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RESPONSE OF AN EMPTY CYLINDRICAL GROUND SUPPORTED LIQUID STORAGE TANK TO BASE EXCITATION

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ABSTRACT

The structure under consideration is an elastic cylindrical liquid storage tank attached to a rigid base slab. A finite element analysis is presented for the free vibrations of the empty tank permitting determination of natural frequencies and associated mode shapes. The response of the empty tank to (a) several simple deterministic base excitations as well as (b) artificial earthquake excitation is also determined by finite elements. Examples together with complete program listings are offered.

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BACKGROUND

The problem of free and forced vibrations of thin elastic shells has been of interest to engineers for nearly a century. Most of the significant contributions to this area have been summarized in the 1973 monograph by A.W. Leissa [1]. In [1] the fundamentals of the various shell theories are presented and distinctions between popular theories examined, particularly with respect to curvature-displacement relations. Distinctions between the various theories are further exemplified through presentation of cylindrical shell natural frequencies as determined by each of approximately ten commonly employed theories.

A limited number of treatments of cylindrical shells subject to various dynamic loadings has been reported by P.M. Ogibalov [2], H. Kraus [3], G.B. Warburton [4], and P. Seide [5]. In general these investigations are limited to determination of responses to harmonic excitations applied normal to the shell surface or suddenly applied normal loads that remain constant with respect to time. Transient thermal effects are also investigated in [3]. The case of a shell subject to time-dependent edge loads is discussed in [3] and [5] and the principles outlined for determination of small responses governed by linearized shell equations. The particular case of a circular cylindrical shell subject to dynamically applied axial loading that increases linearly with respect to time has been considered on the basis of finite amplitude response by A.P. Coppa and W.A. Nash [6]. However, the techniques discussed in these works are not considered practical for application to the case of an applied edge loading that varies rapidly and in essentially a random fashion with respect to time. From an analytical standpoint the case of time-dependent edge loads gives rise to significant complications due to the fact that the boundary conditions are inhomogenous. When a shell is subjected to time-dependent edge displacements rather than time-dependent edge forces the solution of the response problem becomes even more difficult.

The objective of the present investigation is to develop a computerized approach for determination of small amplitude elastic responses of an empty slab-supported cylindrical liquid storage tank subject to arbitrary base excitation. It is assumed that the base slab supporting the tank is rigid and that the tank does not separate from the slab during excitation. This study will form the basis for a subsequent investigation concerned with response determination of the same storage tank when filled to an arbitrary depth with liquid.

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ANALYSIS

The finite element method is essentially a variant of the Rayleigh-Ritz approach and usually involves the principle of minimum potential energy. It has been shown to be effective in determination of shell behavior for a variety of both static and dynamic loadings. For the circular cylindrical tank with a vertical geometric axis under consideration here it is attractive to employ a series of ring-shaped elements extending from the base slab to the tank top, with each ring being bounded by a horizontal plane normal to the shell axis. Both in-plane as well as out-of-plane displacements and forces must be considered. These necessitate knowledge of the strain-displacement relations as indicated by an adequate shell theory. The theory employed here is that due to L. Sanders [7], and outlined in Appendix A.

The finite element method regards a complex structure as a finite assemblage of discrete elements, where each such element is a continuous structural member. This approach is thus, in essence, a discretization scheme since it expresses the displacement at any point of the continuous element in terms of a finite number of displacements at the boundaries of the element. This is accomplished through use of suitable interpolation functions. The points of intersection of these fictitious cuts in the complex structure are termed nodes or joints. The displacements of these nodes constitute the number of degrees of freedom of the system.

The equations of motion of an elastic system subject to external driving forces may be written in terms of elastic restoring forces, inertial forces, damping forces, and the applied forces. In the finite element approach

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it is necessary to formulate the stiffness, mass, and damping matrices (denoted by K, M, and C respectively) for each element and then assemble these so as to characterize the complete structure. The element k_{ij} of the stiffness matrix represents the force required (or arising) at coordinate "i" due to a unit displacement of coordinate "j". The element m_{ij} of the mass matrix represents the inertial force corresponding to coordinate "i" due to a unit acceleration of coordinate "j". The elements of the damping matrix are defined in an analogous manner. However, damping is not treated in the present work.

The finite element method is particularly attractive for investigation of the response of structures subject to displacements introduced at the points of support of the structure. Details of this approach are given in Appendix B, but in general the imposition of support displacements is possible since one can partition the displacement vector U into certain components U_b associated with known support displacements with all other components being associated with the remaining (nonsupported) notes. Thus, the general equation of motion

$$M x + C \dot{x} + K x = F(t)$$
(1)

may be written in the partitioned form [8]

$$\begin{bmatrix} \frac{M_{bb}}{M_{b}} + \frac{M_{b}^{T}}{M} \end{bmatrix} \left\{ \frac{\ddot{u}_{bt}}{\ddot{u}_{t}} \right\} + \begin{bmatrix} \frac{K_{bb}}{K_{b}} + \frac{K_{b}^{T}}{K} \end{bmatrix} \left\{ \frac{U_{bt}}{U_{t}} \right\} = \left\{ \frac{F_{b}}{0} \right\}$$
(2)

where damping in (1) has been neglected and U_{bt} and \ddot{U}_{bt} in (2) are known support displacements and accelerations, respectively. All elements in the top line of Equation (2) pertain to base node parameters. Thus, K_{bb}

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and M_{bb} denote forces at base nodes due to unit displacements at the base nodes and the superscript T of course denotes matrix transpose. K_b and M_b in the bottom row are coupling effects between the base nodes and the other (non-base) nodes. All other elements in the bottom row of Equation (2) pertain to non-base nodal parameters. Thus K and M represent stiffness and mass matrices of all non-base nodes.

At any time, the displacement vectors of the non-base nodes can be considered as a summation of two factors. The first vector U_s is a function of the instantaneous ground displacement, thus it can be called static. The second vector U_d is a function of the ground acceleration history, thus it is termed dynamic.

This approach furnishes a suitable method to reduce the equations of motion to the familiar form of forced vibrations:

$$[M] \{U_d\} + [K]\{U_d\} = F$$
(3)

where {F} is a defined driving forces vector to be derived hereafter. Thus:

$$\{U_t\} = \{U_s\} + \{U_d\}$$
(4)

The equations of motion are

$$\left[\frac{M_{bb}}{M_{b}} + \frac{M_{b}}{M}\right] \left\{\frac{U_{bt}}{U_{s}} + U_{d}\right\} + \left[\frac{K_{bb}}{K_{b}} + \frac{K_{b}}{K}\right] \left\{\frac{U_{bt}}{U_{s}} + U_{d}\right\} \left\{\frac{F_{b}}{0}\right\} (5)$$

The equations of the off-base elements are

$$[M_{b}]\{\ddot{U}_{bt}\} + [M]\{\ddot{U}_{s}\} + [M]\{\ddot{U}_{d}\} + [K_{b}]\{U_{bt}\} + [K]\{U_{s}\} + [K]\{U_{d}\} = 0$$
(6)

Now it is attractive to define U_s as a displacement vector so that when it is associated with the ground displacement vector U_{bt} the resulting motion of the structure corresponds to no internal strain energy. This condition implies that

$$[K_{b}]\{U_{bt}\} + [K]\{U_{s}\} = 0$$
(7)

In other words the vector $\{U_s\}$ is developed through rigid body displacements consistent with $\{U_{bt}\}$. Thus from (7)

$$U_{s} = -[K]^{-1}[K_{b}] U_{bt}$$

This phenomena has also been demonstrated numerically and the resulting static displacement $\rm U_S$ is nothing but a series of $\rm U_{bt}$ or

$$\{U_{s}\} = \left\{ \begin{array}{c} U_{s1} \\ - \\ U_{s2} \\ - \\ U_{s3} \\ - \\ \vdots \\ - \\ U_{sN} \end{array} \right\} = \left\{ \begin{array}{c} U_{bt} \\ - \\ U_{bt} \\ - \\ - \\ U_{bt} \end{array} \right\}$$

where N is the total number of elements and $\{U_{si}\}$ is the displacement vector of node i = $\{U_{bt}\}$ for all values of i and $\{U_{bt}\}$ is a (4 x 1) vector representing the axial, tangential, and radial displacements as well as the rotation of the generator at the base.

Thus, the off-base node equations yield

$$[M]{\{\ddot{U}_{d}\}} + [K]{\{U_{d}\}} = -[M_{b}]{\{\ddot{U}_{bt}\}} - [M]{\{\ddot{U}_{s}\}}$$

$$[M]{\{\ddot{U}_{d}\}} + [K]{\{U_{d}\}} = -[[M_{b}]] + [M][K]^{-1}[K_{b}]]{\{\ddot{U}_{bt}\}}$$

$$= [effective mass matrix] {\{\ddot{U}_{bt}\}}$$

$$= [M_{eff}] {\{\ddot{U}_{bt}\}}$$

(8)

It should be pointed out that for most practical tank dimensions the driving forces developed due to the mass $[M][K][K_b]$ are much larger than those developed by $[M_b]$. This has been demonstrated numerically.

The ground acceleration vector \tilde{U}_{bt} will be proved to be equal to:

$$\mathbf{U}_{g}(t) \left\{ \begin{array}{c} 0\\ -1\\ 1\\ 0 \end{array} \right\}$$

where $\ddot{U}_{q}(t)$ is the ground acceleration amplitude at time t.

Since the base of the tank is excited by a ground displacement and acceleration acting in its plane and in the constant direction $\theta = 0$, no axial acceleration component develops and the ground acceleration will be completely defined by its amplitude value $\ddot{U}_q(t)$:

$$U_{q}(t) = Peak \cdot f(t)$$
 (10)

The peak is an acceleration value independent of time and f(t) is a non-dimensional function of time.

The associated base-node displacement vector ${\rm U}_{\rm bt}$ is derived by use of Fig. 1, viz:

$$u(o,\theta,t) = 0$$

$$v(o,\theta,t) = -\ddot{U}_{g}(t) \cdot \sin \theta = -\text{Peak} \cdot f(t) \cdot \sin \theta$$

$$w(o,\theta,t) = +\ddot{U}_{g}(t) \cdot \cos \theta = +\text{Peak} \cdot f(t) \cdot \cos \theta$$

$$\frac{\partial W}{\partial z}(o,\theta,t) = 0.0$$

(11)

Since the excitation function is described in the previous form (11) to be associated with m = 1, obviously only the first circumferential harmonic will be excited, and thus the vibration of the tank can be prescribed by super-position of certain contributions of different axial

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modes corresponding to m = 1 only (see Appendix A,assumed form of loads and displacements).

(12)

$$\ddot{U}_{b}(t) = Peak \cdot f(t) \cdot \begin{cases} -1 \\ 1 \\ 0 \end{cases}$$

Let

$$\{P_{eff}\} = Peak \cdot [M_{eff}] \cdot \begin{cases} 0\\ -1\\ 1\\ 0 \end{bmatrix}$$

.'. the equations of motion reduce to

$$[_{M}]{\{\ddot{U}_{d}\}} + [K]{\{U_{d}\}} = {P_{eff}\}} \cdot f(t)$$

which is the desired form of forced vibration to which the modal analysis technique will be applied.

Modal Analysis Solutions

$$[M]{\ddot{U}_{d}} + [K]{U_{d}} = {P_{eff}} \cdot f(t)$$

Let

$$\{\ddot{U}_{d}\} = [X]\{\ddot{A}\}$$

 $\{U_{d}\} = [X]\{A\}$

. . [X] is the rectangular mode matrix formed as a set of mode

vectors (n x m) where

n = number of degrees of freedom of the non-base elements

m = number of modes considered in the analysis

 $\{A\}$ = mode participation factor vector = m x 1

$$\{A\} = \{A(t)\} ; \{A\} = \{P_{eff}\} : f(t)$$

$$\{A\} = \{A(t)\} ; \{A\} = \{A(t)\}$$

$$f(t) = \frac{\ddot{U}_{g}(t)}{Peak}$$

Premultiply by $[X]^T$; (m x n)

:
$$[X]^{T}[M][X]{\ddot{A}} + [X]^{T}[K][X]{A} = [X]^{T}{P_{eff}} \cdot f(t)$$

= {GP} \cdot f(t)

Now, use the orthogonality condition:

$$\{X_n\}^T[M]\{X_m\} = 0 \qquad m \neq n$$

Obviously the resulting matrix $[X]^{T}[M][X] = [GM]$ is a diagonal matrix since the (generalized m x n mass matrix) nonvanishing terms are only $[X_{n}]^{T}[M][X_{n}] = GM(n,n)$.

The same concept holds for $[X]^{T}[K][X] = [GS] = diagonal matrix where <math>\Omega^{2}$ is the squared eigenvalue diagonal matrix = $[\Omega^{2}][GM]$:

Thus GM, as well as GS can be considered as vectors,

	GM(1,1) GM(2,2) GM(3,3) GM(m,m)	and	$GM(1,1) \cdot \omega_1^2$ $GM(2,2) \cdot \omega_2^2$ \vdots $GM(m,m) \cdot \omega_n^2$	respectively.
--	--	-----	--	---------------

Thus m independent equations result:

$$GM(I,I) \cdot A(I) + \omega(I) \cdot \omega(I) + A(I) \cdot GM(I,I) = GP(I) \cdot f(t)$$

where I refers to the mode number.

Thus:

$$\ddot{A}(I) + \omega^{2}(I) \cdot A(I) = \frac{GP(I)}{GM(I,I)} \cdot f(t)$$

which are the equations of m independent lumped masses each representing the participation of the corresponding I-th mode.

Now, A(I) can be found using Duhamel Integration to account for the initial conditions (just before the instant t), i.e. to consider the whole acceleration record imposed on the structure, viz:

$$A(I) = \frac{GP(I)}{GM(I,I) \cdot \omega(I)} \cdot \int_{0}^{t} f(\tau) \cdot \sin \omega(t-\tau) d\tau$$
$$= \frac{PIN(I)}{GM(I,I) \cdot \omega(I)}$$
where PIN(I) = $(\int_{0}^{t} f(\tau) \sin \omega(t-\tau) d\tau) \cdot GP(I)$
. $A(I) = \frac{GP(I)}{GM(I,I)} f(t) - (\omega(I))^{2} \cdot A(I)$

Now from the original equations of motion the displacement and acceleration nodal vectors are determined:

$$\{ \mathsf{U}_{\mathsf{d}} \} = \{ \mathsf{X} \} \{ \mathsf{A} \}$$
$$\{ \ddot{\mathsf{U}}_{\mathsf{d}} \} = \{ \mathsf{X} \} \{ \ddot{\mathsf{A}} \}$$

The accuracy of the modal analysis approach depends on the number of modes involved in the superposition. The latter depends on how close or scarce the natural frequencies of the structure are spaced.

The accuracy of the method can be examined through the satisfaction of the original external equilibrium equation:

$$[M]{\ddot{U}_{d}} + [K]{U_{d}} = {P_{eff}} \cdot f(t)$$

For the structure considered it was found that the superposition of four modes offered only a crude approximation since the external equilibrium equation failed to be satisfied by as much as thirty percent. Use of eight modes reduced the maximum discrepancy to about ten percent. It was worth the effort to cross-check the program by use of a coarse idealization of the tank involving a limited number of degrees of freedom, i.e. a limited total number of natural modes. In that case the external equilibrium equation was satisfied perfectly.

Reactions of the Base

From the equations of base vibrations:

$$[\mathsf{M}_{bb}|\mathsf{M}_{b}^{\mathsf{T}}]\left\{\frac{\mathsf{U}_{bt}}{\mathsf{U}_{s}+\mathsf{U}_{d}}\right\} + [\mathsf{K}_{bb}|\mathsf{K}_{b}^{\mathsf{T}}]\left\{\frac{\mathsf{U}_{bt}}{\mathsf{U}_{s}+\mathsf{U}_{d}}\right\} = \left\{\mathsf{F}_{b}\right\}$$

Now, \boldsymbol{U}_{S} and \boldsymbol{U}_{S} were proved to be equal to

$$| \vec{U}_{s} | = \begin{bmatrix} I \\ - \\ I$$

where [I] is a(4 x 4) identity matrix, N/4 of which form the relating matrix between the resulting static non-base node displacements and the base node imposed displacements. Also N = number of non-base node degrees of freedom and since M_b^T contains nonzero elements only in the first four columns $M_b^T \cdot \ddot{u}_s$ can be expressed as

 $[M_b^T]'[I]{\ddot{U}_{bt}}$ where $[M_b^T]'$ is the 4 x 4 matrix including the nonzero elements

$$[M_{bb} + M_{b}^{T}'I]\{\ddot{U}_{bt}\} + [M_{b}^{T}]'\{\ddot{U}_{d}\} + [K_{bb} + K_{b}^{T}'I]\{U_{bt}\} + K_{b}^{T}U_{d} = \{F_{b}\}$$

but

$$[K_{bb} + K_{b}^{T'}I]\{U_{bt}\} = 0$$

$$F_{b} = [M_{bb} + M_{b}^{T'}I]\{\ddot{U}_{bt}\} + [M_{b}^{T}]\{\ddot{U}_{d}\} + [K_{b}^{T}]\{U_{d}\}$$

Of course the most significant part of the base force is attributed to the displacements of the non-base nodes, i.e. $[K_b]^T \{U_d\}$.

COMPUTER IMPLEMENTATION

The expressions for displacements and forces arising because of base excitation (as given in the previous section) are well-suited to computer implementation. This is achieved through use of two main programs. The first main program, see Page D-4, is termed the free vibration program. Its main tasks are:

(a) To develop the element mass matrix for the typical ring element. This is done in subroutine MASS, see page D-9, using the final expression for the mass integral which is carried out by hand computation.

(b) To develop the ring element's stiffness matrix in subroutine STIFF, see page D-10. This is obtained by numerical integration using Gaussian integration numbers stored on a file under the designation GASN. Thus, it is clear that prior to running the first main program it is necessary to run the Gaussian integration program NIXW listed on page D-17.

(c) To assemble the structural mass and stiffness matrices in subroutine ASSTR, see page D-8.

(d) To apply the boundary conditions on the structural matrices according to the given boundary conditions of the physical problem. This is processed in subroutine BOUN, see page D-7.

(e) To extract the eigenvalues and natural modes. This is accomplished in subroutine EGN, see page D-13, using the Cholesky reduction method to obtain the first mode. Then, the orthogonality conditions are utilized to obtain the higher modes.

(f) To develop the stress-displacement matrices indicating the three orthogonal components of force per unit length of shell middle surface, i.e.

the axial, tangential, and radial forces, as well as the bending moments M_{ZZ} and $M_{\Theta\Theta}$ and the twisting moment $M_{\Theta Z}$. These are shown in Figures 15 and 16. These stress-displacement matrices are computed at six cross sections, namely at the top, bottom, and middle of the typical ring element at both $\theta = 0^{\circ}$ and $\theta = \pi/2$. This is performed in subroutine STRMAT, see page D-6.

(g) To store on disc files the symmetric mass and stiffness matrices in triangular form. Also, to store the modes and the corresponding natural frequencies together with the stress-displacement matrices.

The second main program, page D-20, is the response program, the major tasks of which are:

(a) To retrieve the stored data from the disc through the use of control cards.

(b) To partition the original mass and stiffness matrices into the required matrices used in the analysis. This is achieved through use of subroutine EXTRACT, see page D-29.

(c) To develop the effective mass matrix M_{eff} discussed previously. This is done in subroutine EFFMASS, see page D-27.

(d) To apply modal analysis techniques by creating the generalized mass and stiffness matrices in subroutine MODAN, see page D-28. This is of course accomplished after retrieving the stored modes and associated frequencies.

(e) To solve for the participation factor of the modes employed by calculating the Duhamel integral for each. This is carried out using either of two subroutines. For the ground acceleration pulse in deterministic form of a rectangle, one sine wave, or a triangle, the closed form solution is obtained for each prescribed value of time from subroutine INTE, see page D-30. For the ground motion in the form of the artificial earthquake accelerogram available through the National Information Service - Earthquake Engineering (PSEQGN) [11], numerical intergration for each mode is carried out in subroutine INT, see page D-26. The earthquake record is stored on a disc file.

(f) To obtain the nodal displacements through superposition of the modes and their participation factors, as well as the external reaction developed at the base slab. Also, the stresses developed at the six cross sections mentioned previously are computed in the main program RESP, see page D-21, for each time station.

(g) To carry out an external equilibrium check.

It is to be noted that both of these main programs are written in Fortran IV language and implemented on a CDC Cyber computer. Data input to both main programs follow the scheme outlined in the following two charts. It is to be noted that several tanks can be investigated in the same computer run in which case the number of tanks being considered is entered into Line 704. However, this number is unity for the common case of considering only one tank at a time, hence in that case unity is entered in Line 704.

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FIRST MAIN PROGRAM



_ ____

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SECOND MAIN PROGRAM

DATA FEEDING



where

TTOTAL	1	Total time under consideration
DT	=	Time increment
TO	Ξ,	Total time duration of load application, used only
		for closed form solution
R	=	Radius of tank
M	=	Number of natural modes used for response superposition
NLOAD	=	Load indication. For example this is RECPU for rectangula
		pulse
	or	TRIPU for triangular pulse
	or	SINPU for sinusoidal pulse
	or	ARTEQ for artificial earthquake

PEAK = MAX AMPLITUDE of ground acceleration or the value used for normalization.

- 55 INDEX Indicates the method of solution required can be CLOSD for closed form solution or NUMER for numerical integration.
- 997 TSTAR = Initial time for which response is to be analyzed.
- 997 TEND = Final time for which response is to be analyzed.
- 997 TDT = Time interval between each two successive points under consideration as for response.
- 998 ISKIP = Number of points to be skipped as for external equilibrium check, stress analysis and detailed printing between two successively considered time stations.

EXAMPLES

I. Free Vibrations of Empty Storage Tank

Let us consider the slab-supported tank discussed in [9]. This structure is 40 feet high and 60 feet in radius with a steel wall having thickness of one inch. First, let us determine the empty tank natural frequencies for the case of the tank clamped at the base slab and free at the top. The computer program of Appendix D is utilized for this frequency determination. To utilize the program one enters into Lines 111, 112, 113, 114, 401, 431, 501, and 990 of the main program on Page D-4 the following data:

Line 111:	UM = ρ = density of tank material = 0.733 x 10 ⁻³ lb·sec ² /in ⁴
	$E1 = E = Young's modulus = 30 \times 10^6 lb/in^2$
	PX = nu = Poisson's ratio = 0.3
Line 112:	R = tank radius = 720 inches
	H = tank wall thickness = 1 inch
	AL = tank altitude = 480 inches
Line 113:	NSIN = total number of circumferential wave patterns
	that analyst desires to investigate = 1
Line 114:	NELEM = number of ring-shaped finite elements representing
	the tank = 9
Line 401:	NMODE = number of axial waves under consideration = 36
	(Printout indicates frequencies and displacements
	for modes 1, 2, 36)
Line 431:	NAT = number of circumferential waves in pattern under
	consideration (i.e. "instantaneous" number of
	circumferential waves) = 1. This number specifies
	which one of those patterns listed under NSIN is

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currently being investigated.

Line 501: NBCAS = total number of cases involving different sets of boundary conditions that analyst desires to investigate = 1.

Line 990: NBC = denotes boundary conditions at base and top of tank. First, enter CL if base is clamped or SM if base is simply supported. Next, enter CL if top is clamped, or SM if it is simply supported, or FR if it is free. Do not introduce a space between the designations of these two boundary conditions.

This completes all necessary input to the computer program.

The program output is displayed as follows: From Subroutine EGN on page D-13, line 108 INA represents the number of waves in the axial direction and omega in line 6990 denotes the corresponding natural frequency in Hz. These natural frequencies are as follows:

Mode	Frequency (Hz) Ref. [9]	Present work
1	34.04	34.08
2	43.87	43.91
3	44.58	44.64
4	45.10	45.19
5	45.80	45.92
6	47.97	47.13
7	-	49.03
8	-	51.86
9	-	55.79
10	-	61.91

11			69.28
12		-	79.00
13		-	84.33
14		-	91.45
15		-	107.07
16		-	111.14
17		-	126.17
18		-	147.94
19		-	168.62
20			205.18
21			210.55
22		-	325.09
23		-	351.53
24		-	486.49
25		-	572.91
26		-	649.62
27		-	823.44
28		-	826.61
29	$\sim \sim $	-	1010.55
30		-	1097.67
31			1178.23
32			1284.02
33		-	1396.31
34		-	1707.09
35		-	1990.22
36		-	2169.27

For each of the above natural frequencies the relative (normalized) displacements u, v, and w together with the slope dw/dz are displayed in the computer printout in the form of columns (with these headings) immediately after printing of the natural frequency. In these displays of displacements and slope the first (top) line represents tank displacements and slope at the junction of the tank with the rigid base slab (base node) and the last (bottom) line represents the corresponding quantities at the tank top. As an example, the third (axial) mode values are found to be:

u	V	W	dw/dz
.0000000	0.0000000	0.0000000	0.0000000
00025816	00050568	.02571988	.00065707
.00114042	00070022	.04663320	.00005942
00208424	00034154	.03029001	00064278
00235623	.00037411	01117024	00084468
00174015	.00094758	04620948	00041509
00068429	.00095662	04882863	.00032133
.00003875	.00037045	01675913	.00083742
00011887	00042156	.02879214	.00082998
00118237	00036095	.06570091	.00061867

Plots of u, v, w, and dw/dz for the first four axial modes appear in Figures 2 through 5 inclusive.

II. Free Vibrations of Cylindrical Shells with Diverse Boundary Conditions

Let us compare the predictions of the present analysis with results due to D.F. Vronay and B. L. Smith [10]. These investigators considered a cylindrical shell of length 12 inches, radius 3 inches, thickness 0.010 inches, and having properties $E = 29.6 \times 10^6 \text{ lb/in}^2$, v = 0.29, and $\rho =$ $0.733 \times 10^{-3} \text{ lb} \cdot \text{sec}^2/\text{in}^4$. We seek to determine the natural frequencies of this shell for four sets of boundary conditions, namely both ends clamped designated as C-C, one end clamped, the other simply supported designated as C-SS, both ends simply supported denoted as SS-SS, and one end clamped and the other free denoted by C-F. The computer program of Appendix D is utilized for this frequency determination. To employ this program one enters into Lines 111, 112, 113, 114, 401, 431, 501, and 990 of

Page D-4 the following data:

Line 111: UM = ρ = density of shell material = 0.733 x 10⁻³ 1b·sec²/in⁴

 $EI = E = Young's modulus = 29.6 \times 10^6 lb/in^2$

PX = nu = Poisson's ratio = 0.29

Line 112: R = shell radius = 3 inches

H = shell wall thickness = 0.010 inches

AL = shell altitude = 12 inches

Line 113: NSIN = total number of circumferential wave patterns that analyst desires to investigate = 5.

Line 114: NELEM = number of ring-shaped finite elements

representing the shell = 9.

Line 401: NMODE = number of axial waves under consideration = 4.

Line 431: NAT = number of circumferential waves in pattern under consideration = 1, 2, 3, 4, and 5 successively.

Line 501: NBCAS = total number of cases involving different sets of boundary conditions that analyst desires to investigate = 4.

Line 990: NBC = denotes boundary conditions at both ends of shell. First, enter CL if first end is clamped or SM if it is simply supported. Next, enter CL if other end is clamped, or SM if it is simply supported, or FR if it is free. Do not introduce a space between the designations of these two boundary conditions.

This completes all necessary input to the computer program.

The program output is displayed as follows: From Subroutine EGN on Page D-13, line 108, INA represents the number of waves in the axial direction and omega in line 6990 denotes the corresponding natural frequency in Hz. These natural frequencies are indicated in the following table in parentheses, preceded by values found in [10].

				_	_	-	$\widehat{}$	\frown	5	_	_	5		$\widehat{}$	$\widehat{}$	<u>.</u>		$\widehat{}$				$\widehat{}$
	22]	06	62)	(61)	76	1	376	211	307	63)	55)	167	671	033	102	562		33]	725	83.	565	739
	こ	(4	2	3	(2		<u> </u>	5	<u> </u>	8)	(9	5	4	<u>(</u>)	2	5		<u>®</u>	9)	6	<u>.</u>	(2
	205	479	255	219	280		818	136	240	800	597	817	406	324	906	371		147	228	401	158	343
		-				(ñ	2	<u> </u>			Ö	4	Ñ				თ	ö	4	ŝ	Ň
	($\widehat{\mathbf{C}}$	$\widehat{\mathbf{C}}$	_		-		<u>.</u>	~	$\widehat{\mathbf{x}}$	<u>(</u>)	a	6	Ŧ	6		т.,	$\widehat{\ }$	$\widehat{\mathbf{x}}$	$\widehat{}$	6	()
<i>.</i> .	3467	196(120(310	521		227	t05!	2867	190	143!	3739	514(137 <i>i</i>	324(2517		967:	73	<u> 9</u> 6(165(3735
-SS-	<u> </u>	5	5	3	9		2	2	0	5	5	3	9	2	<u> </u>			<u>.</u>	5	<u> </u>	2	0
SS	423	915	152	763	579		41	906	532	748	283	8491	833	047	616	184		421	296	439	760	157
	(7)					,	Û	,	~			.00	ų,	7	~		÷	01		40	4	(m)
	(L	(8)	(6	3			(4)	(0)	(2)	2	2)	(H	(0	32)	8	33)		<u>()</u>	(4)	5)	(†)	(9)
	347	196	120	820	632		65/	406	269	191	145	874	615	438	325	253		396	773	596	466	374
-SS	3	9	3	4	0		2	-	4	0	2	و و	6	_ ნ) 9	2		_ و	8		9	
S S	342	191	115	76	58		641	390	253	175	128	849	583	404	291	218		941	729	544	409	316
	4)	(9	6		-	ĩ	5)	5)	2	-	6	Ē	2)	8	6	8		6	(9	8)	6	(9
	347	197	121	831	643		657	406	270	193	146	874	615	438	326	254		696	773	596	467	375
ပ ပ	3 (7 (4 (5) 		2	2	9 9	2.(7 (3 (2 (<u> </u>	8) 0	•	8) 6	2 () 0	5 (
	N		ŝ	9	. 00			2	3	S	ĝ	ଟ୍ର	33	5	5	6		<u> </u>	5	4	0	9
	34	19		\sim	S.		64	33	25	2		87	ñ	4	š	5		94	72	54	41	3
	34	19	-	7	വ	ļ	64	39	25	17		8	5	40	20	5	•	64	72	54	41	33
	34	19	7	7	2		64	39	25	17	2	8	22	4(53	21	•	6	72	24	41	31
	34	19	7	7	2		64	36	25	17		84	22	4(23	21	•	64	72	24	41	31
tial	34	19	, 	7	5		64	30	25	17	12	78	55	4	23	21	•	6	72	24	41	31
rential e	34	19		7	5		64	36	25	17	12	98	5	4(52	21	•	6	72	24	41	31
nferential Aode	.1 34	2	3	4	5		1	2 39	3 25	4 17	5 12	1	2	3 4(4	5	•	1	2 72	3	4	5
°cumferential Mode	1 34	2 19	3	4	5		1 64	2 39	3 25	4 17	5	1	2	3 4(4 29	5	•	1	2 72	3	4	5
Circumferential Mode	34	2	3	4	5		1 64	2 39	3 25	4 17	5 12	1	2	3 4(4	5		1	2 72	3	4	5
Circumferential Mode	34	2	3	4	5		1 64	39	3 25	4 17	5 12	1	2	4(4 29	5		94	2	3	4	31
Circumferential Mode	34	19	3	4	5		1 64	39	3 25	4 17	5 12	1	5	4(4	5		1 9 4	2	54	4	3 1
Circumferential Mode	34,	2	3	4	5		1 64	2 39	3 25	4 17	5	1	2	40	4	5		1	2 72	54	4	3 1
Circumferential Mode	34,	19	3	4	2		1 64	39	3 25	4 17	5 12	1	2 56	40	29	5		10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	2	3	4	5
Circumferential Mode	34,	2	3 11	4	2		1 64	39	3 25	4 17	5 12	1	2	40	29	5			2	5 4	4	5
ode Circumferential Mode	34,	2 19	3	4	2		1 64	39	3 25	4 17	5	1	5	40	4	5 1 1 1			2	54 3 C 2 C 2 C 2 C 2 C 2 C 2 C 2 C 2 C 2 C	4	5
l Mode Circumferential Mode	34,	2	3 1 1 1	4	5 		2 1 64	39	3 25	4 17	5	3 1 84	5	40	29	5		4 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	2	54 States 2	4	5
xial Mode Circumferential Mode	1 34	19 · · · · · · · · · · · · · · · · · · ·	3	4	2		2 64	39	3 25	4 17	5	3 1 84	5	40	29	5		4 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	72	54	4	5
Axial Mode Circumferential Mode	1	19	3	4	2		2 1 64	39	3 25	4 17	5	3 1 84	5	40 A	29	5		4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	2	54 3 4 5 5 4 5 5 4 5 5 4 5 5 4 5 5 5 4 5	4	3

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III. <u>Cylindrical Tank Whose Base Slab is Subject to a Single</u> Rectangular Pulse Load

Let us consider again the tank of Ref. [9] where the tank wall is rigidly clamped to the base slab and the tank top is freely supported. The excitation is a rectangular pulse, as indicated in Figure 6. This acceleration is applied in the direction $\theta = 0^{\circ}$.

It is necessary to run the first main program as shown in Example I prior to running the second main program which describes the input excitation. Note that after the first main program has been run once that it is filed, so it is not necessary to run it again for each separate base excitation being considered.

It is now necessary to enter into the second main program of Appendix D, page D-21, the following data characterizing base excitation:

Line 101: TTOTAL = 1 second DT = 0.001 second T0 = 0.1 second Line 102: R = 720 inches Line 103: M = 8 modes Line 55: NLOAD = RECPU PEAK = 120 inches/second²

FEAR - 120 Inches/secor

INDEX = CLOSD

Also, an "end" card is required. This completes all necessary input to the computer program. The printed computer output for the closed form solution presents axial as well as radial components of shell middle surface displacement (u and w respectively) together with slope dw/dz at $\theta = 0^{\circ}$. The tangential displacement v is also indicated at $\theta = \pi/2$. An example of
these responses is indicated below for t = 0.5 seconds after initiation of the pulse. Eight modes were considered. There, the figures in the top row correspond to the node at the base of the tank and the figures in the bottom row correspond to the node at the tank top.

LI .		W	DW/07
81652437F-04	46740950E-03	-18208493E-02	.303348765-04
- 1798449PF-03	92366075E-03		
286711312-13	13511467E-02	.45354341E+D2	·20652330E-04
30758616E-03	- 173319615-02	527622426-02	<u>12245377E-04</u>
507990668-63	2.595841E-02	.61856043E-02	.17011134E-04
617349335-63	23205191E-02	61154179E-02	
69542760E-03	25174721E-02	.48646779E-D2	-,13219555E-04
75196334E-03	- 266357428-42		20202177E-04
820886532-03	275578802-02	.62569511E-02	-18612571E-04
		_	

At t = 0.5 seconds the external applied load is zero. The computer display of the sum of inertia and internal forces at each node at t = 0.5 seconds indicated extremely good agreement with this zero value. For this same pulse, the corresponding results found by direct numerical integration (replacing CLOSD in Line 55 by NUMER), (using eight modes) of the equations of motion are:

Ŭ	V	· · · · · · · · · · · · · · · · · · ·	FW/0Z
93929171E-(4	52839347E-03	.21513162E-02	.33915542E-04
205707885-03	10436033E-02		27507251E-04
326075255-03	15262609E-02	·51559075E-02	.26867135E-04
- 453054175-13	19574746E-02		
574892122-03	23262383E-02	.66951275E-02	.153346565-04
69178481E-C3			
778562332-03	-,28 532298E-02	.56321753E-02	71536281E-D5
84830809E-03	302309598-02		20950682E-04
93053598E-03	31284692E-02	-71307191E-02	.14981571E-D4

Agreements of these two appraoches for other values of time are comparable but omitted for brevity.

Again, for the sake of brevity no other numerical results are tabulated here but instead Figure 7 indicates the time dependent behavior of radial displacement w at the tank top for $\theta = 0^\circ$. Also, the bottom traces in Figure 7 indicate the behavior of radial displacement w at node 6 (top of the central element) as well as axial displacement at that same

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node for $\theta = 0^{\circ}$. These plots are for the first 1.00 seconds with time origin taken at the instant of pulse application.

Significant forces and moments per unit length of the shell middle surface are given by the second main program and as an example the values for t = 0.5 seconds are given below. Here the first three columns represent axial, tangential, and in-plane shear forces respectively at $\theta = 0^{\circ}$. The fourth column represents the bending moment M_{ZZ}, the fifth column the tangential bending moment M_{$\theta\theta$} and the sixth column represents the twisting moment M_{$\theta\theta$}.

STRESSES AT THETA = 0.0

AXIAL F.	TANGT. F.	IN-PLANE SH.	AXIAL MT.	TANGT. MT.	TORSION
والمشورة المتراجع المراجع		mentalagi seri seri e	19 - A - A	يه الرابوية المتركب ال	ale en
-59.60	-15.18		-7.427	-2,228	
-36.99	45.30	0.	2.765	.8360	С.
-32.64	83.27			1741	
-23.58	125.6	<u>e</u> .	1.123	.3524	t.,
-19.72	141.7	Q.		1849	
-11.23	169.5	Ū.	1.058	.3374	C . 1
-5.803	156.4	<u>n</u> .	1.867		<u> </u>
-9.363	94.93	0.	-2.407	-,7109	ε
-3.849	164.8	<u></u>	4119	1113	0 .
5.493	147.5	G •	.1791	.7961E-01	C.
			,		12

The corresponding values at $\theta = 0^\circ$ are

STRESSES AT THETA = 90.0 DEGREES

TANGT. F.	IN-PLANE SH.	AXIAL MT.	TANGT. MT.	TORSION
		9854F-85	2056F-05	- 17565-01
.6010E-34	-98.63	.36698-15	.11098-05	.6360E-01
.1667E-33	-82.94	• 1490E - C5		.3970E-J1
.2237E-03	-55,40			
<u>20.75E-03</u> 1260E-03	-25.96		.7672E-06	6940E-31 4240E-31
<u>13905-03</u>	=13.73	<u>54665-06</u>		4879F-11
	TANGT. F. 2014E-C4 .6010E-34 .1105E-03 .1667E-33 .2237E-03 .2075E-03 .1260E-03 .1390E-03 .1957E-03	TANGT. F. IN-PLANE SH. 2014E-04 -101.1 .6010E-34 -98.63 .1105E-03 -92.71 .1667E-33 -82.94 .1880E-03 -70.26 .2237E-03 -55.40 .2075E-03 -25.96 .1390E-03 -13.73 .1957E-03 -6.755	TANGT. F. IN-PLANE SH. AXIAL MT.	TANGT. F. IN-PLANE SH. AXIAL MT. TANGT. MT.

IV. Cylindrical Tank Whose Base Slab is Subject to Single Sinusoidal Pulse Load

The tank of Example III is reconsidered here, for excitation in the form of a single sinusoidal pulse, as indicated in Figure 8. This acceleration is also applied in the direction $\theta = 0^{\circ}$.

Again, the first main program has already been run, so it is unnecessary to run it again. For the base excitation under consideration now, it is necessary to enter into the second main program of Appendix D the following data characterizing base excitation:

Line 55: NLOAD = SINPU

PEAK = 120 inches/second²

$$INDEX = CLOSD$$

This completes all necessary input to the computer program.

The printed computer output of displacements for t = 0.5 seconds after initiation of the pulse is as follows:

TIME=	-500JJ	· · · · · · · · · · · · · · · · · · ·	يستعمر المعتقر والمتحد والمتحد
-		<u>11</u>	[.4/[.7-
.41841928E-15 .90744454E-05 .13451164E-04 .18821053E-04 .23548499E-04 .27520.883E-04 .31118018E-04 .34775136E-04	.21168633E-34 .41414549E-C4 .60441915E-04 .77469908c-04 .31864731E-04 .10376167E-03 .11311563E-03 .11974903E-03	12699475E-L3 12790795E-C3 21024378E-F3 25501342E-D3 23701829E-L3 25751647E-L3 25751647E-L3 27936318E-C3 2793685-03	14221379E-05 .69186850E-07. .21875769E-05 .27207151E-06 .71824744E-08 .27392337E-07 630790C9E-06 .72220160E-06 .18415839E-05
.37363903E-04	.123614912-03		a de la companya de l

For this same pulse, the corresponding results found by direct numerical integration of the equations of motion (replacing CLOSD in Line 55 by NUMER) are:

TINE=	.50000		
	1/	y i	[W/D7
.451108675-05	.23269174E-04	12975100F-03	154709925-05
-98161637E-45	45619638E-04	14582139E-03	27894220E-06-
.16793719F+B4	66589156E-04	22096339E-03	19043123E-05
-20479905E-AL	853690535+04	26435806E-03	
25543938E-04	.10141784E-03	26658283E-03	41209183E-06
. 30888886F+04	114677576=03	271716505-03	372\$0512E-06
.339522305-04	12511155E-C3	27849401E-03	94230393E-06
-38050467E-04	-13258939F=03	38936957E-03	
•41116894E-04	.13690073E-03	21487833E-D3	.22512543E-05

Again, agreements for other values of time are comparable.

Figure 9 indicates the time dependent behavior of radial displacement w at the tank top for $\theta = 0^{\circ}$. Also Figure 9 indicates the behavior of radial displacement w at node 6 as well as axial displacement at that same node.

V. <u>Cylindrical Tank Whose Base Slab is Subject to Single</u> Triangular Pulse Load

This example considers again the same tank of Example III, but now with the rigid base slab subject to excitation in the form of a single triangular pulse, as indicated in Figure 10. As in Example III, this is applied in the direction $\theta = 0^{\circ}$.

The first main program need not be run again. For this particular base excitation, it is necessary to enter into the second main program of Appendix D the following data characterizing base excitation:

Line 55 NLOAD = TRIPU

PEAK = 120 inches/second²

INDEX = CLOSD

This completes all necessary input to the computer program.

As in example IV, the printed computer output of displacements for t = 0.5 seconds after initiation of the pulse is as follows:

TIME= .	50000	•	
U • 107 85180E-04 • 22597025t-04 • 32916638E-04 • 439857145-04 • 54011250E-04 • 63946369E-04 • 75454273E-04 • 88595208E-04 • 10032630E-03	V • 55378303E-04 • 10928750E-03 • 16092664E-03 • 20896062E-03 • 25210669E-03 • 25210669E-03 • 32029266E-03 • 34188597E-03 • 35373066E-03	25344254E-D3 26081243E-03 40270811E-3 51069075E-03 54919748E-53 67998620E-53 67998620E-53 67998620E-53 77810897E-03	DW/D7 - 290017475-05 - 231151595-06 - 349421075-05 - 407859765-06 - 171859345-05 - 280187755-05 - 298186055-05 - 957834055-06 - 306279955-05

For this same pulse, the corresponding results found by direct numerical integration of the equations of motion are:

	50600		••••••••••••••••••••••••••••••••••••••
	V	ана на селото на село	0W/07
.11776005E-04	.61257601E-04	26807146E-03	321062635-05
-24729702E-04	.12100055E-03	31859217E-03	71040037E-06
.36341184E-04	.17815728E-03	44763491E-03	324776428-05
.48344197E-04	,2313087DE-J3	-,55189529E-03	82329672E-06
-59533570c-04			
•71146923E-04	.32069488E-03	- . 77023393E-03	22477814E-05
-83827430E+04	.35402631E-03	909120228-07	31550583E-05
-96073508E-04	-37767895E-03	99692442E-03	-98177097E-06
: •110 46927E-03	.39068319E-03	84353252E-03	•36478079E-₽5

As before, agreements for other values of time are comparable.

Figure 11 indicates the time dependent behavior of radial displacement w at the tank top for $\theta = 0^\circ$. Figure 11 indicates the behavior of radial displacement w at node 6 as well as axial displacement at that same node.

Comparison of the above results for Examples III, IV and V as obtained by the finite element approach with results of direct numerical integration lend confidence to use of the finite element program presented here for arbitrary base excitation. VI. <u>Cylindrical Tank Whose Base Slab is Subject to Artificial</u> Earthquake Excitation

The tank of [9] is employed again in this example. The tank wall is rigidly clamped to the base slab and the top is freely supported. The artificial earthquake accelerogram available through the National Information Service - Earthquake Engineering - Computer Program Applications (PSEQGN) was considered to be the exciting mechanism acting on the rigid base slab in the horizontal direction along the line $\theta = 0^\circ$.

The artificial earthquake record was imposed upon the base slab for five seconds and the tank response determined at 0.1 second intervals during the time period t = 0 to t = 5 seconds using time increments of 0.001 second. In using the artificial earthquake record the assigned maximum ground acceleration was taken to be g/2 although the record itself is normalized in terms of a unit value of g. The input to the rigid base was in terms of acceleration. The data cards employed and values assigned were as follows:

Line 55 NLOAD = ARTEQ

PEAK = 384 inches/second²

INDEX (leave blank)

The time history of radial displacement at the tank top at $\theta = 0^{\circ}$ during the time interval t = 4.0 to 4.5 seconds appears as shown in Figure 12. The axial, tangential, and in-plane shearing stresses as well as moments M_{ZZ} , $M_{\theta\theta}$, and $M_{Z\theta}$ at $\theta = 0^{\circ}$ are tabulated below at the time t = 4.3 seconds where the values in the top row correspond to base nodes and values in the bottom row correspond to nodes at the top of the tank.

	STRESSES	A T	IHETA=0.0	
--	----------	-----	-----------	--

AXIAL F.	TANGT. F.	IN-PLANE SH.	AXIAL HT.	TANGT. MT.	TORSION
385.4	115.9	0.	45.82	13.75	0.
391.2	-175.1	0.	-21.19	-6.387	8.
285.9	-270.9	3.	14.34	4.261	0.
200.8	-738.1	C.	-4.988	-1.589	0.
138.0	-1079.	8.	-11.33	-3.529	0.
122.5	-1067.	0.	7.533	2.132	n,
63.45	-1219.	0.	-6.567	-2.113	0.
36.33	-1204.	3.	-3.825	-1.288	0
33.53	-1100.	0.	8.183	2.325	¢.
19.63	-1258.	0.	6865	3509	0.

Corresponding values at θ = 90° at t = 4.3 seconds are tabulated below:

AXIAL F.	TANGT. F.	IN-PLANE SH.	AXIAL NT.	TANGT. MT.	TORSION
.51278-03	.1538E-03	776.1	.6080E-04	.19246-04	.1347
.3997E-03	2323E+03	763.0	2811E-04	84758-05	1733
.3807E-03	3595E-03	737.1	.1903E-04	.5653E-05	3343
.2664E-03	9793E-03	683.3	6618E-05	2108E-05	6816
+1831E-03	1420E-02	595.6	15045-04	46822-65	1062
-1826E-J3	1416E-02	489.7	.9994E=05	.2829E-05	77258-01
.8365E-04	1618E-32	373.4	87135-65	2804E-05	1893
+4820E-04	15986-02	249.0	5075E-05	1709E-05	.1926
.4449E-04	1459E-02	125.4	.1086E-04	.3087E-05	4624E-01
25052-04	1659E-02	53.38	911DE-06	* .4656E-96	2263

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REFERENCES

1.	A.W. Leissa, <u>Vibration of Shells</u> , NASA SP-288, Washington, D.C., 1973.
2.	P.M. Ogibalov, <u>Dynamics and Strength of Shells</u> , translated from Russian as NASA TT F-284, 1966.
3.	H. Kraus, Thin Elastic Shells, John Wiley and Sons, New York, 1967.
4.	G.B. Warburton, Dynamics of Shells, Department of Mechanical Engineering, University of Toronto, TP 7307, 1973.
5.	P. Seide, <u>Small Elastic Deformation of Thin Shells</u> , Noordhoff International Publishing, Leyden, The Netherlands, 1975.
6.	A.P. Coppa and W.A. Nash, "Dynamic Buckling of Shell Structures Subject to Longitudinal Impact," Air Force Flight Dynamics Laboratory Report FDL-TDR-64-65, 1964, prepared by the General Electric Company.
7.	J.L. Sanders, Jr., "An Improved First Approximation for Thin Shells," NASA TR-R24, 1959.
8.	R.W. Clough, "Analysis of Structural Vibrations and Dynamic Response," in <u>Recent Advances in Matrix Methods of Structural Analysis and</u> <u>Design</u> , ed. by R.H. Gallagher, Y. Tamada, and J.T. Oden, University of Alabama Press, 1971.
9.	N.W. Edwards, "A Procedure for the Dynamic Analysis of Thin Walled Cylindrical Liquid Storage Tanks Subjected to Lateral Ground Motion," Ph.D. Dissertation, University of Michigan, Ann Arbor, Michigan, 1969.
10.	D.F. Vronay and B.L. Smith, "Free Vibration of Circular Cylindrical Shells of Finite Length," Journal of the AIAA, Vol. 8, No. 3, 1970, pp. 601-603.
11.	P. Ruiz and J. Penzien, "Artificial Generation of Earthquake Accelerograms," Program available as PSEQGN from the National Information Service, Earthquake Engineering, Computer Program Applications, University of California, Berkeley, California 94720.







CLAMPED-FREE BOUN.









-40-



acc (in/sec²)



FIGURE 7











Bending and Torsional Stress Resultants

FIGURE 15





FIGURE 16

APPENDIX A

RESUME OF SANDERS' SHELL THEORY

The present investigation is based upon the shell theory due to J.L. Sanders, Jr. [7]. A brief resume of these equations for a thin, elastic, circular cylindrical shell follows.

Let us consider a right, circular cylindrical shell of radius a and thickness h. Let the quantities, r, θ , and z denote radial, circumferential, and axial coordinates respectively of a point on the shell middle surface. The corresponding displacement components are denoted by w, v, and u, as indicated in Figure 13. The force and moment resultants action on an element of the shell are depicted in Figures 14 and 15 respectively. The equilibrium equations in terms of these force resultants are:

$$a \frac{\partial N_{z}}{\partial z} + \frac{\partial \overline{N}}{\partial z} - \frac{1}{2a} \frac{\partial \overline{M}}{\partial \theta} = -aq_{z} + a\rho_{s}h\ddot{u}$$

$$a \frac{\partial \overline{N}}{\partial z} + \frac{\partial N_{\theta}}{\partial \theta} + Q_{\theta} + \frac{1}{2} \frac{\partial \overline{M}}{\partial z} = -aq_{\theta} + a\rho_{s}h\ddot{v}$$

$$N_{\theta} - a \frac{\partial Q_{z}}{\partial z} - \frac{\partial Q_{\theta}}{\partial \theta} = aq_{r} - a\rho_{s}h\ddot{w}$$

$$(A-1)$$

$$a Q_{z} = a \frac{\partial M_{z}}{\partial z} + \frac{\partial \overline{M}}{\partial \theta}$$

$$a Q_{\theta} = a \frac{\partial \overline{M}}{\partial z} + \frac{\partial M_{\theta}}{\partial \theta}$$

where $q_r^{}$, $q_\theta^{}$, and $q_z^{}$ are applied forces per unit area of the shell middle surface in the radial, tangential, and axial directions respectively; $\rho_s^{}$ denotes density of the shell material, and

$$\overline{N} = \frac{1}{2} (N_{Z\theta} + N_{\theta Z}) + \frac{1}{4a} (M_{Z\theta} - M_{\theta Z})$$

$$\overline{M} = \frac{1}{2} (M_{Z\theta} + M_{\theta Z})$$

A-1

By Sanders' theory, the curvatures are given by

$$k_{z} = -\frac{\partial^{2} w}{\partial z^{2}}$$

$$k = -\frac{1}{a^{2}} \left(\frac{\partial^{2} w}{\partial \theta^{2}} - \frac{\partial v}{\partial \theta} \right)$$

$$k_{z} = -\frac{2}{a} \frac{\partial^{2} w}{\partial z \partial \theta} + \frac{3}{2a} \frac{\partial v}{\partial z} - \frac{1}{2a^{2}} \frac{\partial u}{\partial \theta}$$

and the strain-displacement relations by

$$\varepsilon_{z} = \frac{\partial u}{\partial z}$$

$$\varepsilon_{\theta} = \frac{1}{a} \left(\frac{\partial v}{\partial \theta} + w \right)$$

$$\varepsilon_{z\theta} = \frac{\partial v}{\partial z} + \frac{1}{2} \frac{\partial u}{\partial \theta}$$
(A-3)

Accordingly, the force and moment resultants may be expressed in the forms

$$N_{z} = k[\varepsilon_{z} + v\varepsilon_{\theta}]$$

$$N_{g} = k[\varepsilon_{\theta} + v\varepsilon_{z}]$$

$$\overline{N} = k(\frac{1-v}{2})\varepsilon_{z\theta}$$

$$M_{z} = D[k_{z} + vk_{\theta}]$$

$$M_{\phi} = D[k_{\theta} + vk_{z}]$$

$$\overline{M} = D(\frac{1-v}{2})k_{z\theta}$$

(A-4)

(A-2)

where \boldsymbol{v} denotes Poisson's ratio and

$$k = \frac{Eh}{(1 - v^2)}$$
$$D = \frac{Eh^3}{12(1 - v^2)}$$

(extensional rigidity)

(A-5)

(bending rigidity)

Substitution of Equations (A-2), (A-3), and (A-4) in (A-1) yields the shell equations in terms of displacements:

$$\alpha^{2} \frac{\partial^{2} u}{\partial z^{2}} + (\frac{1-v}{2})(1 + \frac{\alpha^{2}}{4})\frac{\partial^{2} u}{\partial \theta^{2}} + \frac{a}{2}[1 + v - \frac{3}{4}(1-\alpha)\alpha^{2}] \frac{\partial^{2} v}{\partial \theta \partial z}$$

$$+ a\alpha \frac{\partial w}{\partial z} + \frac{a\alpha^{2}}{2}(1-v) \frac{\partial^{2} w}{\partial \theta^{2} \partial z} = -\frac{a^{2}}{k}q_{z} + \frac{a^{2}}{k}\rho_{s} h\ddot{u}$$

$$\frac{a}{2}[1 + v - \frac{3}{4}(1-v)\alpha^{2}] \frac{\partial^{2} u}{\partial \theta \partial z} + \frac{a^{2}(1-v)}{2}(1 + \frac{q}{4}\alpha^{2})\frac{\partial^{2} v}{\partial z^{2}}$$

$$+ (1+\alpha^{2})\frac{\partial^{2} v}{\partial \theta^{2}} + \frac{\partial w}{\partial \theta} - \alpha^{2}[\frac{\partial^{3} w}{\partial \theta^{3}} + a^{2}(\frac{3}{2} - \frac{v}{2})]\frac{\partial^{3} w}{\partial z^{2} \partial \theta}$$

$$= -\frac{a^{2}}{k}q_{\theta} + \frac{a^{2}}{k}\rho_{s} h\ddot{v}$$

$$av \frac{\partial u}{\partial z} + \frac{a}{2}(1-v)\alpha^2 \frac{\partial^3 u}{\partial z \partial \theta^2} + \frac{\partial v}{\partial \theta} - \alpha^2 \left[\frac{\partial^3 v}{\partial \theta^3} + a^2 \left(\frac{3}{2} - \frac{v}{2}\right)\right] \frac{\partial^3 v}{\partial \theta \partial z^2} + w + v_w^4 = \frac{a^2}{k} q_r - \frac{a^2}{k} \rho_s h\ddot{w}$$

where

$$\alpha^{2} = \frac{1}{12} \left(\frac{h}{a}\right)^{2}$$

$$\nabla^{4} w = a^{4} \frac{\partial^{4} w}{\partial z^{4}} + 2a^{2} \frac{\partial^{4} w}{\partial z^{2} \partial \theta^{2}} + \frac{\partial^{4} w}{\partial \theta^{4}}$$

In the finite element analysis carried out here, the significant forces and moments (per unit length of shell middle surface) that were investigated are indicated in Figure 16 in their positive directions. At the base of the cylindrical tank the external axial force must equal the internal force N_z and similarly for N_{θ} and M_z .

The equations (A-5) governing motion of the shell permit representation of the applied loads in the form

$$q_{z} = \sum_{m} q_{z}^{m} (z,t) \cos m\theta$$

$$q_{\theta} = \sum_{m} q_{\theta}^{m} (z,t) \sin m\theta \qquad (A-6)$$

$$q_{r} = \sum_{m} q_{r}^{m} (z,\theta) \cos m\theta$$

while simultaneously the displacements may be expressed as

$$u = \sum_{m} u_{m}(z,t) \cos m\theta$$

$$v = \sum_{m} v_{m}(z,t) \sin m\theta$$

$$w = \sum_{m} w_{m}(z,t) \cos m\theta$$
(A-7)

It is to be noted the m-th harmonic of displacement is coupled only to the m-th harmonic of loading.

APPENDIX B

DEVELOPMENT OF MATRICES EMPLOYED IN FINITE ELEMENT ANALYSIS

For a specified harmonic m the displacement function vector $\{u\}$ assigned for the typical ring-shaped element is expressed, according to Sanders' theory for any point (z,θ) in terms of a generalized displacement vector $\{u_m\}$ (a function of z only) as follows

$$\begin{cases} u \\ v \\ w \end{cases} = \{u\} = [T'] \{u_m\} = \begin{bmatrix} \cos m\theta & 0 & 0 \\ 0 & \sin m\theta & 0 \\ 0 & 0 & \cos m\theta \end{bmatrix} \begin{pmatrix} u_m \\ v_m \\ w_m \end{pmatrix}$$
(B-1)

where u_m and w_m are the axial and radial displacements at $\theta = 0^\circ$ and v_m is evaluated at $\theta = \pi/2$.

The displacement function is also expressed in a polynomial form in terms of a generalized coordinate vector {A} whose length equals the number of degrees of freedom per element:

$$\{u\} = \left\{ \begin{array}{c} u \\ v \\ w \end{array} \right\} = [P] \{A\}$$
(B-2)

The nodal displacement vector $\{\delta\}$ which constitutes the number of degrees of freedom of the element can be employed to define the generalized coordinate vector $\{A\}$ by substituting in Equation (B-2) the nodal coordinates. Thus, a square matrix C involving the dimensions of the element results:



$$\{A\} = [C]^{-1} \{\delta\}$$
(B-4)
$$\{u\} = [P][C]^{-1} \{\delta\} = [N] \{\delta\}$$
(B-5)

where [N] is the shape function matrix relating the displacements at a general point on the element to the nodal displacements $\delta(\theta)$.

By Sanders' theory, the compatibility equations are introduced through the strain-displacement relations as follows:

 $\{\epsilon\} = [\boldsymbol{\chi}]\{u\}$



(B-6)

(B-3)

where \mathcal{X} is a differential operator matrix. Thus:

$$\{\varepsilon\} = [\mathbf{X}] \{\mathbf{u}\}$$
$$= [\mathbf{X}] [\mathbf{T}] \{\mathbf{u}_{\mathrm{m}}\}$$
$$= [\overline{\mathbf{T}}] [\mathbf{X}] \{\mathbf{u}_{\mathrm{m}}\}$$
$$= [\overline{\mathbf{T}}] [\mathbf{X}] [\mathbf{N}] \{\delta_{\mathrm{m}}\}$$
$$= [\overline{\mathbf{T}}] [\mathbf{B}] \{\delta_{\mathrm{m}}\}$$

where

[B] = **[x**][N]

The differential operator matrix involves differentiation with respect to both z and θ . Obviously the deformation matrix [T] involves functions of θ , i.e.

	cos me]
[T] =		cos me		
			cos me	
				cos mə

The differentiations with respect to θ are performed on T and the result is a new differential operator matrix $[\mathbf{z}]$ which involves differentiation with respect to z only.

Since [N], the shape function, is a function of z only it follows that B is in terms of z only and that was the purpose of the previous modification. These operations are shown in the following matrix notations: (see B matrix development in Appendix C):

(B-8)

(B-7)



[\$\mathcal{z}][T] = [\bar{\bar{T}}][\bar{z}]

B-4



Stress-Strain Relationships

The stress vector is

B-5



= $[D][\overline{\overline{T}}][B]{\delta_m}$

where D is the elastic coefficient matrix involving E, H, and v, $\overline{\overline{T}}$ is a transformation matrix involving functions of θ only, and B is the linear strain-displacement relationship that involves functions of the lineal axial dimension z only. Thus, the stress-generalized nodal displacement (corresponding to a specific harmonic m) matrix is

[D][Ŧ][B]

Derivation of the Element Stiffness Matrix K

$$U = \frac{1}{2} \int_{vol} \{\varepsilon\}^{T} \{\sigma\} dv$$
$$= \frac{1}{2} \int_{vol} \{\varepsilon\}^{T} \{D\} \{\varepsilon\} dv$$

But since

$$\{\varepsilon\}^{\mathsf{T}} = \{\delta_{\mathsf{m}}\}^{\mathsf{T}} [\mathsf{B}]^{\mathsf{T}} [\bar{\mathsf{T}}]^{\mathsf{T}}$$

then

$$J = \frac{1}{2} \int_{vol} \{\delta_m\}^T [B]^T [\overline{T}]^T [D] [\overline{T}] [B] \{\delta_m\} dv$$

B-6

$$= \frac{1}{2} \{\delta_{m}\}^{\mathsf{T}} \int_{\mathsf{vol}} [\mathsf{B}]^{\mathsf{T}} [\overline{\mathsf{T}}] [\mathsf{D}] [\overline{\mathsf{T}}] [\mathsf{B}] d\mathsf{v} \{\delta_{m}\}$$
$$= \frac{1}{2} \{\delta_{m}\}^{\mathsf{T}} [\mathsf{K}] \{\delta_{m}\}$$

$$\begin{bmatrix} K \end{bmatrix} = \int_{VOI} [B]^{T} [\overline{T}] [D] [\overline{T}] [B] dv$$
$$= h \int_{O}^{L} \int_{O}^{2\pi} [B]^{T} [\overline{T}]^{T} [D] [\overline{T}] [B] ad\theta dz$$
$$= \pi ha \int_{O}^{L} [B]^{T} [D] [B] dz$$

where L denotes shell length of the ring element.

In the computer program the element stiffness matrix was developed by using its elementary component matrices and through linear integration using the Gaussian integration method along the length of the element.

Derivation of the Element Mass Matrix M

The element mass matrix is developed by considering the expression for the element kinetic energy, viz:

$$V = \int_{vol} \{u\}^T \rho_s \frac{\partial^2}{\partial t^2} \{u\} dv$$

But

$$\{u\} = \{N\}\{\delta\} = [N][T']\{\delta_m\}$$

$$V = \int_{VOI} \rho_s \{\delta_m\}^T [T']^T [N]^T [N][T'] \frac{\partial^2}{\partial t^2} \{\delta_m\} dv$$

$$= \{\delta_m^T\} \rho_s \int [T']^T [N]^T [N][T'] dv \{\tilde{\delta}_m\}$$

$$= \{\delta_m\}^T [M] \{\tilde{\delta}_m\}$$

$$[M] = \rho_s \int [T']^T [N]^T [N][T'] dv$$



The mass matrix element was evaluated by performing the matrix multiplication $[N]^{T}[N]$ and by carrying out the integration along the element length longhand. The final values are then substituded into the computer program in subroutine MASS. This is carried out in Appendix C.

APPENDIX C

DETAILED DEVELOPMENT OF MATRICES

Derivation of the B. Matrix

We have





$$\begin{split} & B_{11} = \frac{3}{32} (1 - \frac{z}{L}) = -\frac{1}{L} \\ & B_{12} = B_{13} = B_{14} = 0 \\ & B_{12} = B_{13} = B_{14} = 0 \\ & B_{12} = B_{13} = B_{14} = 0 \\ & B_{12} = B_{13} = B_{14} = 0 \\ & B_{12} = B_{13} = B_{14} = 0 \\ & B_{22} = \frac{m}{a}(1 - \frac{z}{L}), \\ & B_{23} = \frac{1}{a}(1 - \frac{3z^2}{L^2} + \frac{2z^3}{L^3}) \\ & B_{24} = \frac{1}{a}(z - \frac{2z^2}{L} + \frac{z^3}{L^2}) \\ & B_{25} = 0 \\ & B_{26} = \frac{m(z)}{L} \\ & B_{27} = \frac{1}{a}(\frac{3z^2}{L^2} - \frac{2z^3}{L^3}) \\ & B_{28} = \frac{1}{a}(-\frac{z^2}{L} + \frac{z^3}{L^2}) \\ & B_{31} = -\frac{m}{a}(1 - \frac{z}{L}) \\ & B_{32} = -\frac{1}{L} \\ & B_{36} = \frac{1}{L} \\ & B_{37} = B_{38} = 0 \\ & B_{41} = 0, \\ & B_{42} = 0 \\ & B_{43} = -\frac{3^2}{az^2} (1 - \frac{3z^2}{L^2} + \frac{2z^3}{L^3}) = \frac{6}{L^2} - \frac{12z}{L^3} \\ & B_{44} = -\frac{3^2}{3z^2} (z - \frac{2z^2}{L} + \frac{z^3}{L^2}) = \frac{4}{L} - \frac{6z}{L^2} \\ & B_{45} = B_{46} = 0 \\ & B_{47} = -\frac{3^2}{az^2} (\frac{3z^2}{L^2} - \frac{2z^3}{L^3}) = -\frac{6}{L^2} + \frac{12z}{L^3} \\ & B_{48} = -\frac{3^2}{az^2} (-\frac{z^2}{L} + \frac{z^3}{L^2}) = \frac{z}{L} - \frac{6z}{L} \\ & B_{51} = 0 \\ & B_{52} = \frac{m}{a}(1 - \frac{z}{L}) \\ & B_{53} = \frac{m^2}{a}(1 - \frac{3z^2}{L^2} + \frac{2z^3}{L^3}) \\ & B_{54} = \frac{m^2}{a^2} (2 - \frac{2z^2}{L} + \frac{z^3}{L^2}) \\ & B_{55} = 0 \\ & B_{56} = \frac{m}{a}\frac{z}{L} \\ & B_{57} = \frac{m^2}{a^2}(3\frac{z^2}{L^2} - \frac{2z^3}{L^3}), \\ & B_{58} = \frac{m^2}{a^2} (-\frac{z^2}{L} + \frac{z^3}{L^2}) \\ & B_{61} = \frac{m}{a^2}(1 - \frac{z}{L}) \\ & B_{62} = \frac{3}{2a}(-\frac{1}{L}) \\ & B_{63} = \frac{2m}{a}(-\frac{6z}{L^2} + \frac{6z^2}{L^3}) \\ \end{array}$$

$$B_{64} = \frac{2m}{a}(1 - \frac{4z}{L} + \frac{3z^2}{L^2}) \qquad B_{67} = \frac{2m}{a}(\frac{6z}{L^2} - \frac{6z^2}{L^3})$$
$$B_{68} = \frac{2m}{a}(\frac{-2z}{L} + \frac{3z^2}{L^2})$$

Derivation of	the	Elemen	<u>t Shape</u>	Funct	<u>ion Matr</u>	ix N =	Pc ⁻¹	_	
× .	٢	•						-	-
· ·		1	Z	0	0	0	0	0	0
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		0	0	0	0	1	Z	z ²	z ³ .
	٣								
· · ·		1	0	0	0	0	0	0	0
		0	0	1	0	0	0	0	0
		0	0	0	0	1	Ő	0	0
[C] =		0	0	0	0	0	1	0	0
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L		0	0	L ³	0	0	0	0	0
		0	0	0	L ³	0	0	0	0
		0	0 -	-3L ·	-2L ²	0	0	3L -	-L ²
		0	0	2	L	0	0	-2	L

C-3

 $[N] = [P][C]^{-1}$ $N_{11} = 1 - \frac{z}{L}$ $N_{15} = \frac{z}{L}$ $N_{12} = N_{13} = N_{14} = 0$ $N_{16} = 0 = N_{17} = N_{18}$ $N_{12} = 0$ $N_{13} = N_{14} = 0$ $N_{15} = \frac{z}{L}$ $N_{16} = 0$ $N_{17} = N_{18} = 0$ $N_{22} = 1 - \frac{z}{L}$ $N_{21} = 0$ $N_{23} = 0$ $N_{24} = N_{25} = 0$ $N_{26} = \frac{z}{L}$ $N_{27} = 0$ $N_{28} = 0$ $N_{33} = 1 - \frac{3z^2}{L^2} + \frac{2z^3}{L^3}$ $N_{31} = 0$ $N_{32} = 0$ $N_{34} = z - \frac{2z^2}{L} + \frac{z^3}{12}$ $N_{35} = N_{36} = 0$ $N_{37} = \frac{3z^2}{12} - \frac{2z^3}{13}$ $N_{38} = \frac{-z^2}{L} + \frac{z^3}{12}$ $[N] = \begin{bmatrix} 1 - \frac{z}{L} & 0 & 0 & 0 & \frac{z}{L} & 0 & 0 & 0 \\ 0 & 1 - \frac{z}{L} & 0 & 0 & 0 & \frac{z}{L} & 0 & 0 \\ 0 & 0 & 1 - \frac{3z^2}{L^2} + \frac{2z^3}{L^3} & 2 - \frac{2z^2}{L} + \frac{z^3}{L^2} & 0 & 0 & \frac{3z^2}{L^2} - \frac{2z^3}{L^3} - \frac{z^2}{L} + \frac{z^3}{L^2} \end{bmatrix}$
Deri	vation of	the Product	<u> Matrix [N</u>	<u>]* = [N^T][N</u>	1			1
Deri	[N]* =	the Product $1 - \frac{z}{L}$ 0 0 0 $\frac{z}{L}$ 0 0 0	$\frac{\text{Matrix [N]}}{0}$ $1 - \frac{z}{L}$ 0 0 $\frac{z}{L}$ 0	$\frac{1}{2} = \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} - \frac{2z^{2}}{L} + \frac{1}{2}$ $\frac{3z^{2}}{L} - \frac{2z^{3}}{L} + \frac{1}{2}$	$\frac{2z^3}{3}$			
	1 - 2 0 0	0 0 1 - <u>2</u> 0 1-	$0 = \frac{3z^2}{L^2} + \frac{2z^3}{L^3} = 2$	$\frac{L^{2}}{L} - \frac{L^{3}}{L^{2}}$ $\frac{-z^{2}}{L} - \frac{z^{3}}{L^{2}}$ $0 \qquad \frac{z}{L}$ $0 \qquad 0$ $\frac{z}{L}$ $\frac{z}{L^{2}} + \frac{z^{3}}{L^{2}} = 0$	0 <u>2</u> L 0	$ \begin{array}{c} 0 \\ 0 \\ \frac{3z^2}{L^2} - \frac{2z^3}{L^3} \end{array} $	0 0 $\frac{-z^2}{L} + \frac{z}{L}$, <u>3</u>
	$N_{11}^{*} = (1)$ $N_{15}^{*} = (1)$ $N_{21}^{*} = 0$ $N_{25}^{*} = 0$ $N_{31}^{*} = N_{31}^{*}$ $N_{34}^{*} = 2$ $N_{44}^{*} = z^{2}$	$-\frac{z}{L})^{2}$ $-\frac{z}{L}(\frac{z}{L})$ N_{22}^{*} N_{26}^{*} N_{33}^{*} $-\frac{2z^{2}}{L} - \frac{2z^{3}}{L^{2}}$ $-\frac{4z^{3}}{L} + \frac{6z^{4}}{L^{2}}$	$N_{12}^{*} = N_{16}^{*} = (1 - \frac{z}{L})$ $= \frac{z}{L}(1 - \frac{z}{L})$ $= 1 - \frac{6z^{2}}{L^{2}}$ $+ \frac{9z^{4}}{L^{3}} - \frac{7}{L}$ $- \frac{4z^{5}}{L^{3}} + \frac{z}{L}$	$N_{13}^{*} = N_{14}^{*} =$ $N_{17}^{*} = N_{18}^{*} =$ $\frac{2}{10} = N_{23}^{*}$ $\frac{1}{2} =$	0 0 = 0 = N ₂₈ = 0 $\frac{4}{L^{5}}$	$N_{24}^{*} = 0$ + $\frac{4z^{6}}{L^{6}}$		

$$N_{45}^{*} = N_{46} = 0$$

$$N_{47}^{*} = \frac{3z^{3}}{L^{2}} - \frac{8z^{4}}{L^{3}} + \frac{7z^{5}}{L^{4}} - \frac{2z^{6}}{L^{5}}$$

$$N_{48}^{*} = \frac{-z^{3}}{L} + \frac{3z^{4}}{L^{2}} - \frac{3z^{5}}{L^{3}} + \frac{z^{6}}{L^{4}}$$

$$N_{51}^{*} = \frac{z}{L}(1 - \frac{z}{L}) \qquad N_{52}^{*} = N_{53}^{*} = N_{54}^{*} = 0$$

$$N_{55}^{*} = (\frac{z}{L})^{2} \qquad N_{56}^{*} = N_{57}^{*} = N_{58}^{*} = 0$$

$$N_{65}^{*} = 0 \qquad N_{65}^{*} = (\frac{z}{L})^{2} \qquad N_{63}^{*} = N_{64}^{*} = 0$$

$$N_{65}^{*} = 0 \qquad N_{65}^{*} = (\frac{z}{L})^{2}$$

$$N_{71}^{*} = N_{72}^{*} = 0 \qquad N_{73}^{*} = \frac{3z^{2}}{L^{2}} - \frac{2z^{3}}{L^{3}} - \frac{9z^{4}}{L^{4}} + \frac{12z^{5}}{L^{5}} - \frac{4z^{6}}{L^{6}}$$

$$N_{37}^{*} = \frac{-3z^{4}}{L^{3}} + \frac{5z^{5}}{L^{4}} - \frac{2z^{6}}{L^{5}}$$

$$N_{38}^{*} = \frac{-z^{2}}{L} + \frac{z^{3}}{L^{2}} + \frac{3z^{4}}{L^{3}} - \frac{5z^{5}}{L^{4}} + \frac{2z^{6}}{L^{5}}$$

$$N_{74}^{*} = \frac{3z^{2}}{L^{2}} - \frac{2z^{3}}{L^{3}} - \frac{9z^{4}}{L^{4}} - \frac{12z^{5}}{L^{5}} - \frac{4z^{6}}{L^{5}}$$

$$N_{77}^{*} = N_{76}^{*} = 0$$

$$N_{77}^{*} = \frac{9z^{4}}{L^{4}} - \frac{12z^{5}}{L^{5}} + \frac{4z^{6}}{L^{5}}$$

$$N_{78}^{*} = -\frac{3z^{4}}{L^{3}} + \frac{5z^{5}}{L^{4}} - \frac{2z^{6}}{L^{5}}$$

$$N_{78}^{*} = -\frac{3z^{4}}{L^{3}} + \frac{5z^{5}}{L^{4}} - \frac{2z^{6}}{L^{5}}$$

$$N_{78}^{*} = -\frac{3z^{4}}{L^{3}} + \frac{5z^{5}}{L^{4}} - \frac{2z^{6}}{L^{5}}$$

$$N_{78}^{*} = -\frac{3z^{4}}{L^{3}} + \frac{5z^{5}}{L^{5}} - \frac{2z^{6}}{L^{5}}$$

$$N_{81}^{*} = N_{82}^{*} = 0$$

$$\begin{split} &\mathsf{N}_{83}^{\star} = -\frac{z^{2}}{L} + \frac{z^{3}}{L^{2}} + \frac{3z^{4}}{L^{3}} - \frac{5z^{5}}{L^{4}} + \frac{2z^{6}}{L^{5}} \\ &\mathsf{N}_{84}^{\star} = \frac{-z^{3}}{L} + \frac{3z^{4}}{L^{2}} - \frac{3z^{5}}{L^{3}} + \frac{z^{6}}{L^{4}} \\ &\mathsf{N}_{85}^{\star} = \mathsf{N}_{86}^{\star} = 0 \\ &\mathsf{N}_{88}^{\star} = \frac{z^{4}}{L^{2}} - \frac{2z^{5}}{L^{3}} + \frac{z^{6}}{L^{4}} \\ \hline &\mathsf{Development of the Integral Matrix} \int_{0}^{L} \frac{\mathsf{N}^{7}}{\mathsf{d}z} \\ &\int_{0}^{L} \mathsf{N}_{11}^{\star} \, \mathsf{d}z = \int_{0}^{L} (1 - \frac{2z}{L} + \frac{z^{2}}{L^{2}}) \mathsf{d}z = (z - \frac{z^{2}}{L} + \frac{z^{3}}{3L^{2}}) = \mathsf{L}(1 - 1 + \frac{1}{3}) = \frac{\mathsf{L}}{3} \\ &\int_{0}^{L} \mathsf{N}_{15}^{\star} \, \mathsf{d}z = \int_{0}^{L} (\frac{z}{L} - \frac{z^{2}}{L^{2}}) \mathsf{d}z = (\frac{z^{2}}{2L} - \frac{z^{3}}{3L^{2}})_{0}^{L} = \mathsf{L}(\frac{1}{2} - \frac{1}{3}) = \frac{\mathsf{L}}{6} \\ &\int_{0}^{L} \mathsf{N}_{22}^{\star} \, \mathsf{d}z = \int_{0}^{L} (1 - \frac{\mathsf{d}z}{L^{2}})^{2} = \frac{\mathsf{L}}{3} = \int \mathsf{N}_{11}^{\star} \, \mathsf{d}z \\ &\int_{0}^{L} \mathsf{N}_{26}^{\star} \, \mathsf{d}z = \frac{\mathsf{L}}{6} = \int \mathsf{N}_{15}^{\star} \, \mathsf{d}z \\ &\int_{0}^{L} \mathsf{N}_{33}^{\star} \, \mathsf{d}z = \int_{0}^{L} (1 - \frac{\mathsf{d}z^{2}}{L^{2}} + \frac{4z^{3}}{L^{3}} + \frac{9z^{4}}{L^{4}} - \frac{12z^{5}}{L^{5}} + \frac{4z^{6}}{L^{6}}) \, \mathsf{d}z \\ &= \mathsf{L}(1 - \frac{6}{3} + 1 + \frac{9}{5} - \frac{12}{L^{4}} + \frac{12z^{5}}{L^{5}} - \frac{4z^{6}}{L^{6}}) \, \mathsf{d}z \\ &= \mathsf{L}(1 - \frac{2}{4} - \frac{9z}{L^{2}} - \frac{2z^{3}}{L^{3}} - \frac{9z^{4}}{L^{4}} + \frac{12z^{5}}{L^{5}} - \frac{4z^{6}}{L^{6}}) \, \mathsf{d}z \\ &= \mathsf{L}(1 - \frac{2}{4} - \frac{9}{5} + \frac{12}{6} - \frac{4}{7}) \\ &\int_{0}^{L} \mathsf{N}_{33}^{\star} \, \mathsf{d}z = \int_{0}^{L} (\frac{-z^{2}}{L} + \frac{z^{3}}{L^{3}} + \frac{3z^{4}}{L^{3}} - \frac{5z^{5}}{L^{4}} + \frac{2z^{6}}{L^{5}}) \, \mathsf{d}z \end{split}$$

C-7

$$= L^{2}\left(-\frac{1}{3} - \frac{1}{4} + \frac{3}{5} - \frac{5}{6} + \frac{2}{7}\right)$$

$$\int_{0}^{L} N_{43}^{*} dz = \int_{0}^{L} \left(z - \frac{2z^{2}}{L} - \frac{2z^{3}}{L^{2}} + \frac{8z^{4}}{L^{3}} - \frac{7z^{5}}{L^{4}} + \frac{2z^{6}}{L^{6}}\right) dz$$

$$= L^{2}\left(\frac{1}{2} - \frac{2}{3} - \frac{2}{4} + \frac{8}{5} - \frac{7}{6} + \frac{2}{7}\right)$$

$$\int_{0}^{L} N_{44}^{*} dz = \int_{0}^{L} \left(z^{2} - \frac{4z^{3}}{L} + \frac{6z^{4}}{L^{2}} - \frac{4z^{5}}{L^{3}} + \frac{z^{6}}{L^{4}}\right)$$

$$= L^{3}\left(\frac{1}{3} - \frac{4}{4} + \frac{6}{5} - \frac{4}{6} + \frac{1}{7}\right)$$

$$\int_{0}^{L} N_{47}^{*} dz = \int_{0}^{L} \left(\frac{3z^{2}}{L^{2}} - \frac{3z^{4}}{L^{3}} + \frac{7z^{5}}{L^{4}} - \frac{2z^{6}}{L^{5}}\right) dz$$

$$= L\left(\frac{3}{3} - \frac{8}{5} + \frac{7}{6} - \frac{2}{7}\right)$$

$$\int_{0}^{L} N_{48}^{*} dz = \int_{0}^{L} \left(\frac{-z^{3}}{L} + \frac{3z^{4}}{L^{2}} - \frac{3z^{5}}{L^{3}} + \frac{z^{6}}{L^{4}}\right)$$

$$= L^{3}\left(-\frac{1}{4} + \frac{3}{5} - \frac{3}{6} + \frac{1}{7}\right)$$

$$\int_{0}^{L} N_{51}^{*} dz = \int_{0}^{L} \left(\frac{z}{L} - \frac{z^{2}}{L^{2}}\right) dz = L\left(\frac{1}{2} - \frac{1}{3}\right) = \frac{L}{6}$$

$$\int_{0}^{L} N_{55}^{*} = \int_{0}^{L} \frac{z^{2}}{L^{2}} dz = \frac{L}{3}$$

$$\int_{0}^{L} N_{56}^{*} dz = r^{L} \frac{z^{2}}{L} - \frac{z^{2}}{L^{2}} = \frac{L}{6}$$

$$\int_{0}^{L} N_{66}^{*} dz = \frac{L}{3}$$

$$\int_{0}^{L} N_{73}^{*} =$$

$$\int_{0}^{L} N_{77}^{\star} dz = \int_{0}^{L} \left(\frac{9z^{4}}{L} - \frac{12z^{5}}{L^{5}} + \frac{4z^{6}}{L^{6}}\right) dz = L\left(\frac{9}{5} - \frac{12}{6} + \frac{4}{7}\right)$$
$$\int_{0}^{L} N_{78}^{\star} dz = \int_{0}^{L} \left(\frac{-3z^{4}}{L^{3}} + \frac{5z^{5}}{L^{4}} - \frac{2z^{6}}{L^{5}}\right) dz = L^{3}\left(\frac{-3}{5} + \frac{5}{6} - \frac{2}{7}\right)$$
$$\int_{0}^{L} N_{88}^{\star} = \int_{0}^{L} \left(\frac{z^{4}}{L^{2}} - \frac{2z^{5}}{L^{3}} + \frac{z^{6}}{L^{4}}\right) dz = L^{3}\left(\frac{1}{5} - \frac{2}{6} + \frac{1}{7}\right)$$

	<u>L</u> 3	0	0	0	<u>L</u> 6	0	0	0
	0	<u>L</u> 3	0	0	0	$\frac{L}{6}$	0	0
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L Ntda -	0	0	$\frac{11L^2}{210}$	2L ³ 210	0	0	$\frac{13L^2}{420}$	$\frac{-3L^3}{420}$
0	<u>L</u> 6	0	0	0	<u>L</u> 3	0	0	0
	0	<u>L</u> 6	0	0	0	$\frac{L}{3}$	0	0
	0	0	<u>54L</u> 420	$\frac{13L^2}{420}$	0	0	<u>78L</u> 210	$\frac{-11L^2}{210}$
· ·	0	0	$\frac{-13L^2}{420}$	$\frac{-3L^2}{420}$	0	0	$\frac{-11L^2}{210}$	2L ³ 210

APPENDIX D

FLOW CHART AND PROGRAM LISTINGS

FLOW CHART OF THE FIRST MAIN PROGRAM





SAVE (1/4PE/96-MODAL)	GEI FTN LGO SAVE	I(TAPE5=GAS	N) DES)	D-3			
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₿.	
•	PROGRAM MAIN(INPUT, OUTPUT, TAPE4, TAPE5, TAPE7, TAPE10, TAPE9, TAPE20)
	$20 \text{DMENSION } D(40.41) \qquad D-4$
a	30 DIMENSION ST(8,8), AMAS(8,8)
	70 DIMENSION OMEG(5)
	701 EDRMAT(1018)
\$	702 FORMAT(8G10.4)
	704 READ 701, NPROB
	110 DO 41 LLK=1, NPROB
8	BRINT 1
	1 FORMAT(1H1)
	111 READ 702, UM. E1, PX
\$	PRINT 772
	772 FORMAT(//.10X.* MATERIAL PROPERTIES*./)
	PRINT 703, UM, E1, PX
•	703 FORMAT(77,5%,* DENSITY OF SHELL MATERIAL=*,G10,4
•	**//,5X,* MODULUS OF ELASTICITY=*,G10.4
	**//,5X,* POISSON RATIU=*,610.4)
8	162 PRINT 771
•	112 READ 702, R, H, AL,
	771 FORMAT(///,10X,*STRUCTURAL GROMETRY*,/)
	170 PRINT 7, R, H, AL
*	7 FORMAT(2X, *RADIUS=*, P9.3, 5X, *THICKNESS=*, F6, 3, 5X, *HEIGHT=*, P9, 3)
	113 READ 701, NSIN
1	114 READ 701, NELEM
•	NP=NELEM+1
	NDF=4
*	NFRESENDF*NP
v	230 FLN=AL/FLOAT(NELEM)
	C NDE=NUMBER OF DEGREE OF PREEDOM PER NODE
- Ø	C NRANDEHALF BAND WIDTH
	C NEREE=NUMBER OF DEGREES OF FEREEDOM
	401 READ 701. NMODE
10	PRINT 43.NELEM
•	AS FORMAT(77.5% + NOT OF BING FLEMENTS=+.13)
	BRINT 51.NMODE.NSIN
e	51 EORMAT(//,5X,12,* AXIAL MODES TO BE CONSIDERED FOR*,12,
	Q* CIRCUMFERENTIAL NO.S*./9
	430 DO 59 KS1=1,NSIN
C	431 READ 701, NAT
	450 ANT=NAT
	CALL STRMAT(ELN.R.H.ANT.FX,F1)
C C	501 READ 701,NBCAS
•	BRINT 52, NBCAS
· .	52 EORMAT(//,5X,* NO. OF BOUNDARY DASES CONSIDERED=*+12)
. 5	502 DO 808 10R=1, NUCAS
	504 JF(IPR_,GT, 1) GO TO 801
	520 CALL ASSTRINULLY, H. UM, ANTALX, H, LLN, L, H1
C .	NFREE1=NFREE+1
-	WRITE(4)(NFREE)
	570 WRITE(4)((D(1,J),J=1,NFREE1),I=1,NFREE)
0	RFWIND 4
	801 CONTINUE
12	990 READ 911, NBC
6 H	911 FORMAT(A4)
10	620 CALL BOUN(NEREE, NAT, D', NG; NBC)
,	NO1=NO+1
1 🚳 🔹	653 WRITE(7)((D(I,J),J=1,N01),I=1,N0)
7	REWIND 7
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	691 DO 91 I=1,40
0 -5	692 DD 91 J=1,41
. 4	91 D(1,J)=0,
) 1885.	700 CALL EGN(D,NO,NMODE, EL.NBC)
88. A .	

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202	CONTINUE					- •	
59	CONTINUE						
41	CONTINUE	· · · · · · · · ·			· · ·		
790	END	(para	ann na shaqaa . Ahagma ayaa yayyon nada san af ila sa saasaa sa s		inina in	, , , , , , , , , , , , , , , , , , ,	na sumboling and and a subsection of a subsection of subsection of subsection of a subsection of a subsection of
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5	UBROUTINE STPMAT (AL, R, H, ANT, P, E)	D-6
C	IMENSION B(S,8), DM(8,8), DBT(6,8,6)	······································
4 F	ORMAT(///,10X,*STRESS-DISPLACEMENTS MATFIGES*,/)	
	RINT 4	
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5	P(T, D=D)(T, D*F*B/(1, -P*P)	an ann an an an an an ann an ann an ann an a
3 F	ORMAT(6(5X.010.4))	
andraadamiinii dhi amadamaa waxaa miinadii noo ii ya waxiima ya wa	00 1"C NN=1,6	ан алман на села се се се со
	IF(NN .LT. 4) THETA=0.0	
na milionalaria mandari ngari antan dalammater dia anta antar dalam kata da	IF (NN .GE. 4) THETAEPPI	na anna maraona dha bha annar - anaist - casa ann, in Non maraona dhe am baan a bhaidh an anaichean a' a na an
I	F(NN .E9. 1) X=0.0	
1	F(NM .EQ. 2) X=AL	nama ku dhenkar dhe kaka kaka kaka kaka kaka kaka kaka ka
I	F(NN , EQ. 3) X=HAL	a na anna an
	FINE ED. 4) X=0.0	· · · · · · · · · · · · · · · · · · ·
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¥ T-		
	0 17 J=1.6	an daarda waxaa daalaa ka ka ahaa ahaa ka ahaan ahaan ka ahaa aha
· E	(1,J)=B(1,J)*COSIN	
	(2,J)=8(2,J)*COSIN	angan namu ng mapakakan na manakaka kana kana kana kana k
N	(3, J) = B.(3, J) * SINE	ан сайтаан ал
an a	(4, J) = B(4, J) * COSIN	аналанар районаларын жалар мандаларын алар салуунун карарын караларын караларын караларын караларын караларын к Каралар
P	(5, J) = B(5, J) * COSIN	
10 8	(6, J) = R(6, J) * SINE	
* (• • • • • •	-
· L	U 2P 1=1,8	
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r	0 - 21 = K = 1 + 6	
20 0	$BT(I \bullet J \bullet NN) = BBT(I \bullet J \bullet NN) + DN(I \bullet K) + B(K \bullet J)$	
	······································	
W	RITE(20)(NN)	Σ™ «Μαβαλημανία μαξιστικών σύσταμα «σάμπαχα» αναμβάλλαθα ανό το μογό του πάλλοπο τίπος Ποπολιάμα Ηλακότου Πολυγ
ρ	RINT 1, NN	
W	RITE(20) (()ET(I, J, NN), J=1,8), I=1,6)	kalanga kangangka dangangangangangan kan kanganakan kangan kangan kangan kangan kangan kangan kangan kangan ka
P	RIN1 2,((DBT(I,J,NN),J=1,8),I=1,6)	
1 F	OENAT(7/,10X,*NN=*,16,/)	intel social and a line sense with a sense second conservation on a striker for a social second conservation. The second
<u> 2 F</u>	ORMAT(8(5X,F10.4))	
108 6	ONTINUE -	
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800	SUPPOUTINE BOUN (NFREE, NAT, D, NO, NBC)		D-7	
805	DIMENSION D(40,41)	· · · · · · · · · · · · · · · · · · ·		
	READ 911, NRC			
911	FORMAT(A4)			
815	IF(NBC , EQ. 4PCLFR) 40 10 1	να το	Male construction and appropriate to service the sector of a service material mater	an so na an
821	IF (NBC .EG. 4HCLCL) GO TO 2			
825	IF (NBC .EQ. 4HCLSM) GO TO 3			· · · · · · · · · · · · · · · · · · ·
830	TF(NBC .EQ. 4HSMSM) GO 10 4			
- 55	FORMAT(1H1)			
1	PRINT 55			
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11	FOFMAT(77, *NATURAL MODES AND FREQ.	FOR A DL-FREE GYLT	') .	
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101	FORMATT, FOR SIFGUMPERENTIAL HA	RM. M=* 1 3,73		
855	NO=NFFEE-4	· · · · · · · · · · · · · · · · · · ·		
860	GO 10 33			
2	PKINI 55		-	
	PRINT 12		·	
12	FORMALLIFIT NATURAL MODES AND FREM.	FUR A GL-GE UTL. T		
875	PFLMI 181,NAI			
088		i i i i i i i i i i i i i i i i i i i	and a second	
55	00 777 (=1,NO		· · · ·	×
-		n an	Солущищим монтализации прогосод с како на има в конски с собласти на дек	Management (Management School School and Berger and School and
(((U(1,J)=U(1+4,J+4)	·		
900	RETURN			
3	PKINI 55	ىرى. مەسىيە بىرى بىرى	at an	-
	THINI IS	FOD A CL CTHOUT ON	41 X X	
13	FURMATIZE TNATURAL MUDES AND FREU.	FUR A CLOSIMPLE. GI		ante alla de la compañía de la comp
915	MALNI 1919NAI No-NERSE 7			the second s
920		· · · · · · · · · · · · · · · · · · ·	nangen af san an a	
	NU1=NU-1 Do 111 T-1 NO1		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
070	$DD 442 3 \pm 1 NO$		-	
930	$\frac{112}{112} = \frac{1}{11} + \frac{1}{1$			
444	$\frac{D(1)J(1-D(1)+4)J(1+4)}{D(1-D(1)+4)-D(1-D(1)+4)}$	I PRES Lawy (J. PROTESTIC) - MERCINA INSTRUMENT - MERCINA INSTRUMENT STATE AND AND AND AND AND AND AND AND AND A	n Andrehamen and an Africa and Arrianteer specified Africa American and a statistical specified	non-sampi 1994 shan oor dhe shadhida Yekhin yabiteit oo yabiteit oo ya
0/5	T-NO	· · · · · · · · · · · · · · · · · · ·		
94/		- 		
113	$D(T_{1}) = D(NEREF_{1}+4)$			
960	$D(NO \cdot NO + 1) = D(NEREE \cdot NEREE + 1)$	· · · · · · · · · · · · · · · · · · ·		r ann an Arabian an Ara
	D(NO.NO) = D(NFREE.NFREE)			
965	RFTURN	and a second second second second second and second second second second second second second second second sec	۵۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰	4
4	PRINT 55			
• • • • • •	PRINT 14	and the second	n an ar air an a'	مهرین رئین میں ری میں میں ری اور
14	FORMAT(//, *NATURAL MODES AND FREQ.	FOR A SIMPLE SIMPL	E CYL . *)	
980	PRINT 101.NAT			and a subscription of the state
985	NO=NFREE-6			
wanya daga nan sudara sinta pisutapan	N02=N0-1	 	an a	anders og han 1986 i Livser frederikker og som eller som forer i nærde allen eller (
	DO 222 I=1, NO2			
995	D0 221 J=1,N0	an a	and a second state of the second s	
221	D(I,J) = D(I+3,J+3)			
222	D(I,NO+1)=D(I+3,NFREE+1)			a na ana ang ang ang ang ang ang ang ang
1010	I=NO			
1015	DO 223 J=1,NO		،	a Land, expendenting on a frances and the time of y same destroyer while you have a significance
223	D(I,J) = D(NFREE, J+3)			
1025	D(NO,NO+1)=D(NFREE,NFREE+1)	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
	D(NO;NO)=D(NFREE;NFREE)			
1830	RETUPN			
1035	END			
diff francisk sampling og som og død			an managala karina bir satisadonin tega sa an a daha yan dari bala adaya Tara	а на солони проститират подар целте в го таринат тратар. На населенија на годира
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1170 SU	IBEOUTINE	ASSTP INE	LEM, H, UM, ANT, PX,	E,XB,8,F)	D-8	
1172 DI 1175 DJ	MENSION I	U(40,41) Amas(8,8)	,ST(8,8)			
1180 NB	AND=8					
54 FO	IL STIFF	1UX, + (H, XB, ANT	, PX, R, ST)	+,/}		lan ta anna an an ann an Airlean a' Mhair Airlean Airlean Air an Airlean
00	41 I=1,8					
00 40 ST (40 J=1,8 (T.J)=STC	T.1)*F				
10 FOR	MAT (8 (5X)	610.4))				
1320 CA	LL MASS(I	UM,R,XB,H INFLEM	,AMAS)		ne 11. mar - ar ar fina na Dialogala ang ang ang ang ang ang ang ang ang an	
1325 IN	=(I-1)+4	y (* 1 . 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.				
1330 00 1340 00) 20 II=1.) 20 JJ=1	NBAND				
1350 K=	IN+IJ	, -				,
1360 L=	RADENK	· TY+AMAS (T T,J	n - In a canada a cadar la coal Pratacalase - In Ing.	алан тараа жала жала жала бала жарааларындан ортоор араар	
1380 00	30 JJ=1	, NBAND				
1390 DO) 30 IT=1. :TN+TT	, JJ				
1410 L=	IN+JJ+1				an a	aya a an inay maay naarina ay
30 0((K,L)=D(K INTTNUF	,L)+ST(I1	, J.))	· · · · · · · · · · · · · · · · · · ·	n andaraanse ee aa araan ar araan ar araan daga maraadaga yaa yaa ay ahaa ay ahaa ay ahaa ahaa	na ang ang ang ang ang ang ang ang ang a
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1450 EN	IC .					
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• •				·	· · · · · · · · · · · · · · · · · · ·	
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a canton administrativo con contra come come administra a constante de .	1921 - FERNER STOLEGING STOLEGING STOLE	ана андары такану котон кака тердина бануусы кетир андектик жана жана жана жана жана жана жана жан	1977 жыла такала жала жала жала жала жала жала жала	, en al l'alfra a l'alfra vers d'al l'alfra d'alfra destructions de l'alfra de l'alfra. De la	na en Almanana idanantaturi de desembreta urranyor interativita desembreta de la francisca de ano versaria.	The optimized in the Trans. By they the to-Antipeline state of the second
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ተዋልጠል የአመራሲያት (ምዕታትም)ል በግንሞ ማዕት በማሪቶ በትርፅሚዎቹ) የሚያገለዋል ምርብ	ann an schwet is eine einer senerische rechtaren ei	Adam and der ter in the second and a second sec	י אין גערטוראר איז	ана силана – со село сели остани останости	੶ ੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶੶	ur na na sana na
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2860 2870 C 2890 2900	SUBROUTINE MASS(RHO,R,AL DIMENSION A(8,8) INITIALIZE MASS MATRIX DO 116 J=1,8 DO 116 I=1,8	,Η,Δ)		D-9	
115 C	CONTINUE CONSTRUCT MASS MATPIX PI=3.1415927			a na a si an an an an an an an an	
2950	CONST= $P*PI*RHO*H$ A(1,1)=A(2,2)=A(5,5) A(5,1)=A(1,5)=A(5,2)	= A(6, 6) = CONS = A(2, 6) = CONS	T*AL/3.		
2990 300n	A(3,3) = A(7,7) = CONST A(4,3) = A(3,4) = CONST = 11.3 A(7,8) = A(8,7) = -A(4,3)	*13.*AL/35. *AU**2/210.			
30 30	A(4,4) = A(8,8) = CONST A(7,3) = A(3,7) = CONST A(4,7) = A(7,4) = CONST*13.* A(8,3) = A(3,8) = -CONST	* AL * * 3/105. * AL * 9./70. AL * AL / 420. T* 13. * AL ** 2/4	20_		
54 3068	A(8,4) = A(4,8) = - CONS' FORMAT(//,10X,* RETURN	T*AL**3/140.	*,/)		
	END	- 			
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		new lakes have been and an and and	ባኤ. ሥራ ማሳታሪቸላይም ላይ ጀመ ናቸው ማመርም የዚያ ምሳ ር የትባቂ ደብ (የትሎ ፈርን ሁለታል) ተመቆተ ፍሬሶቀተ	الا الله عن المسلم المسلم المسلم الله الله عنه المسلم المسلم المسلم المسلم المسلم المسلم المسلم الم	
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3100 3110	SUBFOUTI	NE STIFF(H)	AL, AM, P,R, SUM)	8.81.D8(8.8)	D-10	na an an ann an ann an an an an an an an
X	,SUN (8,8	() ()	,	0,0,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
3140	READ(5)	NI				an in a star star and an and an and
3150	DO 21 7	=1,NI				
21	FEAD(5)	X(I),W(I)	n an	n a transforma anna anna anna anna anna anna an anna an an	nen en	nnanga yangan fermenini ya antin papatèré celetiyake bakar kabartake kutoken garakaba
9	EWIND 5					н Н
3170	A=C• \$	B=AL				
3180	00 12 1	=1 • NI				• • • •
3190	X(T) = (F)	-A)/2.*X(1)	+ (B+4)/2.			
12	W(])=(F	-A)/2.*W(I)			and the second	
3210		=1,8				
3220	- 00 13 J					
JZ 39	SUML1,	F) = 3 •				
200	CUPIENE	TY/H D DW				a An an an An An An Anglassa
3290	UALL DMA					· · ·
32.60	UU 23 1	=1 9 N L	an a	o populario allanezio di la scora di scora presentati integra	n men i adalemente salegar 140 ministrete i dependente i dependente i dependente i dependente i dependente anti	N
3270	CALL MOT	141X (AL) M / AA M / DM - DD - DD	「A C L J 」 2151			
3200	CALL MOR	נפטנים מנווע ווי הייסה המתאדדי			· · · · · · · · · · · · · · · · · · ·	an a
3230	DO 22	STIMUDU JUD JU	0,0,0,0,0,			
3399	00 22 J	1-1-6 		•		and the second
3310						
 27	CONTINU	7-30H(3)N/1	WATL DDADIN'	الي من الي و العنوات و العناق و العالم الله . المالي الي و العنوات و العالم المالي .	та и после по во органита на селение на селение селение селение селение селение селение с ответстви	ማቅም ግንሰብ መታንጉ የተኛው ስም ያውጪ ባለ የመታን ማስተባ ማስተባለ ማስተባለው የድርጉ ዓመልፎ በዓመራቸው በር
23 <u>4</u> 0	000110000 *9=72003	'	////		· · · · · · ·	
3350	DO 1 T=	1.8	17 1. al 🗣 17 17 17 1		· · · · · · · · · · · · · · · · · · ·	
3360	001 = 001	1.8				
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54	FOF MAT (/	•20X•* ====		=======*.//)		
3400	RETURN	The real mean state of the real state of the	ing the second	 Source and the second se Second second s	ан талаан талар байлагдар. Кандалан улсан улсан улсан түрөлөөн улсан туралы таларуулан. Айран кануурага турала	 and out only charge in the methodal base of methodal and a second se
3410	FND					
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3430 SURPOUTINE MRTM(0,8,08,L,M,N) 3440 DIMENSION D(8,8),B(8,8),DR(8,8) 3450 DO 25 1-1 N	D-11
3460 DO 25 J=1,K 3470 DB(I,J)=0.	
3488 DO 25 K=1,M 25 DB(1,J)=DB(I,J)+D(I,K)*B(K,J) 3500 RETURN 3510 END	
3530 SUBPOUTINE MOTTM(D,0,0B,L,M,N) 3540 DIMENSION D(8,5),B(8,8),DB(8,8) 3550 DO 26 1-1 N	
3550 00 26 J=1,N 3560 D0 26 J=1,L 3570 DP(T,J)=0. 3580 D0 26 K=1,M 00 D0 26 K=1,M	
26 08(1,J)=08(1,J)+0(K,1)+8(K,J) 3600 RETURN 3610 END	
4 	
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	C				D	-12	
\smile	3630	SUBFOUTINE PMATX (H,P,DM)			· · · · ·	ан алар на ал образование и село на се Село на село на Село на село на	
	3640	DIMENSION DM(8,8)					
-	3650	DO 27 J=1,6				1	an an Arganer an Arganer
	3660	00 27 J=1.6					
	27	DM(T,J)=0.	a a cara a carante de la destrucción de	and the second sec	 Comparison of the second s	An example of the second s	······································
<u> </u>	3680	H2=H*H					
	3690	DM(1,1) = DM(2,2) = 1.		and the second sec	a an		· · ····
	3700	DM(1,2) = DM(2,1) = P					
-	3719	DM(3,3) = (1, -P)/2					· hr · · · · ·
	3720	DM(4,4)=DM(5,5)=H2/12.					
	3730	DM(5,4)=DM(4,5)=P*H2/12.	Common the state of the state of	an a	(2.4) It is a subscription of an object dependence of the address of the set of the subscription of the	e daaren en je en een op een gebaar verskapele ee oogle de reker te bekele ee	NAME OF TAXABLE POINT OF TAXABLE POINT OF
\sim	3740	DN(6,6)=H2*(1P)/24.				· · · · ·	
	3790	RETURN			terran a ser a		ana na malante se
	3800	EMP					
U	с. с.	· · · ·			· · · · · · · · · · · · · · · · · · ·	an an ann an	ng ta Shar Barna a na mam
	3820	SUBROUTINE BMATX(A_,R,A	M,X,R)				
	3830	DIMENSION B(8,8)	and an example in the second sec	a canada ay ann an color anns an anns a c	 A statistic statistic statistic statistic provide provide an end of the provide statistic statistic statistics. 	and any construction of any spectra second	annen die Aparetanie Manages errete die Aber -
	3840	X2=X**2					
	38.50	X3=X**3			· · · · · · · · · · · · · · · · · · ·	and the second	
	3860	AL2=AL##2					1.1.1
-	3870	AL 3=AL **3			in a second and a second a se		
	3880	AM2=AM**2					· .
	3890	R2=P**2	and a second of the second	a para ana ana ana ana ana ana ana ana ana	and a stand of a stand of a stand to be a stand of the standard standard standard standard standard standard st	eters an marine constants for several constants	, , , , , , , , , , , , , , , , , , ,
-	3900	D0 29 T=1,6					
	3910	DO 29 J=1,8		• ·	an an the second se	· · · · · · · · · · · · · · · · · · ·	
	3920	$B(J \neq J) = 0.$					
~	29	CONTINUE			· · · · · · · · · · · · · · ·		
	3940	B(1,1) = B(3,2) = -1./AL					
	3950	B(1,5) =B(3,6)=1./AL	- Maria M	a in the part of the second	1	a Ramana da mandekon ante ante ante da esta da	ing and a second second second
-	3960	B(2,2)=AM+(1,-X/AL)/₽	. /				
	3970	B(2,3)=(13.*X2/AL2+2.	*/X3/AL3)/R		· · · · · · · · · · · · · · · · · · ·		
	3980	B(2,4)=X*(12.*X/AL+X2)	/AL2)/F				
ц.,	3990	B(2,6)=AM*X/R/AL					
	4000	B(2→7)=X2#(3+/AL2-2+*X)	AL 3) /R				
	4610	B(2,8)=X2*(-1./AL+X/AL/)7R				
~	4020	B(3,1)=-B(2,2)					
	40 30	B(3,5)=-B(2,6)		· · · · · · · · · · · · · · · · · · ·			
	4040	B(4,3)=(612.*X/AL)/4L	2			· .	
~	40.50	B(4,4)=(46.*X/AL)/AU					
	41.60	B(4,7) = -B(4,3)	an an an ann an ann ann an ann ann an a' dh' an a' dh' an a' dhean	er of one occur where to retain the total state	en e	Menandra ar array shikasi wata di wata di wata di karta da ara aya a sa	
	4670	B(4,8) = (26.*X/AL)/AL					
~	4780	B(5,2) = B(2,2)/R					· · · · · · · · · · · ·
	46.98	B(5,3) = B(2,3) + AM2/R					
	4100	B(5,4) = B(2,4) + AM2/P		· . · ·	· · · · · · · · · · · · · · · · · · ·	a sa	
ч ы й	4110						
	4120		n Generale i menumentaria de la composition de	n na anarangana ng ato angkasa Antar Indon	19 - 5 44 - A MER - H Der Trocher von Hannen mitte store stattent von der Lemme		
	41.09	DIDIDIDIEB(2)0JTAM2/* D/C ALMAMA/A					· · · · ·
~~	4140	- DIO917-ANTII-TA74L772.79 - DIS 21-17 72 70 70	×.2		· · · · · · · · · · · · · · · · · · ·		
	4100	D(0,2)	AL A POZALO				
	4178	B(6,4)=2,4,M*(1,-4,*)	4677 AUC 147.44221012		e de la companya de l	Charles and a second	
\sim	4180	$B(6.5) \pm \Delta M \pm X/2 - /P2/\Delta I$					
<i>د</i> ۲	4190	B(6.6) = 3.77.78/4	n an that an an ta	 The state second property second pro- 	รรระ มากราวัตรอยู่ เข้าสะหาศุกรรมสามสามสามสามสามสามสามสามสามสามสามสามสาม	anu a su a companya da sa ang ang ang ang ang ang ang ang ang an	- Mill Chail Post I wait is Statistic This was provide
N.E	4200	B(6,7) = -B(6,3)					. w
- 	4210	B(6.8)==2.*AM*X*(2.=3.*)	XZALYZEZAL	· · · · ·			ana
174 6	4220	RETURN					
الاستعاد	4230	END			· · · · · · · · · · · · · · · · · · ·		
	·						
- 222 6		ann an an ann an an an an an an an ann an a	A-988 1 MAY 1 AT 104 A 1 AT 11 AT			an a	
(~~ s							
A							

Ú	5500 5510	SUBPOUTINE EGN(D,ND,NMODE,E,NBC) DIMENSION D(40,41)			D-13	
$\mathbf{v}_{\mathbf{r}}$	6010	PRE-EIGENVALUE CHOLESKY REDUCTIONS INA=1				
÷ ن د	6032	ND1=ND+1 READ(7)((O(I,J),J=1,ND1),J=1,ND) REWIND 7				n a Branch ar gan barrin Jana an
- 	6040 6050	DO 76 MA=1, ND DO 76 MAS=MA, ND MA1=MA+1				
<u> </u>		MAS1=MAS+1 GASH=D(MA,MAS1) GISH=D(MAS,MA) MASH=1		се (толица Мак Солон Варано н с с	annen mennen ander an der einen ander der einen	
\sim	79 78	IF(MA-MASH) 77,77,78 GASH=GASH-D(MASH,MA1)*D(MASH,MAS1	·		. · · ·	en de la companya de La companya de la comp La companya de la comp
J	5150 77	GISH=GISH-D(MA,MASH)*D(MAS,MA MASH=MASH+1 GO TO 79 TF(MAS-MA) 81.81.119	SH)	а и на селото селото състато состато с 		
<u> </u>	81 118	IF(GISH) 118,82,82 GISH=0.	an a			
	82 83	IF(GASH) 83,84,84 GASH=0.	· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • •	андар (Майлайн нэ оноос тэрээлээ оролого) (Майлай) Эмэн уусан оролог оролог (Майлайн нэ оролог (Майлайн нэ оролог)	
	5230	DIAG1=SQRT(GASH) DIAG2=SQRT(GISH) IE(DIAG1=ED.A.V.SO.TO.A5				
<u> </u>	<u>119</u> 85	D(MA, MAS1) = GASH/DIAG1 IF (DIAG2.E0.0.) GO TO 85	15 - 14 (Second and Second	· .	Sharaf Pa, & Yanan Yangi Ya	na ventry ger a for all the first of a star for an A way, of the all the
Ų	85 76	D(MAS, MA) =GISH/DJA52 CONTINUE CONTINUE				
`	6300 6310	FOFM U/UL DO 87 MA=1,ND DO 87 MAS=MA.ND	. an			and references the analysis of the production of
Ú		MAS1=MAS+1 GASH=D (MAS, MA)	: 			
U 1	91 6360	MASH=MASH+1 IF(MAS-MASH) 88,89,89				
times of	89 6380 88	GASH=GASH=D(MA,MASH) +D(MASH=1,MAS GO TO 91 D(MA,MAS1) =GASHZD(MAS,MAS1)			-	
J	87 C	CONTINUE MULTIPLICATION TO GET (U*ULE-1*UL	TE-1+UT)	n na ang ang ang ang ang ang ang ang ang		
<u>`</u>	6430	DO 92 MA=1,ND DO 92 MAS=MA,ND MAS1=MAS+1	- 10-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0			
ن ي	6469	GASH=0. DO 93 MASH=MAS1,ND1 GASH=GASH+DIMA.MASH)*D(MAS.MA	SH)			
. 12	93	CONTINUE D(MA; MAS1) = GASH				raun d
- 51	92	CONTINUE More=NMode Du 1 r TN M1 FROM 1 TO NO AND TTO	Г: А Т Т 18 С	۰ با میں میں	·	
9 • • • • • •	6 115 94	DO 94 I=1,ND V1(I)=1.	NA31V2	u		
÷P,	121	NUMIT=1 ALAM2=0.				· · · · · · · · · · · · · · · · · · ·
	6571	UU 95 I=1,NU I1=I+1				

Ň	6600	$\begin{array}{c} 00 96 J=1,1 \\ 0 0 0 0 0 0 0 0 0 0$	D-14
	07		
	30 	CONTINUE	a sa a s
		1F(1=00) 9(,90,90	
	36		а и стата и стата и стата и стата и стата свои се община община били се община стата и стата и стата и община и Стата и стата и община и
	- 99 - 99		
	98	V2(1)=GASH	
		ALAMZ=ALAMZ+GASH+GASH	
	95	CONTINUE	
		ALAMB=SQRT (ALAM2)	
		21020=0.	
	<u> </u>	DO 101 I=1,ND	
	·	GASH=V2(I)/ALAMB	
		GAS=V1(I)-GASH	
:	····· ·	SIGSQ=SIGSO+GAS*GAS	
		V1(I)=GASH	
	101	CONTINUE	
	U	ZT=1./10.**12	
		NUMIT=NUMIT+1	a sa ana ang ang ang ang ang ang ang ang an
	6800	IF(SIGSO-ZT) 102.102.103	
	103	IF(NUMIT-150) 121.102.102	
	102	CONTINUE	
	and the second s	PETNT 1	
	6830	PRINT 104.NUMIT	
	486	FORMATIA NO DE TTERATTONSEX.13	
		TO MILITOLY PHELINE (1+Y)	
,	- · · ·		
	T / J		
	4.07		
1	107 	= 1 + (J - 1) - 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10	a in the second
	145	GASHERASH-V2(J) +U(J) 1)	
		J=J=1 CO ≭O AD7	a a ser a companya a companya a companya ang ang ang ang ang ang ang ang ang an
	U 0920		
	105	V2(1)=1ASH/U(1,1)	
Ň	U 5950	1F(3) 108,108,109	·
	108	PRIMI 995, INA	
	to the first second	WR11E(10,3)(1NA)	n an
1	🖌 S	FURMATTELS)	
	C	OMEGA IN CYCLE/SEC	
	6980	OMEGA=SQRT(1./ALAME)/2./3.14159	27
. •	6990	PFINT 112, OMEGA	
		WRITE (10,1) (OMEGA)	
		RES=0.0	
,	~	PRINT 12	
	1	FORMAT(4E14.8)	
		IF(NAC .NE. 4HCLFR) GO TO 500	
2	.	WRITE(9)(ND)	
		WRITE(9)(OMEGA)	
		WEITE(9)(V2(I),I=1,ND)	
	✓ 500	IF(NEC .EQ. 4HSMSM) 50 TO 40	
	. Here Ministery my companying a structure is you are not	IF (NBC .EQ. 4HCLSM) GO TO 30	
	(2	PRINT 111, RES, RES, RES, RES	
•		WRITE(10,1)(RES, RES, PES, RES)	
	10	PEINT 111, (V2(I), I=1, NO)	
	ş	WRITF(10,1)((V2(I),I=1,NB))	
	ci Ci	IF(NBC .EQ. 4HCLCL) PRINT 111, RES.	,RES,RES,PES
	- 7	IF (NPC .EQ. 4HOLOL) WRITE(10,1) (P)	ES, MES, RES, RES)
••	1942 Ó .	50 TO 7040	
(,	<u> </u>	PRINT 111, RES, PES, RES, RES	
:	4	WRITE(10,1)(RES,RES,RES,RES)	
	3	NU1=ND-1	

	WRITE(10.1)((V2(T).T=1.N01))	D-15
· · · · · · · · · · · · · · · · · · ·	PRINT 111, RES, RES, RES, V2 (ND)	······································
	WRITE(10,1)(RES, PES, PES, V2(ND))	
· · · · · ·	GO TO 7040	a sa ana ang ang ang ang ang ang ang ang an
40	PRINT 111, RES, RES, RES, V2(1)	
	WRITE(10,1)(RES,RES,RES,V2(1))	
	ND1=ND-1	
	PRJNT 111,(V2(I),I=2,ND1)	
	MRIIE(10,1)((V2(1),1=2;NU1)) DRINE (14, DES DES DES UD(ND)	
	MRINI IIIJKEDIMEDIKEDIVZ(ND) MRTTE/18,1)/DEC.DEC.DEC.VZ(ND)	
995	FORMATIZZ-102. $AXTAL NO. = 4.13$	
11	FORMAT(//, 20X, 25(2H))	
12	FORMAT (30X)* MODE SHAPE*,7,15X,*U*	,20X,*V*,20X,*W*,20X,*DW/0Z*)
111	FORMAT(4(5X,F16.8))	
112	FORMAT(//,1DX,*NATUPAL FREQUENCY=*	,E20.10)
2	FORMAT(8F16.8)	
7040	DO 113 TH1 ND	
70.50	TO 113 JET.ND	المحمور والمراجع والمراجع مستمعتهم والمراجع مستمع والمراجع والمراجع
4620	J1=J+1	
113	D(I,J1)=D(T,J1)-ALAMB*V1(I)*V1(J)	
6965	INA=INA+1	
- Ref Har - and gauge at	MODE=MODE-1	
7090	IF(MODE) 114,114,115	
7440		
7110	FND	
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	na se antiga e construir de la construir de la La construir de la construir de	
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1474-077880-07-00-0-0-0-0-0-0-0-0-0-0-0-0-0-	n a den mangan ang mangan kanang mangan kanang mangan kanang mangan kanang mangan kanang mangan kanang mangan k Mangan kanang mangan kanang	na n
	na se a companya da se ante a companya da se a companya da se a companya da se a companya da se a companya da s	
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	ԱՅՅԱՅՅԱՅՅԱՅՅԱՅՅԱՅՅԱՅՅԱՅՅԱՅՅԱՅՅԱՅՅԱՅՅԱՅՅ	ан тала тала тала таларынун талар жараланда околоонун дан алар талар талан талар талан тарар талан тара тара та Тала тала талар талар тара тара тара тара
	and a second	
	a second a sum a sur species as a second	ار بالای مستقد میشانی میرسد از با مربع در است است است به داند در میداند. است کار در این از در ا
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<pre>/ ************************************</pre>	D-16
LGO. SANE (TADE1=GASN)	(COMPUTER CONTROL CARDS)
) JAVE (TAPEI-GREAT)	
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71 1. A statistical design of the second se second second sec	
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د	

	PROGRAM NIXW(INPUT.OUTPUT.TAPE1)	D-17
	DIMENSION X(60), W(60)	
T 6 7	COMMON NT	
	READ 781-NPR-NTNT	a sa an
704	FORMATIRTIC	
12		
10	OU 12 L=1,NPR	
	and a second s	
· · · ·	GALL GUATA(NI,X,W)	
lana an a go is na a a	PRINT 701, NI	
۵	WRITE(1)(NI)	
	DO 12 JELNI	
	PRINT 702,X(J),W(J)	
702	FORMAT(2(4X,E20,10))	
. 12	WRITE(1)(X(J),W(J))	
	END	
¢.	SUBROUTINE GDATA (NI,X,W)	
For 18-4	DIMENSION X(60), N(60)	
	NR = (NI + 1)/2	
/	<u>XI=0.</u>	
	DX=1,/FLOAT(NT)	
	CALL ROOTS (XT. DX. NR. W)	and the second
· · · · · · · · · · · · · · · · · · ·	DO 11 T=1.NP	
-		
	······································	
11	X(K)=W(J)	
	10 12 1=1,NR	
2	J = NI - I + 1	
2 <u></u> 0	<u>XX=X(J)</u>	
ian Fr	CALL FNSNS(XX,F,FP,2)	
2	XX=(1XX*XX)*FP*FP	
-	$H(J) = 2 \cdot I \times X$	
/ 🗄 👘 17	RETURN	
·····	END	
ç	SUBROUTINE FNSNS(X,F,FP,IM)	
138	COMMON NI	
	P1=0	
a Month Marcala Anna ann an	P2=1.	· · · ·
2 No. 10	T = 1	
	AT=T.	
	D3-(12. #AT+1.)#Y#D2-AT#D1)/(AT+1.)	
d.	= 0-11C1 - ATT101 - A FCTAT, FT11 / ATT101 -	
		ана на правите стратите с сполост ста с с с собрание силистрати на селините проветствите собрание и волости сто Статите с собрание с собрание с собрание с собрание с собрание с собрание собрание с собрание с собрание с собра
 саволист с посте с постада, есс пос 	1=1+1 Tr(T_NT) 44 49 40	
, 	1F(1=N)/ 11,12,12	
12		
	1F(IM+EQ+0)60 TO 17	
·		
	FP=(AI*X*P2-AI*P1)/(X*X-1)	
	PETURN	
 A state of the sta	END	
· · · · · · · · · · · · · · · · · · ·	SUBROUTINE ROOTS(X1, DXX, NRT, RT)	
· 12 ·	DIMENSION RT(60)	
, " 2.30	L0=0_\$ F0=0.	
10	DM=10.	
۹ 	DD=0.	
260	BX=DXX	
7	DO 20 NI=1.NRT	te de la companya de
	K=0	
2 S	KP=0	
-4 21	NO 54 JJ=1.10	
) ~**	DO 30 J=1-11	

	1	X = ¥ 1	a de la compañía de l	D-18
		TE (ABS(F1) .LE.1.E-09) 60 TO 3	36	
		TE(E1.LT.8.) 11=-1		
		19 (F14) (F1.0) 14-4		
		TEATED 47 CO 20 24		
-	-	en na u má mosta sette a sette a sette sette En na u má mosta sette	A contractor to a Contractor Street date on Bolan	19 - Marina Ani Kanang Ka
		JF(L1.NE.LU) 60 40 41		ne e la companya de l
1	31 X0=X1			
1		· F0=F1		
		L0=L1		
	anto a companyo di Partanone del apro di Antonio del Santo	<u>X1=X0+DX</u>		
Sec. 1	30 CONTI	NUE		
angan ga mana a sa sa sa sa sa		DX=DM*DX		
	50 CONTT	NIF		
	32 K=K+1			
	95 K-KI	TE(E7 E0.0) CO TO 49		
		TLALARA CONTRACT		· · · · · ·
ىرۇمەرد ەە «مەمۇمەرىيەتىمەرمەر» بەرە «ەرە» يېلى بولەرە يەرە يېلى بولەرە يەرە يېلى بەرەپىلەرە» (مەرەپىيە يەرەپى د			TA / 0	
		LEXXALEAXU AUKA XAMEAXIF HU I	10 49	· · · · ·
and the second of the second o		GALL HNSNS(X+H+HP+9)		
		1F (ABS(F) .LF.1.E-39) 50 TO 3	36	
		IF(F+LT+G+)/LL=+1	· · ·· · · · · · · · · · · · · · · · ·	
		IF(F.GT.0.) LL=1		
	Tariha minimum a second second second a second a second a second second second second second second second sec	F(LL_NE+L1)_G0_T0_33	Anima man, aga i ala ingénipangkanangkan	• • • • • • • • • • • • • • • • • • •
ана стана стана Стана стана стан	•	TE(11.NE.LA) GO TO 34		• • • • • • • • • • • •
	77 YO=Y			
	30 ×0-×-	EO-E		
÷				•
M				
2			· · ·	
				999
2 ·	34 X1=X			
й. А.		F1=F · · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·
		L1=LL		
		F3=F1+F0		
<u>*</u>	35 XX=AP	S(X1-X0)		
*		F.XX.LE.1.E.071 CO TO 36		
č, ž		IF(K.LF.180) GO TO 32		
¥	49 K=0			
2	τ <u>μ</u> η=ψ '	KP=KP+1		
		ካር ግንር ፕሬ ፕሮፖለቲ ፕሬ		
			· · · · · · · · · · ·	
		UX= {X1-XU}/10.		
			Na se	
		DM≈1.		
· · · · · · · · · · · · · · · · · · ·		- GO TO 21		
	41 XX=X1	-×0		· · · · · ·
· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		36	· · · · · · · · · · · · · · · · · · ·
		1F(F3.FQ.0.) GO TO 49		
		<u>X=X0=F0/F3</u>		
		BO 40 TT=1+1800		
·		CALL FNSNS/Y_F-FD-1)		
		15 (ED EN 0 1 EN TO 32	· · · · · · · · · · · · · · · · · · ·	
		TE TELEVICE OF IN 32		
	· · · · · ·	大臣 幸天寺とすた M		· · · · · · · · · · · · · · · · · · ·
		XX = ABS (Xa - X)		
•		N + N D		
	a mahada magang sa kana ang mahang kang dan kang La	and and a second a second a second a second a		
12	a an	IF(XX.LE.1.F-07) GO TO 36		
12 · · · · · · · · · · · · · · · · · · ·	Mandarda ya mana ya mana ya mana ya mana ya mana ya kata ya kat	IF(XX.LE.1.F-07) GO TO 36 IF(XA.LE.X0 .DR. XA.GE.X1) G	0 TO 32	
t2 11	40 CONTI	IF(XX.LE.1.F-07) GO TO 36 IF(XA.LE.X0 .OR. XA.GE.X1) GO NUF	0 TO 32	
t2 11 10 9	40 CONTI 36 DX=(X	IF(XX.LE.1.F-07) GO TO 36 IF(XA.LE.X0 .OR. XA.GE.X1) G(NUF -DD)*6.5	0 10 32	
tz 11 10 5 8 C	40 CONTI 36 DX=(X 00 IF(D	IF(XX.LE.1.F-07) GO TO 36 IF(XA.LE.X0 .OR. XA.GE.X1) G(NUF -DD)*6.5 X.E2.5.) DX=DXX	0 10 32	
×	40 CONTI 36 DX=(X 00 IF(D	IF(XX.LE.1.F-07) GO TO 36 IF(XA.LE.X0 .OR. XA.GE.X1) G(NUF -DD)*6.5 X.E?.0.) DX=DXX PM=1.	0 TO 32	
¢	40 CONTI 36 DX=(X 00 IF(D	IF(XX.LE.1.F-07) GO TO 36 IF(XA.LE.X0 .OR. XA.GE.X1) G(NUF -DD)*6.5 X.E9.0.) DX=DXX <u>PM=1.</u> X1=X+DX	0 TO 32	
12 31 10 9 8 7 4 5	40 CONTI 36 DX=(X 00 IF(D	IF(XX.LE.1.F-07) GO TO 36 IF(XA.LE.X0 .OR. XA.GE.X1) G(NUF -DD)*6.5 X.E9.9.) 9X=DXX <u>PM=1.</u> X1=X+DX -DB=Y	0 TO 32	
12 31 10 9 8 9 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9	40 CONTI 36 DX=(X 30 IF(D	IF(XX.LE.1.F-07) GO TO 36 IF(XA.LE.X0 .OR. XA.GE.X1) G(NUF -OD)*6.5 X.E9.9.) OX=DXX <u>PM=1.</u> X1=X+DX -DB=X PT(NT)-Y	0 TO 32	

	D-19
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8 /	

	D-20
FRORES;CM20000,T200, ACCOUNT,AOLZ000,AASSDDA.	
GET (TAPE7=ACC)	
OFT(TAPF12=STRMAT)	
657(TARF9=MOUAL) RET(TARF9=MAT)	
FTN.	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.
1 GO.	· · · · · · · · · · · · · · · · · · ·
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			THE REAL PROPERTY AND ADDRESS OF TAXABLE PROPERTY.	
	BROGRAM RESP(INPUT, OUTPUT, TAPF1, TAPE2, TAPE3, TA	PE4,		
	ATTACT AT	STRPF	<u>-</u>	1997
Ø.	DIMENSION STRON(6), STROP(6)			
د رمد	ETMENSION UE(8)			
	DIMENSION BMASS(36,4), RSTF (36,4), SMASS(36,36)	.STIF(30	5.36)	
	DIMENSION EFFM(36,4),P	ACC (4%, 1	EF (36)	si)(36)
	DIMENSION FB3(4)			
	DIMENSION AJ (36,4), BDTS(4)			
	DIMENSION GA(5001), GY(5041)			
	BIMENSION STBB(4,4), BUE(4)	••••••••••••••••••••••••••••••••••••••		
J	BIMENSION BBM(4,4)		·	
-	BIMENSION OME(10), X(36, 10), CM(10, 10), CF(10), A(10), PIN	(10), RCI	* D(10)
	DIMENSION OMED(10), ADD(10), GS(10,10), GMI(10,10).GSA(10))	
1	DIMENSION UDD(36),FR1(4),FR2(4),FR(4) ,FB4(4	4)	
	BIMENSION P1(36), P2(36), P(36), PEXT(36)		•	•
	RI=3.14159			
	102 RFAD 4,R			
	99 FORMAT(F10,4)			
	88 FORMAT(10±10.4)			
1	BU 60 NFEAD=1,6			
	READ(J2)(NN)			
	$\mathbf{A} = \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \\ \mathbf{A} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \mathbf{A} \\ \mathbf{A} \end{bmatrix} $			
•	2 EDRMAT(5(5),610,43)		 	
				· · · · ·
	READ(11)(NEREE)			
				· · ·
3	NFIFM≅N/4	······	<u></u>	
1 2	NTO=NELEMA6			
	NST=NTO+6	·		
. :	₩ MB RFAD(11)((BMASS(I,J),J=1,4),I=1,N)			
/	* MB READ(11)((BMASS(I,J),J=1,4),I=1.N) * M			
	* MB READ(11)((BMASS(I,J),J=1,4),I=1,N) ± M g READ(11)((SMASS(I,J),J=1,N),I=1,N)			
	* MB READ(11)((BMASS(I,J),J=1,4),I=1,N) * M BEAD(11)((SMASS(I,J),J=1,N),I=1,N) * MBR			
ATTA CA MADA	<pre>* MB READ(11)((EMASS(I,J),J=1,4),I=1,N) * M g READ(11)((SMASS(I,J),J=1,N),I=1,N) * MBR READ(11)((BPM(I,J),J=1.4),I=1.4)</pre>			
CA ABOA	<pre>* MB</pre>			
ALLAL CN ABOA	<pre>* MB</pre>			
	<pre>* MB RFAD(11)((BMASS(I,J),J=1,4),I=1,N) * M BFAD(11)((SMASS(I,J),J=1,N),I=1,N) * MBR RFAD(11)((BPM(I,J),J=1,4),I=1,4) * KB RFAD(11)((RSTF(I,J),J=1,4),I=1,N) * K * KB</pre>			
	<pre>* MB READ(11)((BMASS(I,J),J=1,4),I=1,N) * M READ(11)((SMASS(I,J),J=1,N),I=1,N) * MBR READ(11)((BPM(I,J),J=1,4),I=1,4) * KB READ(11)((RSTE(I,J),J=1,4),I=1,N) * K * K * K * COD * COD</pre>			
	<pre>* MB READ(11)((BMASS(I,J),J=1,4),I=1,N) * M BEAD(11)((SMASS(I,J),J=1,N),I=1,N) * MBR READ(11)((BPM(I,J),J=1,4),I=1,A) * KB READ(11)((RSTE(I,J),J=1,4),I=1,N) * K READ(11)((STIE(I,J),J=1,M),I=1,N) * KBR SEAD(11)((STIE(I,J),J=1,A),I=1,N) * KBR</pre>			
	<pre>* MB READ(11)((BMASS(I,J),J=1,4),I=1,N) * M BEAD(11)((SMASS(I,J),J=1,N),I=1,N) * MBR READ(11)((BPM(I,J),J=1,4),I=1,A) * KB READ(11)((RSTE(I,J),J=1,4),I=1,N) * K READ(11)((STIF(I,J),J=1,M),I=1,N) * KBR READ(11)((STBR(I,J),J=1,4),I=1,4) * COONT(0(7)(010,4))</pre>			
	<pre>* MB READ(11)((EMASS(I,J),J=1,4),I=1,N) * M BEAD(11)((SMASS(I,J),J=1,N),I=1,N) * MBR READ(11)((BPM(I,J),J=1,4),I=1,A) * KB READ(11)((STEF(I,J),J=1,4),I=1,N) * K READ(11)((STEF(I,J),J=1,N),I=1,N) * KBR READ(11)((STEB(I,J),J=1,4),I=1,A) 3 FORMAT(9(3x',G12,6))</pre>			
	<pre>* MB READ(11)((EMASS(I,J),J=1,4),I=1,N) * M BEAD(11)((SMASS(I,J),J=1,N),I=1,N) * MBR READ(11)((BPM(I,J),J=1,4),I=1,4) * KB READ(11)((ESTE(I,J),J=1,4),I=1,N) * K READ(11)((STIF(I,J),J=1,N),I=1,N) * KBR READ(11)((STBR(I,J),J=1,4),I=1,4) 3 FORMAT(9(3x,G12,6)) 103 READ 8,M 8 FORMAT(12)</pre>			
	<pre>* MB</pre>			
	<pre>* MB</pre>			
	<pre>* MB</pre>			
	<pre>* MB READ(11)((EMASS(I,J),J=1,4),I=1,N) * M BEAD(11)((SMASS(I,J),J=1,N),I=1,N) * MBR READ(11)((BPM(I,J),J=1,4),I=1,A) * KB READ(11)((STEF(I,J),J=1,4),I=1,N) * K READ(11)((STER(I,J),J=1,4),I=1,N) * KBR READ(11)((STER(I,J),J=1,4),I=1,A) 3 FORMAT(9(3x,G12,6)) 103 READ 8,M B FORMAT(9(3x,G12,6)) 103 READ 8,M B FORMAT(12) DO 10 J=1,M READ(9)(ND) C DMEGA IN CYCLE/SEC READ(9)(OME(J))</pre>			
	<pre>* MB READ(11)((EMASS(I,J),J=1,4),I=1,N) * M * MBR READ(11)((SMASS(I,J),J=1,4),I=1,N) * MBR READ(11)((BPM(I,J),J=1,4),I=1,N) * K READ(11)((STIF(I,J),J=1,4),I=1,N) * K READ(11)((STBR(I,J),J=1,4),I=1,N) * KBR READ(11)((STBR(I,J),J=1,4),I=1,A) 3 FORMAT(9(3X,G12,6)) 103 READ 8,M 8 FORMAT(12) DO 10 J=1,M READ(9)(ND) C DMEGA IN CYCLE/SEC READ(9)(OME(J)) READ(9)(X(I,J),I=1,ND)</pre>			
	<pre>* MB</pre>			
	<pre>* MB RFAD(11)((EMASS(I,J),J=1,4),I=1,N) * M BFAD(11)((SMASS(I,J),J=1,N),I=1,N) * MBP RFAD(11)((BPM(I,J),J=1,4),I=1,N) * K RFAD(11)((STIF(I,J),J=1,4),I=1,N) * KBP RFAD(11)((STBP(I,J),J=1,4),I=1,N) * KBP RFAD(11)((STBP(I,J),J=1,4),I=1,A) 3 FORMAT(9(3X,G12,6)) 103 RFAD 8,M 8 FORMAT(12) DO 10 J=1,M RFAD(9)(ND) C DMFGA IN CYCLE/SEC RFAD(9)(OMF(J)) RFAD(9)(CMF(J)),I=1,ND3 10 CONTINUE PT2=2:*3.14159 DO 20 I=1,M 20 BMF(I)=OMF(1)*P12 C DMFGA NOW JN RAD./SEC BO 15 J=1,4 BO 15 J=1,4 PT5 PT2=2:*3.14159 PT2=1:4</pre>			
	<pre>* MB RFAD(11)((EMASS(I,J),J=1,4),I=1,N) * M BFAD(11)((SMASS(I,J),J=1,N),I=1,N) * MBP RFAD(11)((EPM(I,J),J=1,4),I=1,N) * K RFAD(11)((STIF(I,J),J=1,N),I=1,N) * KBR RFAD(11)((STBR(I,J),J=1,4),I=1,N) * KBR RFAD(11)((STBR(I,J),J=1,4),I=1,N) * KBR RFAD(11)((STBR(I,J),J=1,4),I=1,N) * KBR RFAD(11)((STBR(I,J),J=1,4),I=1,N) * KBR RFAD(2(3X,G12,6)) 103 RFAD R,M 8 FORMAT(2(3X,G12,6)) 103 RFAD R,M 8 FORMAT(12) DO 10 J=1,M READ(9)(ND) C DMFGA IN CYCLE/SEC RFAD(9)(OMF(J)) RFAD(9)(X(I,J),I=1,ND) 10 CONTINUF P12=2:*3.14159 DO 20 I=1,M 20 DMF(I)=OMF(1)*P12 C DMFGA NOW IN RAD./SEC BO 15 J=1,4 STBR(I,J)=STBP(I,J)+ESTF(J,I) * CONTINUE * CONTINUE * CONTINUE * C DMFGA NOW IN RAD./SEC * C DMFGA</pre>			
	<pre>* MB</pre>			

- C		BMED(J) = OME(J) * SQRT(1, -RCRD(J) * RCRD(J))
		CALL MODAN (SMASS, ONF, X', GM, N, M, STIF, GS)
É.	н	NR=4
¥.		CALL FEFMASS(STIF, SMASS, BATE, RMASS, N. NB, EFFM, A1, STBB, BUF)
E3 (*)	55	READ 5, NLOAD, PEAK, INDEX
~	1.01	READ 4, TTOTAL , DT, TO
	· · · · · · · · · · · · · · · · · · ·	NTIMEFILUTAL ZUTAL F.O. RECORD PEAKSG
~	× 5	$\mathbf{F}_{0} = \mathbf{F}_{0} + \mathbf{F}_{1} + \mathbf{F}_{1} + \mathbf{F}_{1} + \mathbf{F}_{1} + \mathbf{F}_{2} $
		JE(NLOAD .FO. SHEND) GO TO 9999
		JE(INDEX .FO. SHCLOSD) CO TO 1004
Ŭ		JE (NLOAD .NE. 5HARTED) GO TO 56
	*	BROUND ACCELERATION VALUES SHOULD BE NORMALIZED
	*	ACC.S ARE IN TERMS OF G
		REAU(7) 887 (GACT7) TET, MITHUA DYED & ADE TN TERMS OF FEFTS
	₩ •	BEAD(B.88)(GY(T), I=1, NTIME)
~~	*	BACC REPRESENT THE PEAK VALUES
	56	JE(NLOAD . FO. 5HRECPU .A. INDEX . FR. SENLMER) GO TO 1011
		JF(NLOAD , FO. 5HTRTPU A. INDEX , FC. 5HNUMER) GO TO 1012
•		JE(NLOAD .FO. 5HSINPU .A. INDEX .ER. 5ENUMER) GO TO 1013
	1011	BU 1014 Lal'MAUK
Ú	1014	0A(I)=1.0
	 ,	GO TO 1004
	<u>≺ 1012</u>	NHDR=NDUR/2+1.0001
-		
	₹ <u>1/15</u> 9	
5. al	W M 4.	NEULENEURFI BO 1016 IENHD1 NDUR
•	1016	GA(I)=1.0-FLOAT(I=NHDR)/FLOAT(NHDR=1)
	1010	BO TO 1OO
\sim	1013	DO 1017 I=1.NDUF
:	1017	GA(I) = SIN(PI + FLOAT(I - 1)/FLOAT(NUR - 1))
	2 1004	PRINI 2225 TEAN AND TO ENDERDIN DRINT 112.TO
~	E	TECNIDAD ED SHTRIPUS PRINT 113 .TO
	-	JECNLOAD FR. SHSINDUN PRENT 114 TO
أهدرية		JE(NLOAD .FO. SHARTED) PRINT 115, TTOTAL
~	112	FORMAT(1,10X, +TANK IS EXCITED BY A RECTANGULAR PULSE GROUND ACC.AP
		RETED FOR+, 515 5, SEC. 4./)
<u> </u>	113	BURMAN(2,10%, TANK IS FUCTED BY A TREARBOLAR TOLOG BROOKD ROOT, AT 2
	ا م 4 ه	HOPMAT(1, 10%, *TANK IS FXCITED BY A SINGSCIDAL PULSE GROUND ACC. AP
		GRITED FOR+, G15, 5, *SEC. *./)
<u> </u>	115	FORMAT(/,10%, *TANK IS EXCITED BY AN ARTIFICIAL E.O. APPLIED FOR*, G PORTA
		015.5,*S ^E C.*'/)
الخصنينة		REINT 70, PEAK
-	70	EDRMAT(/// 10X) * MAX. GRPUND ACULLERALLON VALUE=*, 910-2
	الينينية	Q + IN./SEC/SEC+./)
نې	5555	FORMAT(1H1)
		FE(INDEX .EQ. SHARTEQ ."R. INDEX .EQ. SHRUMER) PRINT 1005
1:	4 1005	HURMARL///JUX/* NUMMERLAL SULULUM OF LAFNEL INTERKAL */// TE/INDEV EO SHCLOSDI PRINT 1006
<u> </u>	1 1 1 1 1 1	EDEMAT(//.20Y.+CLOSED FORM SOLUTION+./)
5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	BACC(1)=0.0
· ب		BACC(2)=-PFAK
		BACC(3)= PEAK
. 4	6	BACC(4)=0,0
د ب -		$\frac{10050}{1000}$
	•	BO 50 JatinB

			D-23
	50	REF(I)=PEF(I)+FFFM(1,J)+BACC(J)	
		BD 60 I=1.M	
34		BP(1)≈0.0	
Ŷ	·	DO 60 J=1.N	
e 9	60	8P(1)#6P(1)+X(J+1)*PEF(J) CODMAT(4/5V C10 4))	
Ś	342 4		
	27 248	READ 999, TOKIP	
	000	ΕΛΡΜΑΤ(Τ7)	
-	,		
		THRN=D	
		NSTAR=TSTAR/DT+1.001	
	a terretalistic en contras de servicio de	NEND=TEND/DT+1.001	
		NDT=TDT/DT	
-	and Minister and All and	NPT=(NEND-NSTAR)/NDT+f	2. So that is a straight of the desire of
-	₽ ₩	*******	*****
	*	*************	****
i U		HRDIS≠C.O	
		DO 1000 ITIM1=NSIAR,NENH,MUI	
	·	110KW±110KW+1	
\smile	.e.		
		ALANCE ATCD INTO IN S	
	"	BDIST#GY(ITIME) *12.0	
~	·	JFINLAAD FO. SHARTFO OR INDEX FO. SHNUMER)	
		DALL INT (GA .PIN, GP, T, ITIME, DT, M, OME,	PEAK, OMED, RCRD)
-	с	JF(NLOAN .NF. SHARTFO .A. INDEX .EG. SHCLOSD)	
	s z	<pre>* CALL INTE(T, TO; OME NLOAD, M, GP, PIN)</pre>	
	0 0	Bo 110 I=1,M	
\smile	110	$A(I) = PIN(I) / (GM(I_J) + OMFD(I))$	
	ē.	BO 120 I=1,N	
	, para di Migla da may a falsa ana sa sa sa mana a sa mana da sa ma	<u>U(1)=</u> ¹ .0	
\smile	-	Bn 120 J=1,M	
	<u>±20</u>	$\frac{U(I)=U(I)+\chi(I)J)*A(J)}{U(I)=U(I)+\chi(I)}$	
4	z	HRDIS#AMAXI(HRDIS)ABS(D(N#1)/)	
-	Ö	DO 111 I=1.M	
	111	ADD(I)=GP(I)*GA(ITTME)/GM(I.I)-OMED(I)*OMED())	*A(I) -
ن ،	*	CHANGE RACC TO REPRESENT THE ACTUAL VALUES	
-		BACCT=PFAK+GA(ITIME)	
		HD1S(1)=BU1S(4)=0.0	<u> </u>
$\mathbf{\hat{\boldsymbol{\nabla}}}$	والمراجع والمحافظ والمراجع والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ وال	BDIS(2)=-BDIST \$ BDIS(3)=RDIST	
		BO 121 I=1,N	
	and tables the examinant of the second statement of	<u>UDD(I)=0.0</u>	· · ·
\checkmark		80 121 J21,M Und(I)-Und(I)-Und(I)	
	121	$\frac{0}{1} \frac{0}{1} \frac{1}{1} = \frac{0}{1} \frac{0}{1} \frac{1}{1} + \frac{1}{2} \frac{1}{1} $	
b d		BACC(2) = BACCT	
-	and a finite state of a second s	BACC(3) = BACCT	
	* 🔹	FB1=MBT*UDD	
U	*	FB2=KBT+1)	
	*	B3=(MBB+MRT *1)* BACC	
	12		
$\mathbf{-}$	u	- アクロイン 1~1~1~1~1~1~1~1~~~~~~~~~~~~~~~~~~~~~~	
	10	BB4(I)=0.0	
	•	BB1(1)=FB2(1)=FB(1)=0.0	
\checkmark	5 ,	PO 126 J=1.4	
	1	ER1(1)=FB1(1)+BMASS(J,1)*UDD(J)	
<i></i>	-	#R3(1)=FB3(1)+BBM(1,J)+RACC(J)	
-	n	ER4(1)=FR4(1)+STBH(1,J)+BBIS(J)	***************************************
	, 126	BB2(I) = FB2(I) + BSTF(J, T) + U(J)	

<pre>125 EH(1)=(H1(1)+FP2(1)+FP4(1)/(3)=1000000000000000000000000000000000000</pre>	****
Dn 401 L=1.N 401 REXT(1)=PEF(1)+GA(TTIME) * M±UDD=P1 * K+U=P2 CHECK P1+P2=PEXT Dn 402 T=1,N R1(1)=0.0 B2(1)=0.0 R1(1)=P1(1)+SMASS(1,J)+HDR(J) d03 J=1,N R1(1)=P2(1) B3 402 T=1,N R1(1)=P1(1)+SMASS(1,J)+HDR(J) d03 J=1,N R1(1)=P1(1)+SMASS(1,J)+HDR(J) d03 J=1,N R1(1)=P1(1)=P2(1) B3 50 (1)=P1(1)=P2(1) B4 50 (1)=P1(1)=0.0 STPP1(1)=0.0 B4 50 50 TE1,NEL B5 50 STP(1)=0.0 B5 50 STP(1)=0.0 B5 50 STP(0)=0.0 B5 50 STP(0)=1.3 (1+0)=0.0 STP0(1)=STP2(1)=0.0 STP1(1)=STP2(1)=0.0 STP1(1)=STP2(1)=0.0 STP1(1)=STP2(1)=0.0 STP1(1)=STP2(1)=0.0 STP1(1)=STP2(1)=0.0 STP1(1)=STP2(1)=0.0 STP1(1)=STP2(1)=0.0 STP2(1)=STP2(1)=1.1,J.3)+UE(J) STP2(1)=STP2(1)=1.1,J.4 STP2(1)=STP2(1)=1.1,J.5 STP2(1)=STP2(1)=0.0 <t< th=""><th></th></t<>	
Dn 401 l=1.N 401 REXT(1)=PEF(1)+GA(TTTHE) M:WDD=P1 * K+U=P2 CHECK, P1+P2=PEXT 00 402 l=1,N R1(1)=0.0 R2(1)=0.0 R2(1)=0.0 R2(1)=0.0 R1(1)=0.0 R2(1)=0.0 R1(1)=0.0 R2(1)=0.0 R1(1)=0.0 R1(1)=0.0 R1(1)=0.0 R1(1)=0.0 87P1(1)=0.0 80 500 TE1,NX1 STRP1(1)=0.0 800 500 TE1,NX1 STRP1(1)=0.0 800 500 TE1,NX1 90 501 TE1,TX1 90 501 TE1,TX1 90 503 J=1.0 91 F(NEL :(UFEL=2)+44+1) 90 503 J=1.4 91 F(NEL :(UFEL=2)+44+1) 91 F(NEL :(UFEL=2)+44+1) 91 F(NEL :(UFEL=2)+44+1) 91 F(J)=5TR1(1)+5TR1(1,46)=1.0 STR0(1)=STR2(1)+0TR(1,J,40+UE(J) 91 F(J)=STR2(1)+0TR(1,J,40+UE(J) STR0(1)=STR2(1)+DTR(1,J,40+UE(J) STR2(1)=STR2(1)+0TR(1,J,40+UE(J) STR2(1)=STR1(1)=DTR(1,J,40+UE(J) 91	waa
<pre>401 RFxt(1)=PCF(1)+GA(TTIME)</pre>	****
<pre>* M*UDD=P1 * K*UEP2 * CUHECK P1+P2=PExT B0.402 I=1,N R1(1)=0.0 P2(1)=0.0 D0.403 J=1,N R1(1)=P2(1)×MASS(j,J)*HDP(J) 403 P2(1)=P2(1)×MASS(j,J)*HDP(J) 403 P2(1)=P2(1)</pre> * STRPI(J)=0.0 E00 STRPI(J)=0.0 E00 STRPI(J)=0.0 E00 STRPI(J)=0.0 UF(J)=UF(2)=UF(3)=UF(4)=0.3 D0 501 NEL=1,NFLEM B0 503 J=1,A * STRP(U)=STR2(1+0)=0.0 * STR1(J)=STR2(1+0)=0.0 * STR1(J)=STR2(1+0)=0.0 * STR1(J)=STR2(1+0)=0.0 B0 503 J=1,A * STRP(0(J)=STRCP(J)=0.0 * STR2(J)=STR2(1+0)=0.0 B0 503 J=1,A * STRP(0(J)=STRCP(J)=TB(I,J,3)*UE(J) * STR2(J)=STR2(1+0)=R(I,J,4)*UE(J) * STR2(J)=STR2(1+0)=TR(I,J,4)*UE(J) * STR2(J)=STR2(1+0)=TR(I,J,4)*UE(J) * STR2(J)=STR2(I)+DTR(I,J,4)*UE(J) * STR2(I)=STR2(I+0)=TR(I,J,4)*UE(J) * STR2(I)=STR2(I)+DTR(I,J,2)*UE(J) * STR2(I)=STR2(I)+DTR(I,J,2)*UE(J) * STR2(I)=STR2(I)+DTR(I,J,2)*UE(J) * STR2(I)=STR2(I)+DTR(I,J,2)*UE(J) * STR2(I)=STR2(I)+DTR(I,J,2)*UE(J) * STR2(I)=STR2(I)+DTR(I,J,2)*UE(J) * STR2(I)=STR2(I)+DTR(I,J,2)*UE(J) * STRPI(NN)=STRP(NN)+STR2(J) * STRPI(NN)=STRP(NN)+STR2(J) * STRPI(NN)=STRP(I)/2. * STRPI(NN)=STRP(I)/2. * STRPI(NN)=STRP(I)/2. * STRPI(NN)=STRP(I)/2. * STRPINT 507,HPDIS * STRPINT 507,HPDIS	
<pre>* K+U=P? CHECK, P1+P2=PExT B0 402 1=1,N R1(1)=0.0 R2(1)=0.0 P1(1)=P1(1)+SMASS(1,J)+HDP(J) 403 P2(1)=P2(1)+SMASS(1,J)+HDP(J) 403 P2(1)=P1(1)+P(1) B0 507 1=1,NST STRP1(1)=0.0 E00 STR(1)=0.0 E00 STR(1)=0.0 E00 STR(1)=0.0 E00 STR(1)=0.0 E00 STR(1)=0.0 E00 STR(1)=0.0 E00 STR(1)=0.0 E00 STR(1)=0.0 E00 STR(1)=0.0 E00 STR(1)=0.0 STRP1(1)=0.0 E00 STR(1)=0.0 STRP(0)=0.0 STRP(0)=STPCP(1)=0.0 STRP(0)=STPCP(1)=0.0 STRP(1)=STRP2(1)+DTR(1,J,3)+HE(J) STRP2(1)=STRP2(1)+DTR(1,J,4)+HE(J) STRP2(1)=STRP2(1)+DTR(1,J,4)+HE(J) STRP2(1)=STRP2(1)+DTR(1,J,4)+HE(J) STRP2(1)=STRP2(1)+DTR(1,J,4)+HE(J) STRP2(1)=STRP2(1)+DTR(1,J,2)+HE(J) STRP1(1)=STRP1(1)+DTR(1,J,2)+HE(J) STRP1(HA)=STR1(1+6)+DTR(1,J,2)+HE(J) STRP1(HA)=STRP1(HA)=STRP2(J)=STRP1(HA)</pre>	
<pre> CHECK P1+P2=PExT B 402 I=1,N P1(I)=0.0 P2(I)=0.0 P1(I)=P2(I)+SMASS(I,J)+HDP(J) 403 P2(I)=P2(I)+SMASS(I,J)+HDP(J) 403 P2(I)=P2(I)+SMASS(I,J)+HDP(J) 402 R(I)=P2(I)+P2(I) B0 700 I=1,NST STAPPI(I)=0.0 STAPI(I)=0.0 STAPI(I)=0.0 B0 501 N=L=I,NELEM B0 503 J=1,A B0 503 J=1,A B0 503 J=1,A STAPO(I)=STAP(I)=0.0 STAPI(I)=STAPI(I)=0.0 STAPI(I)=STAPI(I)=0.0 STAPI(I)=STAPI(I)=0.0 STAPI(I)=STAPI(I)=0.0 STAPI(I)=STAPI(I)=0.0 STAPI(I)=STAPI(I)=0.0 STAPI(I)=STAPI(I)=0.0 STAPI(I)=STAPI(I)=D10(I,J,3)*UE(J) STAPO(I)=STAPI(I)=D10(I,J,3)*UE(J) STAPO(I)=STAPI(I)=DTA(I,J,4)*UE(J) STAP2(I)=STAP2(I)=DTA(I,J,4)*UE(J) STAP2(I)=STAP2(I)=DTA(I,J,4)*UE(J) STAP2(I)=STAP2(I)=DTA(I,J,4)*UE(J) STAP2(I)=STAP2(I)+DTA(I,J,5)*UE(J) STAPI(I)=STAPI(INN)+STAP2(J) STAPI(I)=STAPI(INN)+STAP2(J) STAPI(I)=STAPI(INN)+STAP2(J) STAPI(I)=STAPI(I)/2. STAPI(I</pre>	
DD. 402 1=1,N H1(1)=0.0 P2(1)=0.0 P(1)=0.0 P(1)=0.0 P(1)=P1(1)+STTF(1,J)+UDP(J) 403 P2(1)=P2(1)+STTF(1,J)+UDP(J) 403 P2(1)=P1(1)+P2(1) D0 501 1=1,NST STRP1(1)=0.0 500 STR(1)=0.0 500 STR(1)=0.0 500 STR(1)=0.0 502 J=5,R PF(NEL .GT.1) UE(J=41=UE(J) 502 UF(J)=UU(NFL=2)+4+J) B0 503 J=1,6 STR0(1)=STPCP(1)=0.0 STR2(1)=STPCP(1)=0.0 STR2(1)=STPCP(1)=0.0 STR2(1)=STPCP(1)+DTB(1,J,3)+UE(J) STR2(1)=STR2(1+0)=0.0 B0 503 J=1,6 STR2(1)=STPCP(1)+DTB(1,J,3)+UE(J) STR2(1)=STR2(1+0)=D0.0 STR2(1)=STPCP(1)+DTB(1,J,4)+UE(J) STR2(1)=STR2(1+0)+DTR(1,J,2)+UE(J) STR2(1)=STR2(1+0)+DTR(1,J,2)+UE(J) STR2(1)=STR1(1+0)+DTR(1,J,2)+UE(J) STR1(1)=STP1(1)+DTR(1,J,2)+UE(J) STR1(1)=STP1(1)+DTR(1,J,2)+UE(J) STR1(1)=STP1(1)+0+DTR(1,J,2)+UE(J) STR1(1)=STP1(1)+0+DTR(1,J,2)+UE(J) STR1(1)=STP1(1)+2,2(1) STR1(1)=STP1(1)/2. STR1(1)=STP1(1)/2. STR1(1)=STP1(1)/2. STRP	
<pre>H1(1)=0.0 P(1)=0.0 P(1)=0.0 Dn 403 J=1.N A03 P2(1)=P2(1)+STIF(1,J)+HDP(J) 402 P(1)=P1(1)+SMASS(J,J)+HDP(J) 402 P(1)=P1(1)=P2(1) B0 507 I=1,NST STRP1(1)=0.0 E00 STR(1)=0.0 E00 STR(1)=0.0 D0 501 NFL=1,NFLEM D0 502 J=3.8 F(NEL.0G.1) UE(J=4+=UE(J) 502 UF(J)=U((NFL=2)+4+J) B0 503 I=1.6 STRP(1)=STRP(I)=0.0 STRP(1)=STRP(I)=0.0 STRP(1)=STRP(I)=0.0 B0 503 J=1.8 STRP0(I)=STPC0(I)+DTB(I,J,3)+UE(J) STRP2(I)=STR2(I)+DTR(I,J,5)+UE(J) STRP2(I)=STR2(I)+DTR(I,J,5)+UE(J) STRP2(I)=STR2(I)+DTR(I,J,2)+UE(J) STRP2(I)=STR1(I+0)+DTR(I,J,2)+UE(J) STRP2(I)=STR1(I+0)+STR2(J) STRP1(NN)=STR(I)+STRP2(J) STRP1(NN)=STRP1(NN)+STRP2(J) STRP1(NN)=STRP1(I)/2. S03 STR(I)=STRP1(I)/2. S04 STR(I)=STRP1(I)/2. S05 STR(I)=STRP1(I)/2. S05 STR(I)=STRP1(I)/2. S06 STP(I)=STRP1(I)/2. S07 STRP1,NNT,N,M JUMP=JUMP+ISKIP 1000 CONTINUE PRINT 507,HPDIS 507 E0RMAT(///HDIS 507 E0RMAT(///HDIS 507 E0RMAT(///HDIS</pre>	
<pre>M (1) = 0.0 Dn 403 J=1,N R1(1)=P1(1)+ST[F(1.J)+U(J) 402 R(1)=P2(1)+ST[F(1.J)+U(J) 402 R(1)=P1(1)+P2(1) 90 500 F11,NST STRP1(1)=0.0 E00 STR(1)=0.0 U(f(1)=U(2)=UE(3)=UF(4)=0.3 D0 501 NEL=1,NFLEM B0 502 J=3,8 D1 (NEL=0,1) U(SL=2)+4+J) B0 503 I=1,6 STR0(1)=STR2(1+6)=0.0 STR1(1)=STR1(1+6)=0.0 STR2(1)=STR2(1+6)=0.0 B0 503 J=1,8 STRC0(1)=STRC0(1)+TTB(1.J,3)+UE(J) STR2(1)=STR2(1+6)=0.0 B0 503 J=1,8 STRC0(1)=STRC0(1)+TTB(1.J,3)+UE(J) STR2(1)=STR2(1+6)=0.0 B0 503 J=1,8 STRC0(1)=STRC0(1)+TTB(1.J,3)+UE(J) STR2(1)=STR2(1+6)=0.0 B0 503 STR1(1+6)=TR2(1+6)+DTR(1,J,5)+UE(J) STR2(1)=STR2(1+6)=TR(1,J,5)+UE(J) STR2(1)=STR2(1+6)+DTR(1,J,5)+UE(J) STR2(1)=STR1(1+6)+DTR(1,J,2)+UE(J) STR1(1)=STR1(1+6)+DTR(1,J,2)+UE(J) STR1(1)=STR1(1+6)+DTR(1,J,2)+UE(J) STR1(1)=STR1(1+6)+DTR(1,J,2)+UE(J) STR1(1)=STR1(1+6)+DTR(1,J,2)+UE(J) STR1(1)=STR1(1+6)+DTR(1,J,2)+UE(J) STR1(1)=STR1(1+6)+DTR(1,J,2)+UE(J) STR2(1-6)=T7.NTO STRP1(1)=STR1(1)/2. CALL PRIN(T,RACGT.BRIST.PIN,A,ADT.U,UDD,FE,P1,P2,P,F * STRP1.NST.N,M) JUMP=JUMP+1SKIP 1000 UONTINUE * * * * * * * * * * * * *</pre>	
D0 403 J=1,N P1(1)=P1(1)+SMASS(J,J)+HDP(J) 403 P2(1)=P2(1)+STTF(1,J)+H(J) 402 P(1)=P1(1)+P2(1) B0 500 T=1,NST STRP(1)=0.0 Ur(1)=UF(2)=UF(3)=UF(4)=0.3 D0 501 NFL=T,NFLEM B0 502 J=5,R PF(NEL .GT. 1) UF(J=4)=UE(J) 502 UF(J)=U(NFL-2)+4+J) B0 503 J=1,A STRO(1)=STPCP(1)=0.0 STR2(1)=STR2(1+0)=0.0 STR2(1)=STR2(1+0)=0.0 B0 503 J=1,R STRO(1)=STPCP(1)=TB(1,J,3)+UE(J) STRPC(1)=STRCP(1)+DTB(1,J,3)+UE(J) STRPC(1)=STRCP(1)+DTB(1,J,0)+UE(J) STR2(1)=STR2(1+0)=DTR(1,J,0)+UE(J) STR2(1)=STR2(1+0)=TR(1,J,0)+UE(J) STR2(1)=STR1(1)+DTR(1,J,0)+UE(J) STR2(1+0)=STR2(1+6)+DTR(1,J,2)+UE(J) STR1(1)=STR1(1)+DTR(1,J,0)+UE(J) STR2(1+0)=STR1(1+6)+DTR(1,J,2)+UE(J) STR1(1)=STR1(1)+DTR(1,J,0)+UE(J) STR1(1)=STR1(1)+DTR(1,J	tan an a
<pre>hiti=pi(1)+SMASS(1,J)+HDR(J) 403 P2(1)=P2(1)+ST[F(1,J)+HDR(J) 402 P(1)=P1(1)+P2(1) STPP1(1)=0.0 5TP(1)=0.0 5TP(1)=0.0 5TP(1)=0.0 5TP(1)=0.0 5TP(1)=0.0 5TP(1)=U((NFL-2)+4+J) 502 UF(J)=U((NFL-2)+4+J) 502 UF(J)=U((NFL-2)+4+J) 502 UF(J)=U((NFL-2)+4+J) 502 UF(J)=STRC(1)=0.0 STP(1)=STRC(1)+0=0.0 STR(1)=STRC(1)+0=0.0 STR(1)=STRC(1)+0=0.0 STR(1)=STRC(1)+0=0.0 STR(1)=STRC(1)+0=0.0 STR(1)=STRC(1)+0=0.0 STRC(1)=STRC(1)+0=0.0 STRC(1)=STRC(1)+0=0.0 STR(1)=STRC(1)+0=0.0 STR(1)=STRC(1)+0=0.0 STR(1)=STRC(1)+0=0.0 STR(1)=STRC(1)+0=0.0 STRC(1)=STRC(1)+0=0.0 STR(1)=STRC(1)+0=0.0 STRC(1)=0=0.0 STRC(1)=0=0.0 STR(1)=STRC(1)+0=0.0 STR(1)=0.0 STR(1)</pre>	
403 P2(1)=P2(1)+P2(1) 402 R(1)=P1(1)+P2(1) B0 500 TET.NST STRP1(1)=0.0 E00 STR(1)=0.7 UF(1)=UF(2)=UF(3)=UF(4)=0.0 B0 501 NFLE1.NFLEM B0 502 J=5.8 DF 504 L.GT.1) UE(J=41=UE(J) 502 UF(J)=U((NFL-2)+4+J) B0 503 J=1.4 STR0(1)=STR2(1)+0=0.0 STR1(1)=STR2(1+0)=0.0 B0 503 J=1.4 B0 503 J=1.4 STRC0(1)=STR2(1+0)=0.0 B0 503 J=1.4 STRC0(1)=STR2(1+0)=0.0 STR2(1)=STR2(1+0)=0.0 STR2(1)=STR2(1+0)=0.0 STR2(1)=STR2(1+0)=0.0 STR2(1)=STR2(1+0)=0.0 STR2(1)=STR2(1+0)=0.0 STR2(1)=STR2(1+0)=0.0 STR2(1)=STR2(1+0)=0.0 STR2(1)=STR2(1+0)=TR(1,J,3)+UE(J) STR2(1)=STR2(1+0)+DTR(1,J,4)+UE(J) STR2(1)=STR1(1+0)+DTR(1,J,2)+UE(J) STR1(1)=STR1(1+0)+DTR(1,J,2)+UE(J) STR1(1)=STR1(1+0)+STR2(J) 503 STR1(1+6)=STR1(1)/2. STRP1(NN)=STRP1(NN)+STR2(J) 504 STR(1)=STRP1(N)+STR2(J) 504 STR(1)=STRP1(N)+STR2(J) STRP1(1)=STRP1(1)/2. STRP1(1)=STRP1(1)/2. STRP1(1)=STRP1(1)/2. STRP1,NST.N,M) JUMPEJUMP+1SKIP 1000 CONTINUE PRINT 507,HPDIS 507 E0RMAT(77,10X,*MAX. RADIAL DISPLACEMENT AT TANK TOP=*.G15.	
402 R(1)=P1(1)+P2(1) B0 500 I=1,NST STRP1(1)=0.0 500 STR(1)=0.0 UF(1)=UF(2)=UF(3)=UF(4)=0.3 B0 501 MFL=1,NFLEM B0 502 J=5.8 UF(MFL.GT.1) UE(J=4+=UE(J) 502 UF(J)=U(MFL-2)+4+J) B0 503 I=1.6 STR0(1)=STR0(1)=0.0 B0 503 J=1.8 STR0(1)=STR2(1+6)=0.0 B0 503 J=1.8 STR0(1)=STR0(1)+DTB(1,J,3)+UE(J) STR2(1)=STR2(1+6)=0.0 B0 503 J=1.8 STR0(1)=STR0(1)+DTB(1,J,3)+UE(J) STR2(1)=STR2(1)+DTR(1,J,1)+UE(J) STR2(1+6)=STR2(1+6)+DTR(1,J,2)+UE(J) STR2(1+6)=STR1(1+6)+DTR(1,J,2)+UE(J) B0 504 J=1,12 NN=(NFL-1)+6+J STRP1(1)=STRP1(NN)+STR2(J) STRP1(1)=STRP1(NN)+STR2(J) STRP1(1)=STR0(1)/2. 506 STR(1)=CP(T)/2. CALL PRIN(T,RACGT.BBIST.PIN,A,ADT.U,UDD,FE,P1,P2,P,F * STRP1,NST.N,M) JUMP=JUMP+1SKIP 1000 DONTINUE PRINT 507,HPDIS 507 E0RMAT(//.10X,*MAX. RADIAL DISPLACEMENT AT TANK TOP=+.G15.	
<pre>BU 500 1=1,NS1 STRP1(1)=0.0 UF(1)=UF(2)=UF(3)=UF(4)=0.0 D0 501 NFLEI,NELEM B0 502 J=5.8 JF(NEL.GT.1) UE(J=41±UE(J) 502 UF(J)=U((NFL=2)+4+J) B0 503 I=1,6 STRC0(1)=STPCP(1)=0.0 STR1(J)=STR1(1+6)=0.0 B0 503 J=1,8 STRC0(1)=STPC0(1)+DTB(1.J.3)+UE(J) STRC0(1)=STRCP(1)+DTB(1.J.3)+UE(J) STRC0(1)=STRCP(1)+DTB(1.J.4)+UE(J) STR2(1)=STR2(1+6)+DTR(1.J.4)+UE(J) STR2(1+6)=STR2(1+6)+DTR(1.J.2)+UE(J) STR2(1+6)=STR2(1+6)+DTR(1.J.2)+UE(J) STR1(1)=STR1(1)+DTR(1.J.1)+UE(J) STR2(1+6)=STR2(1+6)+DTR(1.J.2)+UE(J) B0 504 J=1,12 NN=(NFL-1)+6+J STRP1(NN)=STRP1(NN)+STR2(J) 504 STR(NN)=STRP1(N)+STR2(J) 504 STR(NN)=STRP1(1)/2. 506 STR(1)=CTP(1)/2. 506 STR(1)=CTP(1)/2. 506 STR(1)=CTP(1)/2. CALL PRIN(T.RACCT'.BBIST.PIN,A',ADT'.L.UDD,FE,P1;P2,P.F * STRP1,NST.N.M) JUMP=JUMP+1SKIP 1000 DONTINUE PRINT 507,HPDIS 507 E0RMAT(//.10X+MAX. RADIAL DISPLACEMENT AT TANK TOP=+.G15.</pre>	·
E00 STR(1)=0.0 E00 STR(1)=0.0 UF(1)=UF(2)=UE(3)=UF(4)=0.0 D0 501 NFL=1,NFLEM E0 502 J=5,8 DF(NEL GT 1) UE(J+4+=UE(J) 502 UF(J)=U((NFL=2)+4+J) E0 503 J=1.6 STR(1)=STR(1+0)=0.0 E0 503 J=1.8 STR(1)=STR(1+0)=0.0 E0 503 J=1.8 STR(1)=STR(1+0)=0.0 E0 503 J=1.8 STR(1)=STR(1+0)=TR(1,J,3)+UE(J) STR(1)=STR(1)+DTR(1,J,3)+UE(J) STR(1)=STR(1)+DTR(1,J,1)+UE(J) STR(1)=STR(1)+DTR(1,J,1)+UE(J) STR(1+0)=STR(1+0)+DTR(1,J,2)+UE(J) E1 STR(1+0)=STR(1+0)+DTR(1,J,2)+UE(J) E1 STR(1)=STR(1)+DTR(1,J,1)+UE(J) E1 STR(1)=STR(1)+DTR(1,J,1)+UE(J) E1 STR(1)=STR(1)+STR(1) 503 STR(1+0)=STR(1)+STR(2) E1 STR(1)=STR(1)+STR(1) 504 STR(1)=STR(1)/2. 506 STR(1)=STR(1)/2. 506 STR(1)=STR(1)/2. 506 STR(1)=STR(1)/2. 507 SORMAT(7)+HPDIS 507 E0RMAT(7)+10X+MAX. RADIAL DISPLACEMENT AT TANK TOP=+,G15.	· · · · · · · · · · · · · · · · · · ·
UF(1)=UF(2)=UF(3)=UF(4)=0.3 D0 501 NFL=1,NFLEM B0 502 J=5,8 DF(NFL.GT.1) UE(J=47=UE(J) 502 UF(J)=U((NFL=2)*4+J) B0 503 I=1,6 STR0(1)=STR0P(I)=0.0 STR1(J)=STR2(I+6)=0.0 B0 503 J=1,8 B0 503 J=1,8 STR0(I)=STR0P(I)+DTB(1,J,3)*UE(J) STR0P(I)=STR0P(I)+DTB(1,J,4)*UE(J) STR2(I)=STR0P(I)+DTR(I,J,4)*UE(J) STR2(I+6)=STR2(I+6)+DTR(I,J,5)*UE(J) STR1(I)=STR1(I)+DTR(I,J,1)*UUE(J) 503 STR1(I+6)=STR2(I+6)+DTR(I,J,2)*UE(J) B0 504 J=1,12 NN=(NFL=1)*64J STRPI(I)=STRPI(NN)+STR2(J) 504 STR(IN)=STRPI(NN)+STR2(J) 505 STR(I)=STRPI(I)/2. CALL PRIN(T,RACGT.BHIST.PIN,A,ADT.U,UDD,FE,P1,P2,P,F * ST0PI,NST.N,M JUMP=JUMP+1SKIP 1000 CONTINUE * ***********************************	efe de validades sin t- distincente comme altre de con o con altre altre activation en Altre Batellander
<pre>D0 501 NFLE1, NFLEM B0 502 J=5,8 FF(NEL .GT. 1) UE(J=41=UE(J) 502 UF(J)=U((NFL=2)+4+J) B0 503 J=1,6 STR0(1)=STRCP(I)=0.0 B0 503 J=1,8 STR0(I)=STR2(I+6)=0.0 B0 503 J=1,8 STR0(I)=STRCP(I)+NTB(I.J.3)+UE(J) STR2(I)=STR2(I)+DTR(I.J.4)+UE(J) STR2(I)=STR2(I)+DTR(I.J.4)+UE(J) STR2(I+6)=STR2(I+6)+DTR(I.J.2)+UE(J) STR2(I)=STR2(I)+DTR(I.J.2)+UE(J) STR1(I)=STR1(I+6)+DTR(I.J.2)+UE(J) STR1(I)=STR1(I+6)+STR2(J) STR1(I)=STR1(I+6)+STR2(J) STRPI(NN)=STRPI(NN)+STR2(J) 504 STR(INN)=STRPI(NN)+STR2(J) 505 STR(I)=STRPI(I)/2. CALL PRIN(T,RACGT.BBIST,PIN,A,ADT.U.UDD,FE,P1,P2,P,F * STRPI.NST.N.M JUMP=JUMP+ISKIP 1000 CONTINUE ************************************</pre>	1
B0 502 J=5.8 JF (NEL. GT. 1) UE(J=41±UE(J) 502 UF (J)=UU((NFL-2)*4+J) B0 503 I=1.6 STRC0(1)=STRCP(I)=0.0 STR1(J)=STR1(I+6)=0.0 B0 503 J=1.8 STRC0(I)=STRC2(I+6)=0.0 B0 503 J=1.8 STRCP(I)=STRCP(I)+DTB(I.J.3)*UE(J) STRCP(I)=STRCP(I)+DTB(I.J.6)*UE(J) STR2(I)=STR2(I+6)=STR2(I+6)+DTR(I.J.5)*UE(J) STR2(I+6)=STR2(I+6)+DTR(I.J.2)*UE(J) 503 STR1(I+6)=STR1(I+6)+DTR(I.J.2)*UE(J) B0 504 J=1,12 NN=(NFL-1)*6+J STRPI(NN)=STR(NN)+STR2(J) 504 STR(I)=STR(NN)+STR2(J) 504 STR(I)=STR(NN)+STR2(J) 505 STR(I)=STR(NN)+STR1(J) 506 STR(I)=STR(I)/2. CALL PRIN(T.RACCT.BTIST.PIN.A.ADT.L.UDD.FE.P1,P2.P.F * STRPI.NST.N.M) JUMP=JUMP+ISKIP 1000 UONTINUE * ***********************************	
<pre> if (NEL .GT. 1) UE(.J+4f=UE(J) 502 UF(J)=U((NEL-?)*4+J) B0 503 I=1.6 STRC0(1)=STRCP(I)=0.0 STR1(J)=STR2(I+6)=0.0 B0 503 J=1.8 STRC0(I)=STRCP(I)+DTB(I.J.3)*UE(J) STRC0(I)=STRCP(I)+DTB(I.J.4)*UE(J) STR2(I)=STR2(I+6)=STR2(I+6)+DTB(I.J.5)*UE(J) STR2(I+6)=STR2(I+6)+DTB(I.J.2)*UE(J) STR1(I)=STR1(I)+DTB(I.J.1)*UE(J) B0 504 J=1.12 NN=(NEL-1)*6+J STRPI(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STRPI(NN)+STR2(J) STRPI(I)=STRPI(I)/2. CALL PRIN(T.RACCT'.BFIST.PIN.4',ADT'.L.UDD,FE,P1',P2',P.F * STRPI.NST.N,M) JUMP=JUMP+1SKIP IUTO CONTINUE * * PRINT 507.HRDIS 507 E0RMAT(//.10X,*MAX. RADIAL DISPLACEMENT AT TANK TOP=*,G15. </pre>	
502 UF (J)=U((NFL=2)*4+J) B0 503 I=1,6 STRC0(I)=STPCP(I)=n.0 STR1(J)=STR2(I+6)=n.0 B0 503 J=1,8 STRC0(I)=STPC0(I)+DTB(I.J.3)*UE(J) STRCP(I)=STRCP(I)+DTB(I.J.6)*UE(J) STR2(I)=STR2(I)+DTR(I.J.6)*UE(J) STR2(I+6)=STR2(I+6)+DTR(I.J.5)*UE(J) STR2(I+6)=STR1(I+6)+DTR(I.J.2)*UE(J) B0 504 J=1,12 NN=(NFL-1)*6+J STRPI(NN)=STRPI(NN)+STR2(J) 503 STR1(I+6)=STR1(I)+DTR(I.J.2)*UE(J) B0 504 J=1,12 NN=(NFL-1)*6+J STRPI(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STRPI(NN)+STR2(J) 504 STR(I)=STRPI(I)/2. CALL PRIN(T.RACCT'.BHIST.PIN,A,ADT'.U.UDD,FE,P1,P2,P,F * STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 CONTINUE PRINT 507.HFDIS 507 E0RMAT(//.10X,*MAX. RADIAL DISPLACEMENT AT TANK TOP=*.G15.	
B0 503 I=1.6 STRC0(1)=STPCP(I)=0.0 STR1(J)=STR1(I+6)=0.0 B0 503 J=1.8 STRC0(I)=STRC0(I)+DTB(I.J.3)+UE(J) STRCP(I)=STRCP(I)+DTB(I.J.6)+UE(J) STR2(I)=STR2(I)+DTR(I.J.6)+UE(J) STR2(I)=STR2(I+6)+DTR(I.J.5)+UE(J) STR1(I)=STR1(I)+DTR(I.J.1)+UE(J) 503 STR1(I+6)=STR1(I+6)+DTR(I.J.2)+UE(J) B0 504 J=1.12 NN=(NFL-1)+6+J STRPI(NN)=STRPI(NN)+STR2(J) 504 STRPI(NN)=STRPI(NN)+STR2(J) 504 STR(I)=STRPI(I)/2. CALL PRIN(T.RACGT.BBIST.PIN,A,ADT.U.UDD,FE,P1,P2,P,F * STRPI,NST.N,M JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************	
<pre>STRC0(1)=STPCP(1)=0.0 STR1(J)=STR1(1+6)=0.0 B0 503 J=1,8 STRC0(J)=STPC0(J)+DTB(J.J.3)*UE(J) STRCP(I)=STRCP(I)+DTB(J.J.3)*UE(J) STR2(I)=STR2(I)+DTR(I.J.4)*UE(J) STR2(I+6)=STR2(I+6)+DTR(I.J.5)*UE(J) STR2(I+6)=STR1(J)+DTR(I.J.2)*UE(J) 503 STR1(I+6)=STR1(I+6)+DTR(I.J.2)*UE(J) B0 504 J=1,12 NN=(NFL=1)*6+J STRPI(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STR(NN)+STR2(J) 504 STRPI(N)=STR(NN)+STR2(J) 506 STR(I)=STRPI(I)/2. CALL PRIN(T,RACGT.BBIST.PIN,A,ADF.L.UDD,FE,P1,P2,P,F * STRPI,NST.N,M) JUMP=JUMP+1SKIP 1000 CONTINUE * ***********************************</pre>	
<pre>STR1(1)=STR1(1+6)=0.0 STR2(1)=STR2(1+6)=0.0 B0 503 J=1,8 STRC0(1)=STRCP(1)+DTB(1,J,3)*UE(J) STRCP(1)=STRCP(1)+DTB(1,J,3)*UE(J) STR2(1)=STR2(1)+DTR(1,J,4)*UE(J) STR2(1+6)=STR1(1)+DTR(1,J,1)*UE(J) 503 STR1(1+6)=STR1(1+6)+DTR(1,J,2)*UE(J) B0 504 J=1,12 NN=(NFL-1)*6+J STRP1(NN)=STRP1(NN)+STR2(J) 504 STR(NN)=STRP1(NN)+STR2(J) 504 STR(NN)=STRP1(1)/2. STRP1(1)=STRP1(1)/2. CALL PRIN(T,RACGT.BBIST.PIN,A,ADF.U,UDD,FE,P1,P2,P,F * STRP1,NST.N,M) JUMP=JUMP+1SKIP 1000 CONTINUE ************************************</pre>	neres sem er er samme offe de an der anna sam av de av den attende af ar
<pre>SIR2(I)=SIR2(I+6)=0.0 B0 503 J=1,8 STRC0(I)=STRC0(I)+DTB(I.J.3)+UE(J) STRCP(I)=STRCP(I)+DTB(I.J.6)+UE(J) SIR2(I)=SIR2(I)+DTR(I.J.5)+UE(J) STR2(I+6)=STR1(I)+DTR(I.J.5)+UE(J) STR1(I)=STR1(I)+DTR(I.J.2)+UE(J) 503 STR1(I+6)=STR1(I+6)+DTR(I.J.2)+UE(J) 504 STR(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STRPI(NN)+STR1(J) 501 CONTINUF B0 506 I=7.NT0 STRPI(I)=STRPI(I)/2. CALL PRIN(T.RACCT.BBIST.PIN.A.ADC.L.UDD.FB.P1.P2.P.F * STRPI.NST.N.M) JUMP=JUMP+ISKIP 1000 CONTINUF * ***********************************</pre>	•
<pre>B0 503 J=1,8 STRC0(I)=STRC0(I)+DTB(I.J.3)*UE(J) STRCP(I)=STRCP(I)+DTB(I.J.6)*UE(J) STR2(I)=STR2(I)+DTR(I.J.5)*UE(J) STR1(I)=STR1(I)+DTR(I.J.1)*UE(J) 503 STR1(I+6)=STR1(I+6)+DTR(I.J.2)*UE(J) 504 STR(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STR(NN)+STR1(J) 501 CONTINUE B0 506 I=7,NT0 STRPI(I)=STRPI(I)/2. 506 STR(I)=STRPI(I)/2. 506 STR(I)=STRPI(I)/2. CALL PRIN(T,RACCT'.BBIST.PIN,A,ADC'.L.UDD,FE,P1;P2,P,F * STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 UONTINUE ************************************</pre>	
<pre>STRED(1)=STRED(1)+DTB(1, J, 6)+UE(J) STRED(I)=STRED(I)+DTB(I, J, 6)+UE(J) STR2(I)=STR2(I)+DTR(I, J, 1)+UE(J) STR2(I+6)=STR1(I)+DTB(I, J, 1)+UE(J) STR1(I)=STR1(I)+DTB(I, J, 1)+UE(J) STR1(I)=STR1(I)+6+J STRPI(NN)=STRPI(NN)+STR2(J) STRPI(NN)=STRPI(NN)+STR2(J) STRPI(NN)=STR(NN)+STR1(J) STRPI(I)=STRPI(I)/2. CALL PRIN(T, BACGT, BHIST, PIN, A, ADC, L, UDD, FE, P1, P2, P, P * STRPI,NST.N,M) JUMP=JUMP+ISKIP IDUD CONTINUE * ***********************************</pre>	en de la compañía de
<pre>STRPI(I)=STR2(I)+DTR(I,J,4)*UE(J) STR2(I)=STR2(I+6)=STR2(I+6)+DTR(I,J,5)*UE(J) STR1(I)=STR1(I)+DTR(I,J,1)*UE(J) 503 STR1(I+6)=STR1(I+6)+DTR(I,J,2)*UE(J) B0 504 J=1,12 NN=(NEL-1)*6+J STRPI(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STRPI(I)/2. B0 506 I=7.NT0 STRPI(I)=STRPI(I)/2. 506 STR(I)=CTP(I)/2. CALL PRIN(T,RACCT.BBIST.PIN,A,ADF.L,UDD,FB,P1,P2,P.F * STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************</pre>	
<pre>\$TR2(1+6)=STR2(1+6)+DTB(1,J,5)+UE(J) \$TR1(1)=STR1(1)+DTB(1,J.1)+UE(J) 503 \$TR1(1+6)=STR1(1+6)+DTB(1,J,2)+UE(J) B0 504 J=1,12 NN=(NFL-1)+6+J \$TRP1(NN)=STRP1(NN)+STR2(J) 504 \$TR(NN)=STR(NN)+STR1(J) 501 CONTINUE B0 506 1=7,NT0 \$TRP1(1)=STRP1(1)/2. 506 \$TR(1)=CTP(1)/2. CALL PRIN(T,BACGT'BHIST,PIN,A,ADC'L,UDD,FB,P1,P2,P,F * STRP1,NST'N,M) JUMP=JUMP+1SKIP 1000 DONTINUE * ***********************************</pre>	
<pre>\$TR1(I)=STR1(I)+DTR(I,J.1)*UE(J) \$03 \$TR1(I+6)=STR1(I+6)+DTR(I,J.2)*UE(J) B0 504 J=1,12 NN=(NFL-1)*6+J STRPI(NN)=STRPI(NN)+STR2(J) 504 \$TR(NN)=STR(NN)+STR1(J) 501 CONTINUE B0 506 I=7.NT0 STRPI(I)=STRPI(I)/2. CALL PRIN(T,RACCT.BHIST.PIN,A,ADC.L,UDD,FE,P1,P2,P,F * STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************</pre>	
<pre>503 STR1(1+6)=STR1(1+6)+DTR(1,J,2)*UE(J) B0 504 J=1,12 NN=(NEL-1)*6+J STRP1(NN)=STRP1(NN)+STR2(J) 504 STR(NN)=STR(NN)+STR1(J) 501 CONTINUE B0 506 I=7,NT0 STRP1(I)=STRP1(I)/2. 506 STR(I)=CTP(I)/2. CALL PRIN(T,RACCT.BHIST,PIN,A,ADF,L,UDD,FB,P1,P2,P,P * STRP1,NST.N,M) JUMP=JUMP+1SKIP 1000 CONTINUE * ***********************************</pre>	
<pre>BO 504 J=1,12 NN=(NFL-1)*6+J STRPI(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STR(NN)+STR1(J) 501 CONTINUE BO 506 I=7,NTO STRPI(I)=STRPI(I)/2. CALL PRIN(T,RACCT.BHIST,PIN,A,ADC.L,UDD,FB,P1,P2,P,P * STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************</pre>	
<pre>X NN=(NFL-1)*6+J STRPI(NN)=STRPI(NN)+STR2(J) 504 STR(NN)=STR(NN)+STR1(J) 501 CONTINUE B0 506 I=7.NT0 STRPI(I)=STRPI(I)/2. CALL PRIN(T.RACCT.BHIST.PIN,A,ADC.L,UDD,FB,P1,P2,P,F * STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************</pre>	
STRPI(NN)=STRPI(NN)+STR2(J) 504 \$TR(NN)=STR(NN)+STR1(J) 501 CONTINUE B0 506 I=7,NT0 STRPI(I)=STRPI(I)/2. 506 \$TR(I)=CTP(I)/2. CALL PRIN(T,RACCT.BHIST,PIN,A,ADC.L,UDD,FB,P1,P2,P,F * STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************	
504 STR(NN)=STR(NN)+STR1(J) 501 CONTINUE BO 506 I=7.NTO STRPI(I)=STRPI(I)/2. 506 STR(I)=CTP(I)/2. CALL PRIN(T,RACCT.BBIST.PIN,A,ADC.L,UDD,FB,P1,P2,P,F * STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************	
301 UNNTING B0 506 I=7,NT0 \$TRPI(I)=STRPI(I)/2. 506 \$TR(I)=CTP(I)/2. CALL PRIN(T,RACGT.BHIST,PIN,A,ADC.L,UDD,FE,P1,P2,P,F * STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 UONTINUE * PRINT 507,HRDIS 507 E0RMAT(//.10X,*MAX. RADIAL DISPLACEMENT AT TANK TOP=*.G15.	
STRPI(I)=STRPI(I)/2. 506 STR(I)=CTP(I)/2. CALL PRIN(T,RACCT.BUIST,PIN,A,ADC.L,UDD,FB,P1,P2,P,F * STRPI,NST.N,My JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************	
506 STR(I)= <tp(i) 2.<br="">CALL PRIN(T, RACCT'.BHIST, PIN, 4, ADE'.L, UDD, FB, P1, P2, P, F * STRPI, NST. N, M) JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************</tp(i)>	
CALL PRIN(T,RACCT.BHIST,PIN,A,ADE,L,UDD,FB,P1,P2,P,F * STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************	EVT' Dea'
* STRPI,NST.N,M) JUMP=JUMP+ISKIP 1000 CONTINUE * ***********************************	GXF,STK,
IUMPEJUMPETSKIP 1000 UONTINUF * ***********************************	

PRINT 507.HPDIS 507 EORMAT(//.10X,*MAX. RADIAL DISPLACEMENT AT TANK TOP=*.G15.	******
507 BORMAT(//.10X. *MAX. RADIAL DISPLACEMENT AT TANK TOP#*.G15.	
AND A REPORT TO A DEPARTMENT OF A DEPARTMENTA DEPARTA DEPARTA DEPARTA DEPARTA DEPARTA	5. * IN . * >
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<pre>SIRPOUTING FRIME FIGHT. FUNCTION FIGHT AND ADDITED STRATT FROM FOR A STRATT AND ADDITED STRATT FROM FOR A STRATT AND ADDITED STRATT AND ADDITED STRATT AND ADDITED ADDITE</pre>		
<pre>dfwEMSION_PIC(d).sTRP1(60).ACID).ADD(d).PIN(10).FB(4) DIMENSION_PIC(d).PEG(S).PR(3).PERTICAS).U(30).UDD(36) PREMIT 2. BRINT 9. BRINT 9. BRINT 9. BRINT 7. BRINT 1147UINEN11 114 FORMAT(7.10X.*PADUAD DISPLATEMENT ==x-G15.5.*IN.*) 115 FORMAT(7.10X.*CROUND ACCELEPATION =**-G15.5.*IN./SEC/SEC*) BRINT 9 BRINT 9 BRINT 117. BRINT 112. BRINT 113. BRINT 113.</pre>		SURROUTINE PRINCIPRACUTEBUSTPHINPAPAUCELEUDUPEBPEIPRAPPERAPPOT * STRPIENST N.MY
DIMENSION P1(36),PP(36),PP(36),PP(XT(36),UDD(36) PRIMI (200,750H=y,/:15x:+T[ME**,P10.5./) PRIMI (200,750H=y,/:15x:+T[ME**,P10.5./) PRIMI (200,750K=P000000 P15PLATEMENT =::015.5.*IN.*) 14 PRIMI (200,1),I=1.MS PRIMI (• •••	BIMENSION STR(60), STRP1(60), A(10), ADD(10), PIN(10), FB(4)
<pre>> PRMMAI(20x, 25(2)==, 7/1, 15x, *TIME***, P10, 5, 7/ RefINT 9 into PRINT 2, (FA(1), 1=1, M) * PPINT 114, (UIN*) 114 FORMAT(/, 10x, *AROUND ACCELEPATION =**G15,5,*IN,*) 115 FORMAT(/, 10x, *AROUND ACCELEPATION =**G15,5,*IN,*) 116 FORMAT(/, 10x, *AROUND ACCELEPATION =**G15,5,*IN,*) * PPINT 12 PRINT 9 * PRINT 9 * PRINT 9 * PRINT 11, (U(1), 1=1, N) * PRINT 12 * PRINT 400, (P1(1), 1=1, N) * PRINT 500, (PEXT(1), 1=1, N) * PRINT 500, (PEXT(1),</pre>		DIMENSION P1(36), P2(36), P(36), PEXT(36), U(36), UDD(36)
<pre>RFNT 9.T RFNT 2.(ACT):F1:M3 PFINT 2.(ACT):F1:M3 PFINT 2.(ACT):F1:M3 PFINT 2.(ACT):F1:M3 PFINT 2.(ACT):F1:M3 PFINT 114:UTN+11 116 FORMAT(/.10X.*GROUND ACCELEPATION =*.G15.5.*IN.*) 116 FORMAT(/.10X.*GROUND ACCELEPATION =*.G15.5.*IN.*/SEC/SEC*) PFINT 9 P EDRMAT(//) 117 FORMAT(//) 118 FORMAT(//) 119 FORMAT(//) 12 FORMAT(//) 12 FORMAT(//) 12 FORMAT(//) 12 FORMAT(//) 13 FORMAT(//) 14 FORMAT(//) 15 FORMAT(//) 15 FORMAT(//) 16 FORMAT(//) 17 FORMAT(//) 17 FORMAT(//) 18 FORMAT(//) 19 FORMAT(//) 19 FORMAT(//) 10 FORMAT(/) 10 FORMAT(/) 11 FORMAT(/) 11 FORMAT(/) 11 FORMAT(/) 12 FORMAT(//) 13 FORMAT(/) 14 FORMAT(/) 15 FORMAT(/) 15 FORMAT(/) 16 FORMAT(/) 17 FORMAT(/) 17 FORMAT(/) 18 FORMAT(/) 18 FORMAT(/) 19 FORMAT(/) 19 FORMAT(/) 10 FORMAT(/) 11 FORMAT(/) 11 FORMAT(/) 12 FORMAT(/) 13 FORMAT(/) 13 FORMAT(/) 14 FORMAT(/) 15 FORMAT(</pre>		7 BORMAT(20X; 25(2H==);/;+5X;*TIME=*;F10.5;/;
<pre>1012 Prime 2, PIN(1), 1=1, M3 PPINT 2, (PIN(1), 1=1, M3 PPINT 2, (A(T)), 1=1, M3 PPINT 2, (A(D)), 1=1, M4 PPINT 12 PPINT</pre>		
<pre>Brint 2:(ATT):TEL:M1 Brint 2:(ATT):TEL:M1 Print 2:(ATT):TEL:M1 Print 2:(ATT):TEL:M1 Print 114:(INT) I14 FRGMAT(/.10X,*RADOUND BISPLATEMENT ==.G15.5:*IN.*) I16 ERDMAT(/.10X,*RADOUND ACCELEPATION =*.G15.5:*IN.*/SEC/SEC*) Print 9 PERMAT(//10X,*RADOUND ACCELEPATION =*.G15.5:*IN.*/SEC/SEC*) Print 9 PERMAT(//10X,*RADOUND ACCELEPATION =*.G15.5:*IN.*/SEC/SEC*) Print 9 PERMAT(//10X,*RADOUND ACCELEPATION =*.G15.5:*IN.*/SEC/SEC*) Print 9 PERMAT(//10X,*GAOUND ACCELEPATION =*.G15.5:*IN.*/SEC/SEC*) Print 9 PERMAT(//10X,*GAOUND ACCELEPATION =*.G15.5:*IN.*/SEC/SEC*) PRINT 9 PERMAT(//10X)*GAOUND ACCELEPATION =*.G15.5:*IN.*/SEC/SEC*) PRINT 9 PERMAT(//10X)*GAOUND ACCELEPATION =*.G15.5:*IN.*/SEC/SEC*) PRINT 111:(U(T):I=1:N) PRINT 9 PERMAT(//10X)*GAOUND ACCELEPATION =*.G15.5:*IN.*/SEC/SEC*) PRINT 133 PRINT 134 PRINT 134.(FDCF:,7X,*TANGT.FDCFCFS P1 AT NON-BASE NODES*./) PRINT 404 RPINT 404 RPINT 404 RPINT 404 PRINT 404 PRINT 404 PRINT 404 PRINT 405 PRINT 405</pre>		1019 REINI 7.1 DDINT 2.7 PIN(1), 1±4, MÅ
 BRINT 2.(ADD(1).1=1.M4 PRINT 114.UUN-17 BRINT 2.(ADD(1).1=1.M4 PRINT 114.UUN-17 BRINT 2.(ADD(1).1=1.N3 FORMAT(/.10X.*GROUND ACCELEPATION =**G13:5;*IN.**) FORMAT(/.10X.*GROUND ACCELEPATION =**G13:5;*IN.**) BRINT 311.(U(1).1=1.N3 BRINT 9 BRINT 9 BRAT(//:20X.*GROUND ACCELEPATION =**G13:5;*IN.**) FORMAT(//:20X.*GROUND ACCELEPATION =**G13:5;*IN.**) BRINT 9 BRINT 9 BRINT 9 BRAT(//:20X.*GROUND ACCELEPATION =**G13:5;*IN./SEC/SEC*) BRINT 11: (U(1).1=1.N3 BRINT 10.(, AVIAL FORCE+, 7X, *TANGT. FORCE*, 7X, *RADIAL FORCE*, 7X, BRINT 113 FORMAT(10X, *AVIAL FORCE+, 7X, *TANGT. FORCE*, 7X, *RADIAL FORCE*, 7X, BRINT 113 PRINT 111.(FB(1).1=1.M3 PRINT 111.(FB(1).1=1.M3 BOO GORMAT(30X,*GENERALITED INFERTIAL FORCES F1 AT NON-BASE NODES*./1 BRINT 404 PRINT 600.(P1(1).1=1.M3 PRINT 600.(P1(1).1=1.M3 PRINT 404 PRINT 405 PRINT 405 PRINT 405 PRINT 406 PRINT 406 PRINT 406 PRINT 407 PRINT 600.(P1(1).1=1.M3 PRINT 406 PRINT 407 PRINT 600.(P1).1=1.M3 PRINT 407 PRINT 600.(P1).1=1.M3 PRINT 407 PRINT 407 PRINT 407 PRINT 407 PRINT 600.(P(1).1=1.N3 PRINT 600.(P(1).1=1.M3 PRINT 407 PRINT 600.(P(1).1=1.M3 PRINT 407 PRINT 500.(PRINT(1).1=1.N3 PRINT 500.(PRINT(1).1=1.N3 PRINT 500.(PRINT(1).1=1.N3 PRINT 600.(PRINT(1).1=1.N3 PRINT 500.(PRI		BOINT 2.78/TV.TE1.MY
<pre>PPINT 114.11(N=1) 114 606MAT(/.10X.*0ADIAL DISPLACEMENT =*.615.5:*IN.*) 115 607MAT(/.10X.*0ROUND ACCELEPATION =*.615.5:*IN./SEC/SEC*) * 9PINT 0 PPINT 12 PPINT 12 PPINT 11 12 FORMAT(//SX.*0ROUND ACCELEPATION =*.615.5.*IN./SEC/SEC*) * 9P VT 0 PPINT 12 PPINT 112 PPINT 12 PPINT 12 PPINT 12 PPINT 12 12 FORMAT(//SX.*0FORGAL CEMERAL IZED FCCCFS AT RASE*./) 12 FORMAT(//SX.*XIAL FORCF.,7X.*TANGT. FORCE.,7X.*RADIAL FORCE*:7X. CFAXIAL MT.*// PRINT 113. PPINT 111.(FD(1).1=1.Å) 600 FORMAT(12(1X.G10.4)) WPINT 9 404 FORMAT(30X.*GENERAL IZED IMERTIAL FORCES F1 AT NON-BASE NODES*./! PPINT 404 PPINT 404 PPINT 404 PPINT 9 405 FORMAT(30X.*GENERAL IZED INTERNAL FORCES AT NON-BASE NODES*./! PPINT 600.(P2(1).1=1.N) PPINT 9 405 FORMAT(30X.*GENERAL IZED INTERNAL FORCES AT NON-BASE NODES*./! PPINT 600.(P2(1).1=1.N) 406 FORMAT(30X.*GENERAL IZED INTERNAL FORCES AT NON-BASE NODES*./! PPINT 404 PPINT 600.(P2(1).1=1.N) 407 FORMAT(30X.*GENERAL IZED EXTERNAL FORCES AT NON-BASE NODES*./! PPINT 600.(P2(1).1=1.N) 407 FORMAT(30X.*GENERAL IZED EXTERNAL FORCES AT NON-BASE NODES*./! PPINT 405 PPINT 9 407 FORMAT(30X.*GENERAL IZED EXTERNAL FORCES AT NON-BASE NODES*./! PPINT 600.(P2(1).1=1.N) PPINT 9 407 FORMAT(30X.*GENERAL IZED EXTERNAL FORCES AT NON-BASE NODES*./! PPINT 407 PPINT 9 407 FORMAT(30X.*GENERAL IZED EXTERNAL FORCES AT NON-BASE NODES*./! PPINT 500.(PEXT(I).1=1.NS) PPINT 500 PPINT 505 PPINT 505</pre>		■ BRINT 2.(ADD(I),I=1.M ⁵
114 FORMAT(/,10X,*ARADIAL DISPL, AT TANK TCP=C15,5,*IN,*) 116 FORMAT(/,10X,*GROUND DISPLATEMENT =*.G15.5,*IN.*) 117 FORMAT(/,10X,*GROUND ACCELEPATION =*.G15.5,*IN.*/SEC/SEC*) * GPINT 9 9 FORMAT(/,7) 111 FORMAT(/15X,*G16.8) 12 FORMAT(/,75X,*G16.8) 12 FORMAT(/,75X,*U+,20X,*U*,20X,*K*,20X,*CW/DZ*) 12 FORMAT(/,75X,*U+,20X,*U*,20X,*K*,20X,*CW/DZ*) 12 FORMAT(/,75X,*U+,20X,*U*,20X,*K*,20X,*CW/DZ*) 12 FORMAT(/,75X,*U+,20X,*U*,20X,*K*,20X,*CW/DZ*) 13 FORMAT(10X,*ATAL FORCF*,7X,*TANGT. FORCE*,7X,*RADIAL FORCE*,7X, DFANTAL MT.**// REINT 113 PRINT 111,(FEC1),I=1,Å) 600 FORMAT(30X,*GENERAL 17ED IMERITAL FORCES F1 AT NON-BASE NODES*./! PRINT 404 REINT 4000,(P1(1),I=1,N) PFINT 9 405 FORMAT(30X,*GENERAL 17ED IMTERMAL FORCES F2 AT NON-BASE NODES*./! PRINT 600,(P1(1),I=1,N) 405 FORMAT(30X,*GENERAL 17ED INTERMAL FORCES F2 AT NON-BASE NODES*./! PRINT 405 PRINT 405 PRINT 600,(P2(1),I=1,N) 405 FORMAT(30X,*GENERAL 17ED INTERMAL FORCES AT NON-BASE NODES*./! PRINT 600,(P1),I=1,N) 405 FORMAT(30X,*GENERAL 17ED EXTERMAL FORCES AT NON-BASE NODES*./! PRINT 600,(P2(1),I=1,N) 407 FORMAT(30X,*GENERAL 17ED EXTERMAL FORCES AT NON-BASE NODES*./! PRINT 600,(P2(1),I=1,N) 408 FORMAT(30X,*GENERAL 17ED EXTERMAL FORCES AT NON-BASE NODES*./! PRINT 600,(P2(1),I=1,N) 409 FORMAT(40X,*SEREAL 17ED EXTERMAL FORCES AT NON-BASE NODES*./! PRINT 600,(P2(1),I=1,N) 407 FORMAT(40X,*SEREAL 17ED EXTERMAL FORCES AT NON-BASE NODES*./! PRINT 500 PRINT 500 PRINT 500 PRINT 500 PRINT 507 PRINT 507 PRINT 509 PRINT 509 PRIN		PRINT 114, (((N-1))
<pre> 115 CORMAT(/.10X.*GROUND T)TSPLATEMENT =*.G15.5.*IN./SEC/SEC*) * 115 CORMAT(/.10X.*GROUND ACCELEPATION =*.G15.5.*IN./SEC/SEC*) * 115 CORMAT(/.10X.*GROUND ACCELEPATION =*.G15.5.*IN./SEC/SEC*) * 112 CORMAT(//) 12 CORMAT(//) 12 CORMAT(//) 12 CORMAT(//) 13 COMMAT(//) 14 CORMAT(//) 14 CORMAT(//) 15 CORMAT(//) 15 CORMAT(//) 15 CORMAT(//) 15 CORMAT(//) 16 CORMAT(//) 17 CORCE+.7X.*TANGT.FORCE+.7X.*RADIAL FORCE+.7X.* 17 CORMAT(//) 18 CORMAT(//) 19 CORMAT(//) 19 CORMAT(//) 10 CORMAT(//) 10 CORMAT(//) 10 CORMAT(//) 10 CORMAT(//) 11 CORCE+.7X.*TANGT.FORCE+.7X.*RADIAL FORCE+.7X.* 11 CORMAT(//) 12 CORMAT(//) 13 CORMAT(//) 14 CORMAT(//) 14 CORMAT(//) 15 CORMAT(//) 15 CORMAT(//) 15 CORMAT(//) 16 CORMAT(//) 17 CORCE+.7X.*TANGT.FORCES F1 AT NON-BASE NODES*./) 17 CORMAT(//) 18 CORMAT(//) 18 CORMAT(//) 18 CORMAT(//) 18 CORMAT(//) 18 CORMAT(//) 18 CORMAT(//) 19 CORMAT(//) 19 CORMAT(//) 10 CORMAT(//) 12 CORMAT(//) 13 CORMAT(//) 13 CORMAT(//) 14 CORMAT(//) 15 CORMAT(//)</pre>		114 BORMAT(/,1DX,*RADIAL DISPL, AT TANK TOP#*,G15.5.*IN.*)
115 FORMAT(7,10%,*GROUND ACCELEPATION =**.G15.5,*IN./SEC/SEC*) * GPINT 5 GPINT 9 9 FORMAT(7,10%,*GROUND ACCELEPATION =**.G15.5,*IN./SEC/SEC*) 9 FORMAT(7,10%,*GROUND ACCELEPATION =**.G15.5,*IN./SEC/SEC*) 9 FORMAT(7,20%,*GROUND ACCELEPATION =**.G15.5,*IN./SEC/SEC*) 9 FORMAT(7,20%,*GROUND ACCELEPATION =**.G15.5,*IN./SEC/SEC*) 112 FORMAT(7,20%,*G10,*20%,*W*,20%,*W*,20%,*W*,20%,*W*,20%,*U/20%) 112 FORMAT(10%,*G10,*10,*7,*0%,*W*,20%,*W*,20%,*W*,20%,*U/20%) 112 FORMAT(10%,*G10,*FORGF*,7%,*TANGT, FORGE*,7%,*RADIAL FORCE*;7%, 112 FORMAT(10%,*AXIAL FORGF*,7%,*TANGT, FORGE*,7%,*RADIAL FORCE*;7%, 113 FORMAT(10%,*GI0,*G1),*E1,4,3) 600 FORMAT(10%,*GENERAL 17ED INTERNAL FORCES F1 AT NON-BASE NODES*./? 114 FORMAT(30%,*GENERAL 17ED INTERNAL FORCES F2 AT NON-BASE NODES*./? 115 FORMAT(30%,*GENERAL 17ED INTERNAL FORCES F2 AT NON-BASE NODES*./? 116 FORMAT(50%,*GENERAL 17ED INTERNAL FORCES AT NON-BASE NODES*./? 117 FORMAT(30%,*GENERAL 17ED INTERNAL FORCES AT NON-BASE NODES*./? 118 FORMAT(50%,*GENERAL 17ED EXTERNAL FORCES AT NON-BASE NODES*./? 119 FORM 405 119 FORMAT(50%,*GENERAL 17ED EXTERNAL FORCES AT NON-BASE NODES*./? 119 FORMAT(30%,*GENERAL 17ED EXTERNAL FORCES AT NON-BASE NODES*./? 119 FORMAT(30%,*GENERAL 17ED EXTERNAL FORCES AT NON-BASE NODES*./? 119 FORMAT(30%,*GENERAL 17ED EXTERNAL FORCES AT NON-BASE NODES*./? 119 FORMAT(40%,*AXIAL F,*,7%,*TANGT, F.*,5%,*IN-PLANE SH.*,5%, 119 FORMAT(40%,*AXIAL F,*,7%,*TANGT, F.*,5%,*IN-PLANE SH.*,5%,* 119 FORMAT(40%,*AXIAL F,*,7%,*TANGT, F.*,5%,*IN-PLANE SH.*,5%,* 119 FORMAT(40%,*AXIAL F,*,7%,*TANGT, F.*,5%,*IN-PLANE SH.*,5%,* 119 FORMAT(40%,*STRESSFS AT THETA=0.0 */) 119 FORMAT(40%,*STRESSFS AT THETA=0.0 */) 119 FORMAT(40%,*G10,4)) 119 FORMAT(40%,*G10,4)) 119 FORMAT(40%,*G10,4)) 119 FORMAT(40%,*G10,4)) 119	•	116 EORMAT(/,10X,*GROUND DISPLACEMENT =*.G15.5,*IN.*)
<pre>* BRINT 9 BPINT 9 BPINT 9 BPINT 11;(U(I), I=1,N3 BPINT 9 PERMAT(./) 11 EDRMAT(.4(5%, G16.8)] 12 EDRMAT(./) 12 EDRMAT(./) 12 EDRMAT(./) 13 EDRMAT(./) 13 EDRMAT(./) 14 EDRMAT(./) 15 EDRMAT(./) 15 EDRMAT(./) 15 EDRMAT(./) 15 EDRMAT(./) 16 EDRMAT(.2(1%, 4X)AL FDRCF+,7%, *TANGT. FDRCE+,7%, *RADIAL FORCE+;7%, BPINT 132 PPINT 133 PPINT 131.(FB(I), I=1,4) 600 EDRMAT(12(1%, 40%, 40%, 40%, 40%, 40%, 40%, 40%, 40</pre>		115 BORMAT(/,10X,*GROUND ACCELEPATION =*+G15.5,*IN./SEC/SEC*)
<pre>HPINT 12 HPINT 11: HPINT 11: HPINT 11: HPINT 12 HPINT 12 HPINT 12 HPINT 12 HPINT 12 HPINT 12 HPINT 12 HPINT 12 HPINT 12 HPINT 13 HPINT 13</pre>		RRINT 9
<pre>Hartst 111(0))) Print 9 9 9 9 9 9 9 9 9 9 9 111 12 112 9 112 9 112 9 112 9 112 9 112 9 113 9 113 9 114 113 9 113 9 113 113 113 113 11</pre>		BRINT 12 BRINT 111 / //////
9 ÉGRMAT(7/) 11 GRMAT(4(5%,G16.8)) 12 EFRMAT(7,15%,G16.8)) 12 EFRMAT(7,15%,FTFERNAL GEMERALIZED FORCES AT RASE*./) PTINT 112 FORMAT(10%,*AX1AL FORCE*,7%,*TANGT. FORCE*.7%,*RADIAL FORCE*.57%, GRAXTAL MT.*./ RRINT 113 PRINT 113 PRINT 113 PAINT 113 PAINT 113 PAINT 113 PAINT 113 PAINT 113 PAINT 113 PAINT 113 PAINT 404 404 FORMAT(12(1%,G10.4)) PFINT 9 405 FORMAT(30%,*GENERALIZED INFERIAL FORCES F1 AT NON-BASE NODES*./! PFINT 404 PFINT 404 PFINT 404 PFINT 4060,(P1(1),1=1.%) 405 FORMAT(30%,*GENERALIZED INTERNAL FORCES F2 AT NON-BASE NODES*./! PFINT 600,(P2(1),1=1.%) 406 FORMAT(30%,*GENERALIZED INTERNAL FORCES AT NON-BASE NODES*./! PFINT 406 PRINT 600,(P2(1),1=1.%) 407 FORMAT(30%,*GENERALIZED EVTERNAL FORCES AT NON-BASE NODES*./! PFINT 9 407 FORMAT(30%,*GENERALIZED EVTERNAL FORCES AT NON-BASE NODES*./! PFINT 9 407 FORMAT(30%,*GENERALIZED EVTERNAL FORCES AT NON-BASE NODES*./! PFINT 9 509 FORMAT(30%,*GENERALIZED EVTERNAL FORCES AT NON-BASE NODES*./! PFINT 9 509 FORMAT(4%,*AX1AL F.*,7%,*TANGT, F.*,5%,*IN-PLANE SH.*,5%, 0 *AX1AL MT.*,5%,*TANGT, MT.*,7%,*TOPSICN*./! 508 FORMAT(//,40%,* STRESSES AT THETA=0.0 *./! PFINT 509 PFINT 500 PFINT 500 PFINT 500 PFINT 500 PFINT 500 PFINT 50		BRINT 9
<pre>111 ERRMAT(4(5), 6(6,6)) 12 ERRMAT(/,15X,*U*,20X,*V*,20X,*V*,20X,*EW/DZ*) 112 ERRMAT(/,15X,*U*,20X,*V*,20X,*V*,20X,*EW/DZ*) 113 FROMAT(10X,*AXIAL FORCE*,7X,*TANGT. FORCE*,7X,*RADIAL FORCE*;7X, 0#AXIAL MT.**/ RTINT 113 RETNT 104 RETNT 9 404 FORMAT(12(1X,610.4)) RETNT 600.(P1(1),1=1.N) PETNT 600.(P1(1),1=1.N) PETNT 600.(P2(1),1=1.N) RETNT 600.(P2(1),1=1.N) 405 FORMAT(30X,*GENERALIZED INTERNAL FORCES F2 AT NON-BASE NODES*./1 RETNT 600.(P2(1),1=1.N) 406 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./1 RETNT 600.(P2(1),1=1.N) 407 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./1 RETNT 600.(P(1),1=1.N) 407 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./1 RETNT 600.(P(1),1=1.N) 407 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./1 RETNT 600.(P(1),1=1.N) 9 PETNT 9 407 FORMAT(4X,*AXIAL F.*,7X,*TANGT, F.*,5X,*IN-PLANE SH.*,5X, 0 *AXIAL MT.*,7X,*TANGT, MT.*,7X,*TOPSIEN*./1 508 FORMAT(//,40X,* STRESSES AT THETA=0.0 *./1 RETNT 509 RETNT 509 RETURN 509 RETURN END </pre>		9 EORMAT (77)
12 ERRMAT(/,15%, U*,20%,*V*,20%,*W*,20%,*EWDZ*) 112 FORMAT(/,25%,*EXTERNAL FEREAL FEREAL IZED FORCES AT RASE*./) 9 RINT 113 9 RINT 200, (P1(1),I=1,N) 9 RINT 405 9 RINT 500 9 RINT 509 9 RINT 505 9 RINT 5		111 EORMAT(4(5x,G16.8))
112 FORMAT(7,25%, #XTERNAL CEMERALIZED FORCES AT RASE*./) 113 FORMAT(10%,*AXIAL FORCE*.7%,*TANGT. FORCE*.7%,*RADIAL FORCE*.57%, 0*AXIAL MT.*// RFINT 113 PDINT 111.(FB(1),I=1,4) 600 FORMAT(12(1%,G10.4)) HDINT 9 404 FORMAT(50%,*GENERALIZED INTERTIAL FORCES P1 AT NON-BASE NODES*./! PFINT 404 RPINT 404 RPINT 600.(P1(1),I=1,N) PFINT 9 405 FORMAT(30%,*GENERALIZED INTERNAL FORCES P2 AT NON-BASE NODES*./! PRINT 405 PRINT 405 PRINT 4060.(P2(1),I=1,N) 406 FORMAT(50%,*GENERALIZED INTERNAL FORCES AT NON-BASE NODES*./! PRINT 600.(P2(1),I=1,N) 407 FORMAT(30%,*GENERALIZED E%TERNAL FORCES AT NON-BASE NODES*./! PRINT 600.(P2(1),I=1,N) 9 PDINT 407 PDINT 600.(PEXT(1),I=1,N) 9 PDINT 600.(PEXT(1),I=1,N) 9 FINT 407 PDINT 600.(PEXT(1),I=1,N) 9 FINT 407 PDINT 500 FORMAT(7,40%,*STRESSES AT THETA=0.0 *./) 7 RFINT 500 PRINT 500 PRINT 500 PRINT 505.(STREI(1),T=1,NST) 508 FORMAT(4/,30%,*STRESSES AT THETA=0.0 ES*./! PRINT 509 RFINT 505.(STREI(1),T=1,NST) 505 FORMAT(4/,30%,*STRESSES AT THETA=0.0 ES*./! 9 RFINT 505 PRINT 505.(STREI(1),T=1,NST) 505 FORMAT(4/,30%,*STRESSES AT THETA=0.0 ES*./! PRINT 505 PRINT 5		12 BORMAT(/,15X,+U+,20X,+V+,20X,+W+,20X,+CW/DZ+)
<pre>BPINT 132 113 FORMAT(10x; +AXIAL FORCE+,7x, +TANGT, FORCE+,7x, *RADIAL FORCE+\$7x, 0*AXTAL MT.*./) RRINT 113 PRINT 113 PRINT 113 PRINT 113 (FB(1),1=1,4) 000 FORMAT(12(1x,G10.4)) RPINT 9 404 FORMAT(10x, *GENERAL 17FD IMERTIAL FORCES F1 AT NON-BASE NODES*./) PRINT 600,(P1(1),1=1,N) 405 FORMAT(30x,*GENERAL 17ED INTERNAL FORCES F2 AT NON-BASE NODES*./) RRINT 405 PRINT 600,(P2(1),1=1,N) 406 FORMAT(50x.* P1+P2*./) RRINT 406 PRINT 600,(P(1),1=1,N) 9 PPINT 9 407 FORMAT(30x,*GENERAL 17ED EXTERNAL FORCES AT NON-BASE NODES*./) PPINT 9 407 FORMAT(30x,*GENERAL 17ED EXTERNAL FORCES AT NON-BASE NODES*./) PPINT 407 PRINT 600,(PEXT(1),1=1,N) 9509 FORMAT(4x,*AXIAL F.*,7X,*TANGT, F.*,5X,*1N-PLANE SH.*,5X, C *AXIAL MT.*,5X,*TANGT, MT.*,7X,*TOPSICN*./) 507 FORMAT(4x,*AXIAL F.*,7X,*TANGT, F.*,5X,*1N-PLANE SH.*,5X, C *AXIAL MT.*,5X,*TANGT, MT.*,7X,*TOPSICN*./) PPINT 507 PRINT 507 PRINT 507 PRINT 509 RPINT 509 RP</pre>	-	112 FORMAT(/,25X,*FXTERNAL GENERALIZED FORCES AT BASE*+/)
115 FURNET (11, ATTACT FURNET ALTERNAL FORCES AT NON-BASE NODES*./) RRINT 113 PRINT 111, (FB(1), I=1, 4) 600 CORMAT(30X, *GENERALIZED INTERNAL FORCES P1 AT NON-BASE NODES*./) PRINT 404 RPINT 600, (P1(1), I=1, N) PRINT 9 405 FORMAT(30X, *GENERALIZED INTERNAL FORCES P2 AT NON-BASE NODES*./) RRINT 405 RRINT 405 RRINT 406 PRINT 600, (P2(1), I=1, N) 9 407 FORMAT(50X, *GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./) PRINT 9 407 FORMAT(30X, *GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./) PRINT 406 PRINT 407 PPINT 407 PPINT 407 PPINT 407 PPINT 90, (PEXT(1), I=1, N) 507 FORMAT(40, *AXIAL F, *, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 5½, 0 *AXIAL MT.*, 5½, *IANGT, MT.*, 7½, *TANGT, F, *, 5½, *IN-PLANE SH.*, 51, 50, 50, 50, 50, 50, 50, 50, 50, 50, 50		BRINT 112 ATT FORMATCION HAVIAL FORFEL TY STANGE FORCES, TY SPADIAL FORCESTATA
<pre>RRINT 113 PRINT 113.(FB(1),1=1,4) 600 FORMAT(12(1X,G10.4)) PRINT 9 404 FORMAT(30X,*GENERALIZED INTERTIAL FORCES F1 AT NON-BASE NODES*.// PRINT 404 RPINT 400.(P1(1),1=1,N) 405 FORMAT(30X,*GENERALIZED INTERNAL FORCES P2 AT NON-BASE NODES*./) RRINT 600.(P2(1),1=1,N) 406 FORMAT(50X,* P1+P2*./) RRINT 406 PRINT 406 PRINT 406 PRINT 406 PRINT 600.(P(1),1=1,N) 9 P1NT 9 407 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./) PDINT 9 407 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./) PDINT 9 509 FORMAT(X:*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./) PDINT 407 PRINT 600.(PEXT(1).1=1.N) 9509 FORMAT(X:*AXIAL F.*.7X.*TANGT, F.*.5X.*IN-PLANE SH.*.5X. 0 *AXIAL MT.*.5X.*TANGT, MT.*.7X.*TOPSICN*./) 507 FORMAT(//.40X.* STAFSSFS AT THETA=0.0 *./) PRINT 509 PRINT 509 RPINT 505.(STRPI(1).1=1.N\$T) 505 FORMAT(6(5X.GI0.4)) RETURN END</pre>	•	110 FURNALLUA, FRAINE FURUFA, AFAIANO, SURVER, AFAIABURE SURVERS
PRINT 111.(FB(1), I=1, 4) 600 FORMAT(12(1X,G10.4)) HPINT 9 404 FORMAT(30X,*GENERALIZED INTERTIAL FORCES F1 AT NON-BASE NODES*./! PRINT 600,(P1(1),I=1,N) PPINT 9 405 FORMAT(30X,*GENERALIZED INTERNAL FORCES F2 AT NON-BASE NODES*./! PRINT 405 PRINT 405,(P2(1),I=1,N) 406 FORMAT(50X,* P1+P2*./1 RFINT 600,(P2(1),I=1,N) PPINT 406 PRINT 600,(P1(1),I=1,N) PFINT 406 PRINT 600,(P1(1),I=1,N) PFINT 407 PFINT 406 PRINT 600,(PEXT(1),I=1,N) PFINT 407 PFINT 600,(PEXT(1),I=1,N) 9 5n9 FORMAT(30X,*AGENERALIZED E*TERNAL FORCES AT NON-BASE NODES*./! PFINT 600,(PEXT(1),I=1,N) 9 5n9 FORMAT(4X,*AXIAL F.*,7X,*TOPSICN*./! 507 FORMAT(4X,*AXIAL F.*,7X,*TOPSICN*./! 507 FORMAT(//.40X,* STRESSES AT THETA=0.0 *./!) RFINT 509 PFINT 509 PFINT 505,(STRPI(1),I=1,N\$T) 508 FORMAT(//.30X,*STRESSES AT THETA=90.0 DEGREES*./!) PRINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 505,(STRPI(1),I=1,N\$T) 505 FORMAT(6(5X,G10.4)) RFTURN END		BRINT 113
600 FORMAT(12(1X,G10.4)) RFINT 9 404 FORMAT(30X,*GENERALIZED INTERTIAL FORCES F1 AT NON-BASE NODES*./ PRINT 404 RPINT 600,(P1(1),I=1.N) PFINT 9 405 FORMAT(30X,*GENERALIZED INTERNAL FORCES F2 AT NON-BASE NODES*./ RRINT 405 PRINT 600,(P2(1),I=1.N) 406 FORMAT(50X,*P1+P2*./ RRINT 406 PRINT 600,(F(1),I=1.N) 9 PPINT 600,(F(1),I=1.N) 407 FORMAT(30X,*GENERALIZED E*TERNAL FORCES AT NON-BASE NODES*./ RRINT 407 PPINT 407 PPINT 600,(PEXT(1),I=1.N) 509 FORMAT(4X,*AXIAL F.*,7X,*TANGT, F.*,5X, *IN-PLANE SH.*,5X, 0 *AXIAL MI.*,5X,*TANGT, MT.*,7X,*TOPSICN*./) 507 FORMAT(4X,*AXIAL F.*,7X,*TANGT, F.*,5X, *IN-PLANE SH.*,5X, 0 *AXIAL MI.*,5X,*TANGT, MT.*,7X,*TOPSICN*./) 508 FORMAT(4X,*AXIAL F.*,7X) FORMAT(4X,*AXIAL F.*,7X) FORMAT(4X,*AXIAL F.*,7X) 508 FORMAT(4X,*AXIAL F.*,7X) 509 FORMAT(5,5TEP(1),1=1,NST) 509 FORMAT(5,5X,*I,1=1,NST) 509 FORMAT(6(5X,G10.4)) RETURN END		ARINT 111, (FB(1), 1=1,4)
<pre>HPINT 9 404 FORMAT(30X,*GENERALIZED INTERTIAL FORCES P1 AT NON-BASE NODES*./! BFINT 404 RPINT 600,(P1(1),I=1,N) 9 405 FORMAT(30X,*GENERALIZED INTERNAL FORCES P2 AT NON-BASE NODES*./! RRINT 405 PRINT 406 BRINT 600,(P2(1),I=1,N) 406 FORMAT(50X.* P1+P2*./4 RFINT 9 9 PFINT 406 BRINT 600,(P(1),I=1,N) 9 9 PFINT 406 PRINT 600,(P(1),I=1,N) 9 9 PFINT 407 PFINT 407 PFINT 407 PFINT 407 PFINT 407 C *AXIAL F.*,7X.*TANGT. F.*,5X. *IN-PLANE SH.*,5X. 0 *AXIAL MT.*,5X.*TANGT. MT.*,7X.*TOPSIEN*./! 509 FORMAT(7Z.*AXIAL F.*,7X.*TANGT. F.*,5X. *IN-PLANE SH.*,5X. 0 *AXIAL MT.*,5X.*TANGT. MT.*,7X.*TOPSIEN*./! 507 FORMAT(7Z.*AXIAL F.*,7X.*TANGT. F.*,5X.*IN-PLANE SH.*,5X. 0 *AXIAL MT.*,5X.*TANGT. MT.*,7X.*TOPSIEN*./! 507 FORMAT(7Z.*AXIAL F.*,7X.*TANGT. MT.*,7X.*TOPSIEN*./! S08 FORMAT(7Z.*AXIAL STRESSES AT THETA=0.0 *./! RFINT 509 PFINT 509 PFINT 505 RFINT 509 RFINT 505 (STRFI(1).1±1.NST) 505 FORMAT(7C.*GIA.4!) RFTURN END</pre>		600 FORMAT(12(1X,G10.4))
404 FORMAT(30X,*GENERALIZED INTERIAL FORCES P1 AT NON-BASE NODES*,// BFINT 404 RPINT 600,(P1(1),I=1,N) 9405 FORMAT(30X,*GENERALIZED INTERNAL FORCES P2 AT NON-BASE NODES*,/ PRINT 405 PRINT 405 PRINT 600,(P2(1),I=1,N) 406 FORMAT(50X,* P1+P2*,/ PRINT 90 907 FORMAT(50X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*,/ PRINT 600,(P(1),I=1,N) 907 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*,/ PRINT 600,(PEXT(I),I=1,N) 910 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*,/ 9509 FORMAT(40X,*AXIAL F.*,7X,*TANGT, F.*,5X, *IN-PLANE SH.*,5X, 0 *AXIAL MT.*,5X,*TANGT, MY.*,7X,*TOPSICN*,/) 507 FORMAT(7,.40X,* STRESSES AT THETA=0.0 *,/) PRINT 507 PRINT 507 PRINT 508 PRINT 508 PRINT 508 PRINT 508 PRINT 508 PRINT 508 PRINT 509 PRINT 508 PRINT 508 PRINT 508 PRINT 508 PRINT 509 PRINT 508 PRINT 509 PRINT 508 PRINT 508 PRINT 508 PRINT 509 PRINT 508 PRINT 509 PRINT 508 PRINT 508 PRINT 509 PRINT 508 PRINT 509 PRINT 508 PRINT 509 PRINT 508 PRINT 509 PRINT 508 PRINT 508 PRINT 508 PRINT 508 PRINT 509 PRINT 508 PRINT 509 PRINT 508 PRINT 508 PRINT 509 PRINT 508 PRINT 508 PRINT 508 PRINT 508 PRINT 508 PRINT 509 PRINT 508 PRINT 508 P		RPINT 9
<pre>PRINT 404 RPINT 600,(P1(1),I=1,N) PRINT 9 405 FORMAT(30X,*GENERALIZED INTERNAL FORCES P2 AT NON-BASE NODES*./) PRINT 405 PRINT 405 PRINT 406 PRINT 9 PPTNT 9 407 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./) PPTNT 9 407 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./) PPTNT 9 407 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./) PPTNT 9 509 FORMAT(4X,*AXIAL F.*,7¥,*TANGT, F.*,5X, *IN-PLANE SH.*,5X, Q *AXIAL MT.*,5X,*TANGT, MT.*,7X,*TOPSICN*./) 507 FORMAT(//,40X,* STRESSES AT THETA=0.0 *./) PPTNT 509 PPTNT 509 PPTNT 509 PPTNT 505.(STRFI(1).1=1.NST) 505 FORMAT(//,30X,* STRESSES AT THETA=90.0 DEGREES*./) PRINT 509 PPTNT 505.(STRFI(1).1=1.NST) 505 FORMAT(6(5X,GI0.4)) RETURN END</pre>		404 BORMAT(30X, *GENERALIZED INERTIAL FORCES P1 AT NON-BASE NODES*,/)
<pre>RPINT 600.(P1(1), I=1,N) PRINT 9 405 FORMAT(30X, *GENERALIZED INTERNAL FORCES F2 AT NON-BASE NODES*.// RRINT 405 BRINT 600.(P2(1), I=1,N) 406 FORMAT(50X,* P1+P2*./f RRINT 9 RPINT 406 BRINT 600.(P(1), I=1,N) PRINT 500.(P(1), I=1,N) PRINT 500.(PEXT(1), I=1,N) PRINT 407 RPINT 407 RPINT 600.(PEXT(1), I=1,N) PRINT 407 RPINT 600.(PEXT(1), I=1,N) 9 509 FORMAT(4X, +AXIAL F.*,7X,*TANGT, F.*,5X, *IN-PLANE SH.*,5X, 0 *AXIAL MT.*,5X,*TANGT, MT.*,7X,*TOPSICN*,7) 507 FORMAT(7/,40X,* STRESSES AT THETA=0.0 *.7) RPINT 507 PRINT 507 PRINT 507 RPINT 509 RPINT 509 RPINT 505.(STRPI(1), I=1,NST) 505 FORMAT(6(5X,G10,4)) RFTURN END</pre>		BRINT 404
PRINT 9 405 FORMAT(30X,*GENERALIZED INTERNAL FORCES F2 AT NON-BASE NODES*./ PRINT 405 PRINT 600,(P2(1),I=1,N) 406 FORMAT(50X,* P1+P2*./1 RFINT 600,(P(1),I=1,N) PRINT 406 PRINT 600,(P(1),I=1,N) 407 FORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*./2 PRINT 407 PRINT 600,(PEXT(1),I=1,N1 PRINT 600,(PEXT(1),I=1,N1 PRINT 600,(PEXT(1),I=1,N1 PRINT 600,(PEXT(1),I=1,N1 PRINT 502 C *AXIAL MT.*,5X,*TANGT. MT.*,7X,*TOPSICN*./2 507 FORMAT(//,4UX,* STRESSES AT THETA=0.0 *./2 PRINT 509 PRINT 509 PRINT 509 PRINT 509 RFINT 509 RF		RPINT 600, (P1(1), I=1, N)
405 ENEMATION, GENERALIZED INTERNAL FORCES AT NON-BASE NODES*. RRINT 405 RRINT 600, (P2(I), I=1, N) 406 EORMAT(50X.* Pj+P2*./) RRINT 9 PFINT 406 BRINT 600, (P(I), I=1, N) 9 407 EORMAT(30X.* GENERALIZED E*TERNAL FORCES AT NON-BASE NODES*./) RPINT 407 PPINT 407 PPINT 400, (PEXT(I), I=1, N) 9		PRINT 9 ADD DODALT TON ADDITION ATTENANT CODOES DO AT NON-DUSE NODES+ /A
PRINT 500, (P2(I), I=1, N) 406 EORMAT(50X,* P1+P2*, /) PFINT 406 PRINT 600, (P(I), I=1, N) 9DINT 9 407 EORMAT(30X,*GENERAL IZED E*TERMAL FORCES AT NON-BASE NODES*, /) PFINT 407 PRINT 600, (PEXT(I), I=1, N) 9DINT 9 509 EORMAT(4X, +AXIAL F. +, 7X,*TANGT, F. +, 5X, *IN-PLANE SH.*, 5X, 0 *AXIAL MT.*, 5X,*TANGT, MT.*, 7X,*TOPSICN*, /) 507 EORMAT(//, 40X, + STRESSES AT THETA=0.0 *, /) PRINT 507 PRINT 509 PRINT 509 PRINT 509 PRINT 509 PRINT 508 EORMAT(//, 30X,* STRESSES AT THETA=90.0 DEGREES*, /) PRINT 509 PRINT 509 REINT 509 REINT 509 REINT 509 REINT 509 REINT 509 REINT 505, (STREI(I), I=1, N\$T) 505 EORMAT(6(5X,GI0.4)) RETURN END		405 BIRMAT(30X, *GENERALIZED INTERMAL FUNCTS FZ AT NON-DASE NUDES FIF
406 EORMAT(50X.* P1+P2*,/ RFINT 9 PFINT 406 PFINT 406 PFINT 600,(P(1),I=1.N) 9DINT 9 407 EORMAT(30X.*GENERALIZED E*TERMAL FORCES AT NON-BASE NODES*,/) PFINT 407 PFINT 600,(PEXT(1),I=1.N) 9509 EOPMAT(4X,*AXIAL F.*,7X.*TANGT. F.*.5X. *IN-PLANE SH.*.5X. 0 *AXIAL MT.*.5X.*TANGT. MT.*.7X.*TOPSICN*,/) 507 EORMAT(//,40X,* STRESSES AT THETA=0.0 *./) RFINT 507 PRINT 509 PRINT 508 PRINT 508 PFINT 509 PRINT 509 PRINT 509 PRINT 509 PRINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 505,(STRPI(1),I=1.N\$T) 505 EORMAT(6(5X.GI0.4)) RETURN END		RRINT 600.(P2(1), I=1, N)
PFINT 9 PFINT 406 PRINT 600.(F(1), I=1.M) 9 9 407 FORMAT(30X.*GENERAL 12FD E*TERMAL FORCES AT NON-BASE NODES*./) AD7 FORMAT(30X.*GENERAL 12FD E*TERMAL FORCES AT NON-BASE NODES*./) PD1NT 9 \$109 FORMAT(4X.*AXIAL F.*.7X.*TONST. F.*.5X.*IN-PLANE SH.*.5X. 0 *AXIAL MT.*.5X.*TANGT. MT.*.7X.*TONSIEN*./) 507 FORMAT(//.40X.* STRESSES AT THETA=0.0 *./) AD7 FORMAT(//.40X.* STRESSES AT THETA=0.0 *./) PRINT 509 PRINT 507 PS08 FORMAT(//.30X.* STRESSES AT THETA=90.0 DEGREES*./) PRINT 509 PFINT 509 RPINT 509 RPINT 505.(STRPI(1).1=1.N\$T) 505 FORMAT(6(5X.GI0.4)) RETURN END		406 EORMAT(50X,* P1+P2*,/1
PFINT 406 PRINT 600,(P(1), I=1,N) PRINT 9 407 EORMAT(30%,*GENERALIZED E*TERMAL FORCES AT NON-BASE NODES*//) PFINT 407 PFINT 600,(PEXT(I), I=1,N1 PFINT 9 509 EORMAT(4%,+AXIAL F.+,7%,*TANGT, F.*,5%, *IN-PLANE SH.*,5%, 0 *AXIAL MT.*,5%,*TANGT, MT.*,7%,*TOPSICN*//) 507 EORMAT(//,40%,* STRESSES AT THETA=0.0 *//) PRINT 509 PRINT 509 PRINT 509 PRINT 508 PRINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 509 RFINT 505,(STRFI(I),I=T,N\$T) 505 EORMAT(6(5%,GI0.4)) RFTURN END		BRINT 9
BRINT 600, (F(1), 1=1,N) PPINT 9 407 EORMAT(30X,*GENERALIZED EXTERNAL FORCES AT NON-BASE NODES*//) PPINT 407 PPINT 407 PPINT 600, (PEXT(1), 1±1,N') PPINT 500, (PEXT(1), 1±1,N') 9509 EORMAT(4X,*AXIAL F.*,7X,*TANGT, F.*,5X', *IN-PLANE SH.*,5X', Q *AXIAL MT.*,5X,*TANGT, MT.*,7X,*TOPSICN*//) 507 EORMAT(//,40X,* STRESSES AT THETA=0.0 *//) PRINT 507 PRINT 507 PRINT 507 PRINT 507 PRINT 509 PRINT 508 PRINT 509 RPINT 509 RPINT 505,(STRPI(1),1=1,NST) 505 EORMAT(6(5X,G10.4)) RETURN END	~~~~	PPINT 406
<pre>#07 EORMAT(30%,*GENERALIZED E*TERMAL FORCES AT NON-BASE NODES*//) #07 #PINT 407 #PINT 600.(PEXT(I).I±1.N' #PINT 9 509 EORMAT(4%,*AXIAL F.*,7%,*TANGT. F.*,5%, *IN-PLANE SH.*,5%. @ *AXIAL MT.*,5%,*TANGT. MT.*,7%,*TOPSICN*//) 507 EORMAT(//,40%,* STRESSES AT THETA=0.0 */) #PINT 507 #PINT 509 #PINT 509 #PINT 508 #PINT 508 #PINT 508 #PINT 509 #PINT 509 #PINT 509 #PINT 509 #PINT 505.(STRPI(I).I±1.NST) 505 EORMAT(6(5%,GI0.4)) #FTURN END</pre>		PRINT 600, (F(1), 1=1, N)
PPINT 407 PPINT 600.(PEXT(I).I±1.N' PPINT 9 S09 FORMAT(4X, *AXIAL F.*,7X.*TANGT. F.*,5X. *1N-PLANE SH.*,5X. Q *AXIAL MT.*,5X,*TANGT. MT.*,7X.*TOPSICN*//) 507 FORMAT(//,40x,* STRFSSFS AT THETA=0.0 *./) RETNT 507 PRINT 505 PRINT 507 PRINT 507 PRINT 507 PRINT 507 PRINT 508 PRINT 509 PRINT 505.(STP(I).1=1.MST) 508 FORMAT(//.30X,* STRFSSFS AT THETA=90.0 DEGREES*./) RETINT 508 PRINT 509 RETINT 509 RETINT 508 PRINT 509 RETINT 508 RETINT 509 RETINT 508 RETINT 509 RETINT 509 RETINT 505.(STRFI(I).I=1.NST) 505 FORMAT(6(5X.G10.4)) RETURN END		ANT BORMAT (30%, *GENERAL IZED EXTERNAL FORCES AT NON-BASE NODES*//)
RPINT 600.(PEXT(I).I±1.N1 PPINT 9 509 FORMAT(4X, +AXIAL F. +, 7Y. *TANGT. F. *, 5X. *IN-PLANE SH. +, 5X. 0 *AXIAL MT.*, 5X.*TANGT. MT.*, 7X.*TOPSICN*, 7) 507 FORMAT(77.40, * STRESSES AT THETA=0.0 *.7) RPINT 507 PRINT 509 PRINT 505.(STP(I).1=f.NST) 508 FORMAT(77.30X,* STRESSES AT THETA=90.0 DEGREES*.7) REINT 509 PRINT 507 REINT 509 REINT 509 REINT 509 REINT 508 REINT 509 REINT 508 REINT 509 REINT 505.(STRPI(I).1=1.NST) 505 FORMAT(6(5X,G10.4)) RETURN END		BPINT 407
<pre>BPINT 9 509 EORMAT(4x,+axia) F.+,7y'.*TANGT. F.*,5x'. *IN-PLANE SH.*,5x. Q *AXIAL MT.*,5x,*TANGT. MT.*,7x,*TOPSICN*,7) 507 EORMAT(//,40x,* STRESSES AT THETA=0.0 *'./) ARTNT 507 PRINT 509 PRINT 505.(STR(1).1=f'.NST) 508 EORMAT(//.30X,* STRESSES AT THETA=90.0 DEGREES*./) PRINT 508 PFINT 509 RPINT 505.(STRFI(1).1=T'.NST) 505 EORMAT(6(5x'.G10.4)) RETURN END</pre>		RRINT 600. (PEXT(I), I±1.N)
509 FOPMAT(4X, +AXIAL F.+, 7X, *TANGT. F.*, 5X, *IN-PLANE SH.*, 5X, 0 *AXIAL MT.*, 5X, *TANGT. MT.*, 7X, *TOPSICN*, 7) 507 FORMAT(77, 40X, * STRFSSFS AT THETA=0.0 *, 7) RETNT 507 PRINT 507 PRINT 505, (STP(1), 1=f, NST) 508 FORMAT(77, 30X, * STRFSSFS AT THETA=90.0 DEGREES*, 7) RETNT 508 PRINT 508 PRINT 509 RPINT 505, (STRPI(1), 1=1, NST) 505 FORMAT(6(5X, G10.4)) RETURN END		APINT 9
Q *AXIAL MT.*,5X,*TANGT. MT.*,7X,*TOPSICN*,7) 507 EORMAT(//,4UX,* STRESSES AT THETA=0.0 *,/) RPINT 507 PRINT 509 PRINT 505,(STP(I),I=f.NST) 508 EORMAT(//,30X,* STRESSES AT THETA=90.0 DEGREES*,/) RTINT 508 PRINT 509 RPINT 505,(STRPI(I),I=T.NST) 505 EORMAT(6(5X,G10.4)) RETURN END		509 EDRMAT(4X, +AXIAL F. +, 7X. +TANGT, F. +, 5X. +IN-PLANE SH. +, 5X.
507 BURMAI(//,40X,* STRESES AT THETA=0.0 *,77 RRINT 507 PRINT 505;(STP(I):1=1:NST) 508 BORMAT(//,30X,* STRESES AT THETA=90.0 DEGREES*:/) RRINT 508 PRINT 508 RPINT 505;(STREI(I):1=1:NST) 505 BORMAT(6(5X:G10.4)) RFTURN END		Q *AXIAL MT. *, 5X, *TANGT. MT. *, 7X, *TOPSICN*, 7)
RFINE 207 RFINE 509 PRINT 505,(STR(1),1=1.NST) 508 BORMAT(77,30X,* STRESSES AT THETA=90.0 DEGREES*.7) RFINE 508 RFINE 509 RFINE 505,(STREI(1),1=1.NST) 505 FORMAT(6(5X,G10.4)) RFTURN END		50/ BURMAI(//,40X)* SIRESSES AL LECTAFU.U *1/7
PRINT 505.(STP(I).1=f.NST) 508 EORMAT(//.30X.* STRESSES AT THETA=90.0 DEGREES*./) RETINT 508 PRINT 509 RPINT 505.(STRPI(I).1=1.NST) 505 EORMAT(6(5X.G10.4)) RETURN END		RRINT 509
508 EORMAT(//,30X,* STRESSES AT THETA=90.0 DEGREES*,/) REINT 508 REINT 509 REINT 505,(STREI(I),I=1.NST) 505 EORMAT(6(5X,G10.4)) RETURN END		PRINT 505, (STP(I), 1=1.MST)
PRINT 508 PRINT 509 RPINT 505.(STRPI(J).1*1.N\$T) 505 EORMAT(6(5X.G10.4)) RETURN END		508 BORMAT(//,30X,+ STRESSES AT THETA=90.0 DEGREES+,/)
PRINT 509 RPINT 505.(STRPI(T).I≍T.NST) 505 EORMAT(6(5X.G10.4)) RETURN END		PRINT 508
RFINI DUD: (SIRFIC): 1=1.NDI) 505 EORMAT(6(5X.G10.4)) RETURN END		BRINT 509
		$\frac{RPINI 505 (SIRPI(!) 171 NP1)}{505 CDDMAT(475 10 41)}$
C (191)		5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		$\mathbb{C}_{1,0,1}$

<u>0 15</u>	J=1,M			·	······
00 10	$\frac{IT=1, NT}{DAT(IT)=DT}$				
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!	SUBROUTINE EFEMASSISTIE, SM, BETE, BMASS.N.NB, AZ	2,A1,STBB,BUF)
	DIMENSION UA(4), UF (36) DIMENSION CM(32, 36), RETE(36,4), RMASS(36,4), A2	(36-4)-STIF(36-36)
-	$ \begin{array}{c} \text{BIMENSION ST(36,36)} \\ \end{array} $	
;	DIMENSION AT(36,4)	
)	BIMENSION STBR(4,4), BUD(4)	
	BUD(1)=BUD(4)=0.0 BUD(2)==1.0 & BUB(3)±1.0	
,	3 BORMAT(12(1X,G10.4))	
•	BO 6 I=1,4	
	$\frac{00.6}{6} \frac{1}{1}$	
1	CALL INVERSION SUBPOUTINE FOR STIF	
	DALL INVMT(STIF, N, N. 36. DET)	
¥	GHERE STIF IS THE INVERSION OF THE ORTGINAL	MATRIX
	*A1*K-2 KR	
	BO 10 J=1,NR	
1	A1(T,J) = 0.0	
	BO 10 K=1,N	
	$\frac{10 \text{ A1}(1, J) = \text{A1}(1, J) + \text{STIF}(J, K) + \text{BSTF}(K, J)}{10 \text{ A1}(1, J) = \text{A1}(1, J) + \text{STIF}(J, K) + \text{BSTF}(K, J)}$	
	* 47=M K=1 KB	
	BO 20 J=1,NB	
-	A?(I,J)≖0.0	an ann a suis an ann ann ann ann ann ann ann ann ann
	$\frac{1}{6} \frac{1}{10} $	
2	E ARINT 5	and the second
. ·•	5 BORMATCIHI)	
J	$\frac{1}{2} \qquad \qquad$	
	$\frac{1}{3} \frac{1}{1} \frac{1}{1} \frac{1}{1} = \frac{1}{1} \frac{1}{1} \frac{1}{1} \frac{1}{1} = \frac{1}{1} $	
سر	UA(1)=UA(4)=0.	
	Ξ UA(3)=+1.0 % UA(2)=-1.0	
	2 DO 40 I=1,N	
J.	$\frac{1}{2} \qquad \qquad$	
•	$40 \forall F(1) = \forall F(1) + A2(1, J) + \forall A(J)$	
0	00 50 I=1.N	
	$\frac{UF(I)=0}{D_{C}}$	an a
	Sn UF(T)=UF(T)+BMASS(T+J)+UA(J)	
.	* ST2*+KBT K-1 KB	
	80 90 I=1.N	
Ú	$BO = 90 J=1 \cdot N$	
	RETURN	
Ĵ	END	
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						D-28	
		SURPOUTINE M	ODAN(SMASS.	ME, X, GM, N, M.	STIF.GS)	<u><u><u></u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	1999 - Antonio Antonio antone a canada e - 2 Mil. 1999 - Antonio
for Maded		DIMENSION GS	(10,10).64(*	10.10).X(36.1	0).OME(10).X	M(36,10)	
•		DIMENSION ST	IF(36,36),SM	4ASS(36,36)			
	15	FORMAI (5X, I	5)	₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽			
		00 10 1=1.N					
		YM(1.1)=0.0			۱. د		ana manalan dari dari da da da kata yana kata an A Manana da ang ma
		BO 10 K=1.N					
	10	XM(I,J)=XM(I)	, J)+SMASSIT.	KIX(K,J)		an a	
	<u> </u>	=XT * M * X			-		
		00 20 I=1.M					
		<u>DO 20 J=1.M</u>					
		BO 28 K=1.N	•				
	20	GM(1,J)=GM(1	, J)+X(K, 1)+)	(M(K,J)			
		DO 30 1=1,N					
		00 30 J=1.M					
*~~~		$\frac{XM(I,J)=0.0}{DETTO V(I,J)}$		under viss als fillen sign and sign and a second			
		- DO 30 8≡1,N -¥M(T D=×M(T	IN+STIF(I')	() * X (K !)			
		DO 40 I=1 M			ng a 1 mg a a mg a 1 mg a a a a a a a a a a a a a a a a a a 		
		Ð∩ 40 J=1,M					
		85(1,J)=0.0				*****	
and arrive		DO 40 K=1.N					
	40	88(1,J)=68(I	,J)+X(K,I)*	KM(K,J)			
:		RETURN					
<u>.</u>		END					
<u>.</u>			1944 - Span Japakan (1949) - Table Grands - Statistic - Sanatara (1944)	an a			
1 X 1							
ŭ	-	άν το πόταθεί αλατικά στο πολλατικό δεν το τρομογογια για το ποριστικό, το πολλατικό στο ποτοποι το ποιοποι το Τ	y na serien a serie de la serien en a serie de la s	nda manda afala balan da an			
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22 E E E E E E E E E E E E E E E E E E							
			D-29				
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		SUPROUTINE EXTRCI DIMENSION D(40,41)					
⊬ '	, e a consequence a constante, en ancara constante dans Brazera	READ(10)(NEREE)	n ja name kuri dan da tanan dan da nama da na maka da na kuri da nama da nama da nama na na na na na na na na m				
×i		<u>NFREEIENFREE+1</u> <u>- RFAD(10)((D(1))))J=1;NFREE1);1=1;NFREE)</u>	ر بر در واست می می از می				
		BEWIND 10					
		DO 10 JET.T					
	10	D(J.1)=D(1.J)					
		WRITE(11)(NFREF)					
		WRITE(11)((D(I,J),J=1,4),T=5,NFREE)					
	*	WRITE M WRITE(14)((D(I_J), 1=5)NEREE), 1=5, NEREE)	n sene an an ann an an Ann				
		WPITE(11)((D(I,J),J=1,4),I=1,4)	1	n an			
	al new states marked water and a second states of the second states of the	READ(10)(NEPEE)	an da martina da seconda de composito de composito de composito de composito de composito de composito de comp				
		BO 20 I=1,NFPER					
	<u>ں ب</u>	PO 20 J=2,NFREF1		944 A.			
	<i>c</i> u	DO 30 J=1,NFREE	۰ 				
		pn 30 l=1.J	29 may 24 may	er Ren			
	÷ 50	WRITE KR					
14. or	1	WPTTE(11)((D(I,J),J=1,4),1=5,NFREE)					
 	é	WRITE K WRITE(11)((P(I,J),J=5,NFRFE),1=5,NFREE)	های اعلام می از این از این				
	i ⊊	WRITE KEB					
10		NRITE (11)((U(1,J),J=T.47, t=1,47) REWIND 11					
·~ .		RETURN	99 alder anders som som anders av standarden om som forste ander ander ander ander ander ander ander av som so				
\bigcirc .		END					
0	i E E						
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$\langle \cdot \rangle$			1997 - 1992 - 1993 - 1994 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 -	· s .,			
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1. 11))		NANGAN MANANAN MANANAN MANANAN MANANAN MANANAN MANANAN MANANAN MANANAN MANANAN MANAN MANAN MANAN MANAN MANANAN	••			
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i 4		χ.					
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		D-30
and the same definition of the	SUBFOUTINE INTE(T,TO,OME,NLOAD,M,P.PIN) DIMENSION P(10).OME(10).PIN(10)	
an anti-ser telles to there and r	TH=10/2.	
	TE(NLOAD .EC. SHRECPU) GO TO 10	
an sanar ta tridana an	JE(NLOADEQ. SHIRIPU) RO TO 20	**************************************
	JE(NLOAD .ED. SHSINPU) FO TO 30	an Mardandan ang malak kapa ana panjar (mpaka kara 194 - Kanadan Akadan - Jakan da Pana da Kanadan sa Ang Kada -
	REINT 1 - REPART - TUBE OF LOAD INVALIEDT	
	1 KORMATIX TYPE OF LOAD TOVALIEDED STOP	namen a vez namen, an tro an transforme en el contro a se a nel calcular de se aparen o vez a deseñ vez a se a
	10 1F(T .LT. TC) GC TO 19	
والمستعلقات والأرباط مجرد	DO 21 I=1.M	-
-	21 PIN(I)=P(I)/OMF(I)+(COS(OME(I)+(T+TO))+COS(OME(I)+	T))
	RETURN	
	$\frac{11}{31} \frac{90}{91} \frac{51}{128} \frac{11}{128} $	
	RETURN	
	20 FECT .LT. THY GO TO 12	
	JF(T .LT. TO) GO TO 22	
	$\frac{1}{2} = \frac{1}{2} $)=SIN(OME(1)*
	C (T TO ALCINOMETING'S) AND LE SINCONCLES OF	
÷.,		
	12 00 42 I=1.M	and he appendent spatial and an an an an appendence of the providence of the provide
	42 RIN(1)=P(1)/OME(1)/TH*(T-RIN(OME(1)*T)/OME(1))	
	RETURN	
	22 DO 52 I=1.M	
ř.	52 PIN(I)=P(I)/OME(I)/TH*(TC +J+2,*SIN(CME(I)*(I+)H))	VOME(I)=SIN(UME
	Q(I)*I)/IME(I))	
	X0 P1-3 14159	
	IF(T.LT. TO) GO TO 13	
	<u>DO 23 I=1.M</u>	
	23 PIN(I)=-P(I)+P(*)/(DME(I)*)U+UME(I)*(U#PI*PI)*(SI	N(OPE(1)*(1+(0))+
	$\frac{(1+SIN(UME(1)*1))}{\text{perturb}}$	
	13 BO 33 I=1.M	
	E3 PIN(I)=P(I)*TO/(OMF(I)*TO*OME(I)*TO*PI*PI)*(OME(I)	*TO*SIN(PI*T/TO)
	Q -PI*SIN(OME(I)*T))	
	RETURN	
	FND	ala ana ang mang mang mang mang mang mang
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		n fra sayan da anan ang ang ang ang ang ang ang ang a
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· ••		angan anan santa gangan di dalaman dari 1,1 matan ana traditi da dalar tanahar di stran tadi 10,0 mm (1996, 10 m
		n nana akaran manan kar-kaanan mukakan mukakan turi akaran turi akaran turi karan dari kar karan daran karan kara

in and

8010	SUBROUTINE INVET(A,NR,NC, LOIM,DELT) O DIMENSION A(IDIM,IDIM),LAREL(50)		
80%r	DFLT=1.0 0 DO 21 J1=1.NR		anna an Carlon an Santainn an Santainn an Santainn an Santainn
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	T LABEL(J1)=J1		
8080	0 NO 291 J1=1,NR		4
101	1 TFMP=0.0		
F080	0 P0 121 J2=J1,NR		65
	IF(ABS(A(J2:J1):L):L): TEMP) 30 TO LCT	· · · · · · · · · · · · · · · · · · ·	· · · ·
	THMP=ABS(A(J2,J1))		
C110 404	A CONTINUE		
8150	$\frac{1}{0} - \frac{1}{1} $	······	
8140	0 DO 141 J2=1.NC		
8150	0 TEMP=A(J1.J2)		
8160	$B = A(J_1, J_2) = A(IB(G, J_2))$		
141	1 A(TBIG, J2)=TEMP	addi (doʻling aga addan yoʻrdoʻnda yoʻrdoʻnda yoʻrdoʻnda yoʻrdoʻnda yoʻrdoʻnda yoʻrdoʻnda yoʻrdoʻnda yoʻrdoʻnd	a na an an an an an an an an an
8180	0 I=LABEL(J1)		
8190	J LABEL(JI)=LAREL(IRIG)		
8200	J LABEL (IBIG)=1		
8210) DFLT==DELT		
201	1 TEMP=A(J1, J1)		
8240) DELT=DELT+A(J1,J1)		
8260			
CZ/U 501	コード() ととま しとうます()。 4 - みといた (クトームといた) (クトノギロドロ		
6000	1 ACUIJUEJ-ACUI, UEJ/ COP		
, 0290 , 8300	J = VI = Z C + J = Z + Z + J = Z + Z + Z + Z + Z + Z + Z + Z + Z + Z		
831	1 (F(J2,F(0,J1))))))))))))))))))))))))))))))))))))		La su destablished to be able of the pay out of the second second second second second second second second sec
8320	$A(J_2, J_1) = 0.0$		
8330	n no 241 13=1.NC		
241	$1 = A(J_2, J_3) = A(J_2, J_3) = TE^{1/1}P * A(J_1, J_3)$		
281	1 CONTINUE		
291	1 CONTINUE		
301	1 N1=NF=1		nan talihi kata katalah digata, situk ka k
8380	0 DO 391 J1=1. M1		
8390	0 00 321 J?= J1, NP		
8400	0 IF(LABEL(J2).NE.J1) GO TU 321		
8410	$U = \{F(JZ, FN, J1) (U = V) \} $		
6421	U BU ID 341		
<u>्र</u> ्ट्र	1 DO 361 13~1 NO		
9150	1 ΤΕΜΡΞΔΥΙΧ 11 1 ΤΕΜΡΞΔΥΙΧ 11		
8446	$\mathbf{A} = \mathbf{A} \left(\mathbf{A}^{T} + \mathbf{A}^{T} + \mathbf{A}^{T} + \mathbf{A}^{T} \right)$		
361	1 A(.1312)=TEMP		
8481	$1 = 1 \text{ ABEL}(J_2) = L \text{ ABEL}(J_1)$		
391	1 CONTINUE		9 9
5001	1 RETURN		
8510	0 FND		
**			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
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