8670E-01
 104    0.5654E+01  0.1109E+02  0.7539E+01  0.3768E-07  0.3778E-07  0.5002E-07
 104  JUNCTION
  10  JUNCTION
  10    0.1802E+02  0.4295E-05  0.1517E+02  0.1517E+00  0.8789E-08  0.1802E+00
 109    0.1802E+02  0.4295E-05  0.1517E+02  0.1619E-07  0.8789E-08  0.1442E-07
 109  JUNCTION
  12  JUNCTION
  12    0.4933E+01  0.4341E-05  0.4633E+01  0.4633E-01  0.8688E-08  0.4933E-01
 114    0.4933E+01  0.4341E-05  0.4633E+01  0.3996E-08  0.8688E-08  0.3454E-08
 114  JUNCTION
  14  JUNCTION
  14    0.1999E+01  0.4380E-05  0.1052E+01  0.1052E-01  0.8921E-08  0.1999E-01
 118    0.1999E+01  0.4380E-05  0.1052E+01  0.2107E-08  0.8921E-08  0.1602E-08
 118  JUNCTION

 COMBINED VALUES OF COUPLED SUPPORT REACTIONS

 TYPE     NODE      SUPPORT REACTION

 FX         1        0.7579E+01
 FY         1        0.8386E+01
 FZ         1        0.5988E+01
 MX         1        0.3907E+02
 MY         1        0.1355E+03
 MZ         1        0.3231E+02
 FY        13        0.5043E-01
 FY        15        0.5454E+01
 FZ        16        0.1328E+01
 FX       110        0.2614E+02
 FZ       110        0.1435E+02
 FZ       111        0.1233E+02
 FY       113        0.6289E+01
 FZ       115        0.4342E+01
 FX       116        0.5237E+01
 FZ       116        0.2873E+01
 FX       117        0.4355E+01
```